

# LNT – Panikmache im wissenschaftlichen Gewand Atomangst – der lange Schatten eines Diktators



Zu den entscheidenden Befürchtungen, welche die Atomkraftgegner in der Bevölkerung ständig schüren, gehören die Angst vor Krebs sowie vor Erbschäden beim Nachwuchs. Das liegt auch daran, dass Infektionskrankheiten heute ihren Schrecken weitgehend verloren haben. Sie sind einerseits zumeist recht gut heilbar und man kann Ansteckungsgefahren durch Hygiene, gesunde Lebensweise und die Vermeidung bestimmter Risiken deutlich verringern. Für Krebs trifft dies jedoch nur eingeschränkt zu. Krebs ist ein heimtückisches und oft tödliches Leiden, das meist ohne Vorwarnung zuschlägt und oft nicht oder nur mit begrenztem Erfolg behandelbar ist. Indem die Gegner der Kernkraft im Bewusstsein der Bevölkerung Radioaktivität zur wesentlichen Ursache von Krebsgefahren hochstilisieren, haben sie leichtes Spiel damit, die auf diese Art ausgelösten Urängste für ihre Zwecke zu instrumentalisieren. Dazu trägt auch bei, dass die meisten Menschen die entsprechenden Zusammenhänge nur unvollständig kennen. Zumeist ist lediglich bekannt, dass Krebs durch eine genetische Entartung körpereigenen Gewebes entsteht, die ihre Ursache in einer Schädigung des Erbguts einer vorher gesunden Körperzelle hat. Da radioaktive Strahlen solche Schäden herbeiführen können und – rein vom Prinzip her – schon ein einziges Strahlungsquant ausreichen kann, um Krebs auszulösen, glauben die meisten Zeitgenossen, dass man Krebsrisiken am besten dadurch minimiert, indem man das Auftreten von radioaktiver Strahlung im eigenen Umfeld möglichst auf null reduziert. Also, so die scheinbar logische Überlegung, braucht man nur alles, was Kernkraft, Endlager etc. angeht, weit genug vom eigenen Umfeld zu verbannen, um beruhigt und sicher leben zu können.



**Bild 1.** Kernkraftwerke werden von den meisten Menschen als Bedrohung ihrer Gesundheit empfunden (Symbolbild)

## **Eine der größten radioaktiven Gefahren sind wir selbst**

**Dabei ist dies ein Trugschluss, denn eine der gefährlichsten Strahlungsquellen, denen die Mehrheit von uns überhaupt ausgesetzt ist, ist unser eigener Körper. Niemand kann uns vor den rund 7.000 bis über 9000 Becquerel schützen, mit denen der durchschnittliche Europäer belastet ist [BECQ]. Anders ausgedrückt stecken in unserem eigenen Körper so viele radioaktive Elemente, dass in jeder**

**Sekunde bis zu 9.000 Atomkerne zerfallen und dabei radioaktive Strahlung freisetzen. Noch dazu hat gerade diese Strahlung das – aus medizinischer Sicht – höchste Gefährdungspotenzial, weil sie direkt innerhalb unserer Körperzellen und ihres genetischen Materials wirkt. Hier verursacht selbst die außerhalb des Körpers eher harmlosen Alpha- und Beta-Strahlung unweigerlich massive Schäden. Dieses ständige Bombardement unserer Zellen lässt sich weder verhindern noch wesentlich verringern, weil wir die entsprechenden Elemente über unsere Nahrung zwangsläufig Tag für Tag aufnehmen [APFE]. Selbst Babys erhalten bereits mit der Muttermilch sowie über Babynahrung ihre tägliche Dosis Radioaktivität [BAB1, BAB2]. Unsere ganze Umgebung, Erde, Steine und sogar die Luft strahlen und versorgen uns ständig mit radioaktiven Elementen, die unser Körper als natürliche Bestandteile des**

Nahrungskreislaufs einstuft und in den Zellen einbaut. Das reicht vom Kalium  $^{40}\text{K}$  über das radioaktive Kohlenstoffisotop  $^{14}\text{C}$ , das wir mit jedem Bissen Nahrung zu uns nehmen, über Uran und Thorium bis zum Edelgas Radon, das vom Erdboden aus ständig in unsere Gebäude einsickert und eingeatmet wird. In manchen Regionen Deutschlands liegt die natürliche Radioaktivität der Umgebung sogar viermal höher als der zulässige Grenzwert für Mitarbeiter in kerntechnischen Anlagen [HUET]. In anderen Weltgegenden ist die Belastung sogar noch viel höher, so in der iranischen Stadt Ramsar, wo bis zu 260 mSv/ Jahr erreicht werden. Weitere Strahlungsquellen sind das Hautkrebs auslösende UV-Licht der Sonne sowie kosmische Strahlung aus dem Weltall.

# **Kampferprobtes Erbgut**

**Allerdings ist die  
Vorstellung, dass  
die Chromosomen in  
unseren Zellen  
weitgehend vor  
Beschädigungen  
geschützt seien und  
höchstens ab und zu  
mal durch einen  
verirrten**

**Strahlungsimpuls  
beschädigt würden,  
ebenso verbreitet  
wie völlig falsch.  
Unser Erbgut – die  
DNA-Doppelspiralen,  
welche die gesamten  
Baupläne unseres  
Körpers enthalten –  
liegt nicht etwa  
gut geschützt in  
einer Art Tresor,**

**sondern muss einen ununterbrochenen Dauerkrieg um seine Erhaltung führen. In unseren Zellen werden die DNA-Stränge ständig chemisch aufgespalten, in Teilbereichen kopiert und wieder zusammengefügt, da**

**sie die Baupläne  
und  
Betriebsanleitungen  
für nahezu alle in  
der Zelle  
ablaufenden  
Vorgänge enthalten.  
Was da abläuft,  
gleichet einer  
Hochleistungs-  
Chemiefabrik in  
aggressiver**



**Umgebung. Auch die  
Schädigungsrate  
durch die  
natürliche  
Hintergrundstrahlung  
kann man heute  
recht genau  
bestimmen. Sie  
liegt bei ungefähr  
0,005 DNA-Fehlern  
pro Zelle und Tag.  
Andersherum**

**ausgedrückt wird  
jede einzelne Zelle  
unseres Körpers  
alle 200 Tage durch  
die natürliche  
Radioaktivität  
nachhaltig  
geschädigt. Dabei  
ist Radioaktivität  
nur ein Randaspekt  
verglichen mit  
anderen, viel**

**größeren Gefahren,  
denen die  
Chromosomen ständig  
ausgesetzt sind.  
Eine wichtige Rolle  
spielen kleinere  
oder größere  
Fehlfunktionen in  
den unglaublich  
komplexen  
chemischen  
Reaktionen, die in**

**der Zelle ständig  
ablaufen. Hinzu  
kommen Attacken  
durch Viren,  
Bakterien, Gifte  
oder auch  
Temperatureinflüsse  
. Die Zahl der  
Chromosomenfehler,  
die hierbei täglich  
auftreten, geht in  
die Milliarden – in**

**jeder einzelnen  
Zelle, wohlgemerkt  
[HUMP]. Wenn also  
schon ein einzelner  
Fehler  
unausweichlich  
Krebs auslösen  
würde, wäre längst  
jedes Leben  
ausgestorben. Von  
Anbeginn seiner  
Entwicklung an**

**musste sich das  
Leben diesen  
Bedingungen stellen  
und ist deshalb  
durchaus  
kämpferprobt.  
Lebendes Gewebe  
verfügt hierfür  
über ausgeklügelte  
Anpassungs- sowie  
Reparaturmechanismen.  
Selbst große**

**Schäden wie DNA-Doppelbrüche sind nur in einem von 500 Fällen nicht reparierbar, und auch für solche Vorkommnisse hält die Natur Notbremsen wie das Eiweiß p53 bereit. Seine primäre Aufgabe ist die**

**Hilfe bei der  
Reparatur defekter  
Zellen. Ist der  
Schaden jedoch zu  
groß, schickt p53  
die betroffene  
Zelle ohne  
Umschweife in den  
Tod [ZELL]. Über 99  
% der irreparabel  
mutierten Zellen  
sterben daher durch**



**Selbstvernichtung  
ab und werden durch  
gesunde  
Nachbarzellen  
ersetzt. Vor diesem  
Hintergrund ist es  
leicht einzusehen,  
warum die Frage, ob  
ein einzelnes  
Strahlungsquant aus  
einer externen  
Quelle in einer**

**Zelle einen Treffer erzielt hat oder nicht, für die realistische Beurteilung von Krebsgefahren kaum von Bedeutung ist.**

**Das Zusammenspiel von Schädigung durch radioaktive Strahlung und den eingebauten**

**Selbstheilungskräfte  
en der Biologie  
erklärt auch, warum  
eine einmalige  
Exposition mit  
einer extremen  
Überdosis zum Tode  
führt: Die in  
kurzer Zeit  
auftretenden  
Schäden sind so  
massiv, dass die**

**Selbstheilungskräfte  
überfordert sind  
und das Gewebe  
abstirbt. Darunter  
gibt es einen  
Dosisbereich, in  
dem der Organismus  
zwar überlebt, der  
Umfang schwererer  
Chromosomenschäden  
jedoch immer noch  
so hoch liegt, dass**

**auch hier die  
Selbstheilung nur  
teilweise  
funktioniert.  
Deshalb erkrankt  
ein bestimmter  
Prozentsatz dieser  
Überlebenden später  
an Krebs. Diese  
Zusammenhänge sind  
gut untersucht und  
statistisch**

**gesichert.**

**LNT – die  
Angst vor  
kleinsten**

**Strahlungsmengen**

**Mit**

**diesem**

**Hintergru**

**ndwissen**

**kann man**

**die**

**sogenannt**

**e LNT-**

**Theorie**



**in**

**gewisser**

**Weise mit**

**Gedankenm**

**odelen**

**vergleich**

**en, wie  
sie  
beispiels  
weise in  
der  
Homöopath**

**ie**

**Anwendung**

**finden.**

**Ausgangsp**

**unkt sind**

**in beiden**

**Fällen**

**nachgewie**

**sene**

**Zusammenh**

**änge bei**

**hohen**

**Dosierung  
en. Beide  
Lehren  
gehen von  
der  
Annahme**

**aus , dass**

**diese**

**Zusammenh**

**änge**

**linear**

**bis herab**

**zu  
kleinsten  
Mengen  
herunter  
gelten  
würden .**

**Die  
Homöopath  
ie  
betreibt  
die als  
„Potenzie**



**rung“  
bezeichnete  
Verdünnun  
g der  
Wirkstoff**

e so  
extrem,  
dass die  
Ausgangss  
toffe im  
Heilmittte

**↳ nicht**

**mehr**

**nachweisb**

**ar sind.**

**Bei der**

**LNT -**

**Methode  
(LNT=Linear  
ar No  
Threshold  
) wird  
behauptet**

**, dass  
die von  
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Strahlung  
sdosen  
her**

**bekanntesten  
Zusammenh  
änge  
selbst  
dann  
gelten,**

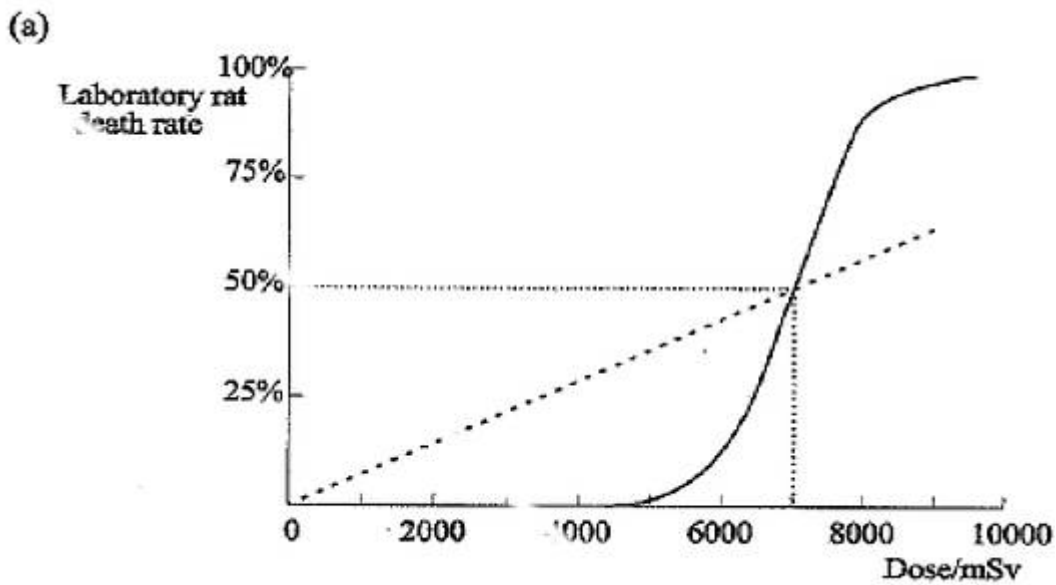
wenn die  
Menge der  
radioakti  
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Substanz  
so gering

**ist, dass  
ihre  
Strahlung  
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**und rausch  
en“ der  
natürlich  
en  
Strahlung  
völlig**

# untergehe n.



**Bild 2.  
Experimente an  
Laborratten  
en  
zeigten,**

**dass die  
Sterberat  
en bei  
Bestrahlung  
mit  
geringere**

**n Dosen  
wesentlich  
h  
schneller  
zurückgin  
gen als**

nach der  
LNT-  
Hypothese  
(gestrichelte  
Linie) zu

**erwarten**

**[HUET]**

**Die**

**Nuklearme**

**dizin hat**

**jedoch**

**bereits**

**in**

**zahlreich**

**en**

**Untersuch**



**ungen**

**bewiesen,**

**dass**

**diese**

**Annahme**

**nicht**

**stimmt.**

**Wenn der  
Körper in  
gewissen  
Abständen  
vergleicht**

**sweise**

**geringen**

**Mengen**

**radioakti**

**ver**

**Bestrahlung**

**ng**

**ausgesetz**

**t ist,**

**dann kann**

**die Natur**

**damit**

**umgehen .**

**Ei**ngehend

**e**

**Untersuch**

**ungen**

**zei**gen

**sogar,  
dass  
solche  
geringen  
Bestrahlu  
ngen eine**

**Art**

**Abhärtung**

**seffekt**

**bewirken,**

**der**

**Hormesis**

**genannt  
wird**

**[HORM].**

**Dies ist**

**die**

**Erklärung**



**dafür,  
warum  
Menschen  
mit  
wiederkeh  
renden**

**geringen  
Strahlung  
expositionen –  
z.B.  
Mitarbeit**

**er**

**kerntechn**

**ischer**

**Anlagen –**

**im**

**statistis**

**chen**

**Mittel**

**sogar**

**weniger**

**häufig an**

**Krebs**

**erkranken**

**als**

**Vergleich**

**sgruppen.**

**Somit**

**steht die**

**LNT -**

**Methode**

**klar im**

**Widerspru**

**ch zu den**

**Erkenntni  
ssen der  
modernen  
Nuklearme  
dizin.  
Diese**

**Zusammenh  
änge  
wurden  
durch  
umfassend  
e Studien**



**bestätigt**

**[GEGN,**

**LNT1,**

**LNT2].**

**Die LNT-**

**Anhänger**

**schätzen**

**diese**

**Theorie**

**jedoch**

**gerade**

**deshalb,**

**weil man**

**damit so**

**schön**

**einfach**

**rechnen**

**kann. Vor**

**allen**

**jedoch**

**eignet**

**sie sich**

**hervorrag**

**end**

**dafür,  
Strahlung  
selbst  
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geringste  
n Dosen**

**als**

**gefährlic**

**h**

**darzuste**

**len und**

**somit**

**Ängste zu  
schüren.**

**Deshalb**

**gehört**

**diese**

**Methode**

**zum**

**bevorzugt**

**en**

**Rüstzeug**

**von**

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**Stellen,**

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**teurere  
Schutzmaß  
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oder die  
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**ie gleich**

**ganz zu**

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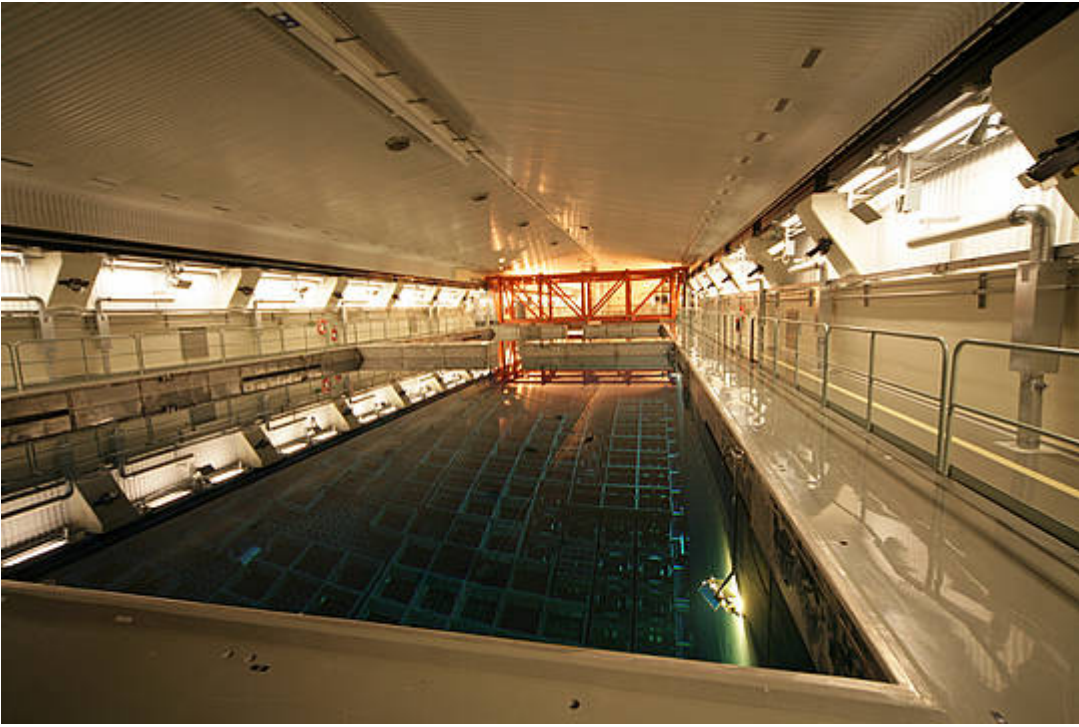
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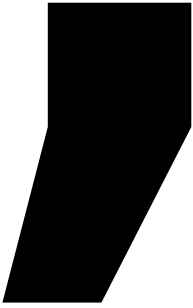
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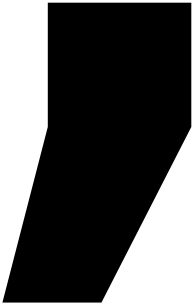
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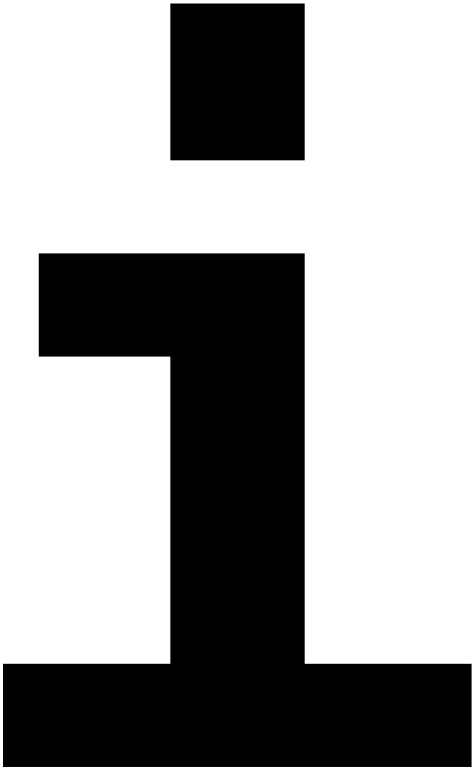
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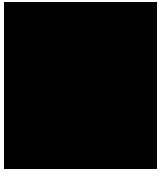


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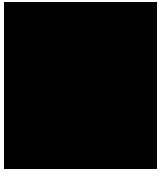


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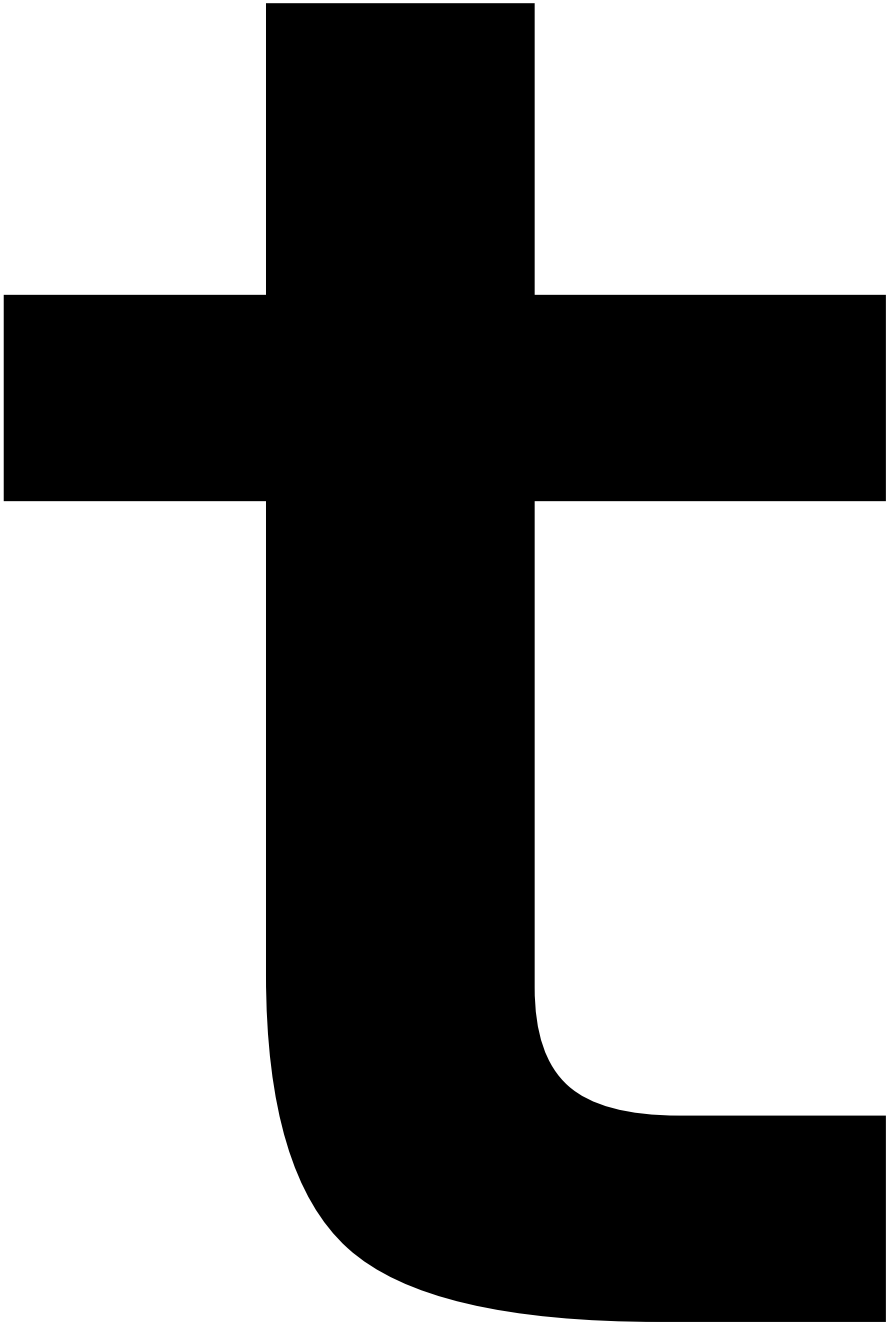
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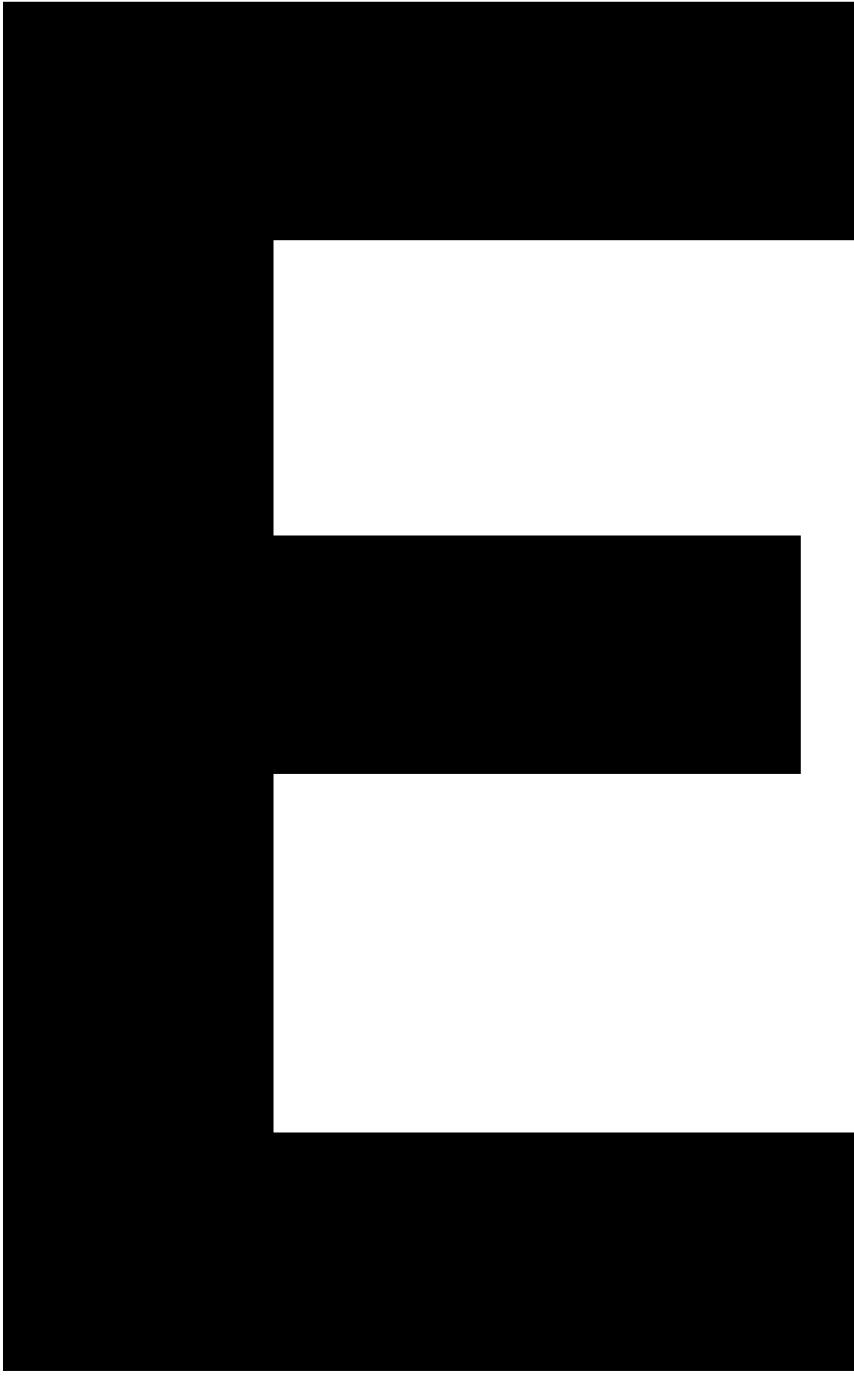
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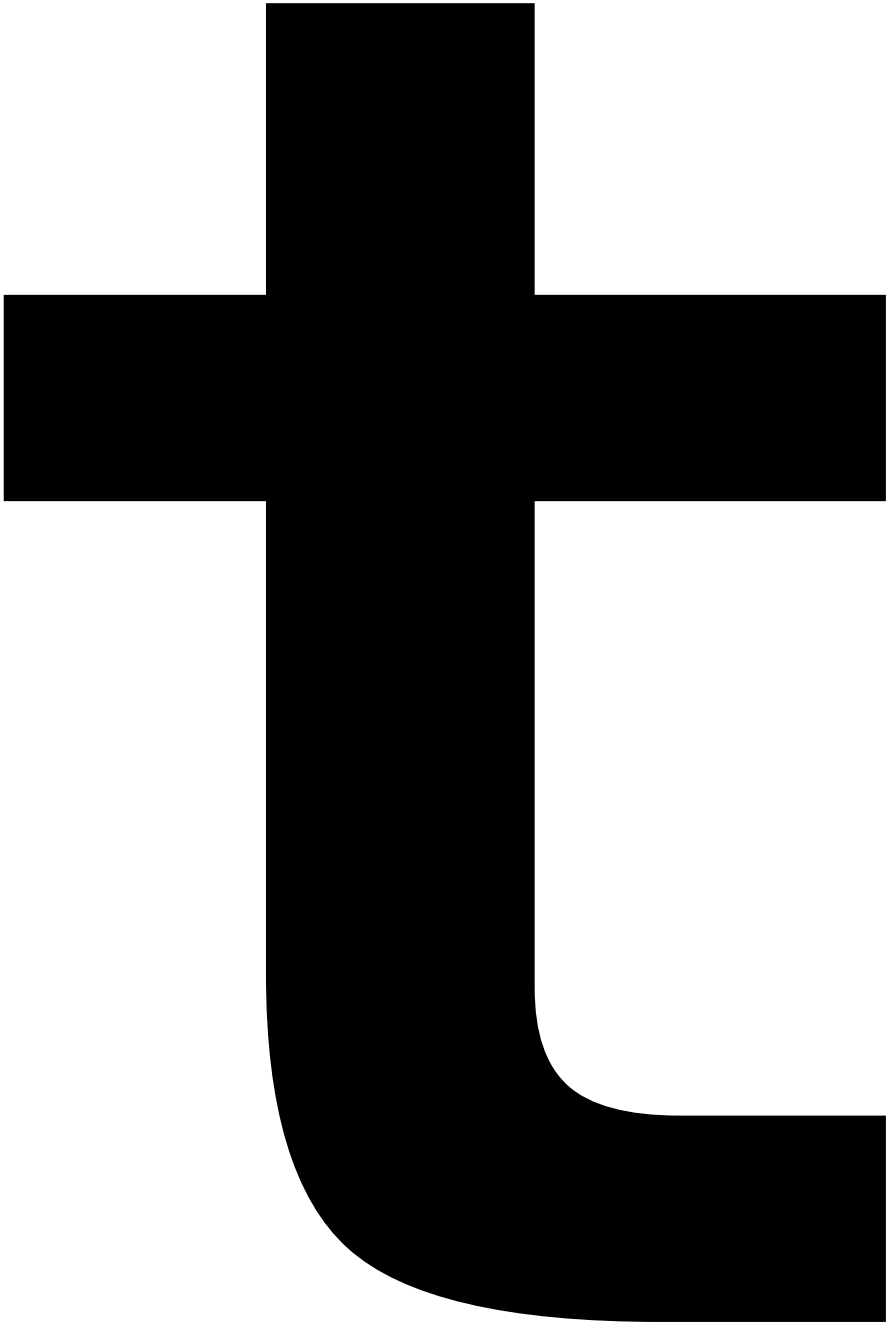






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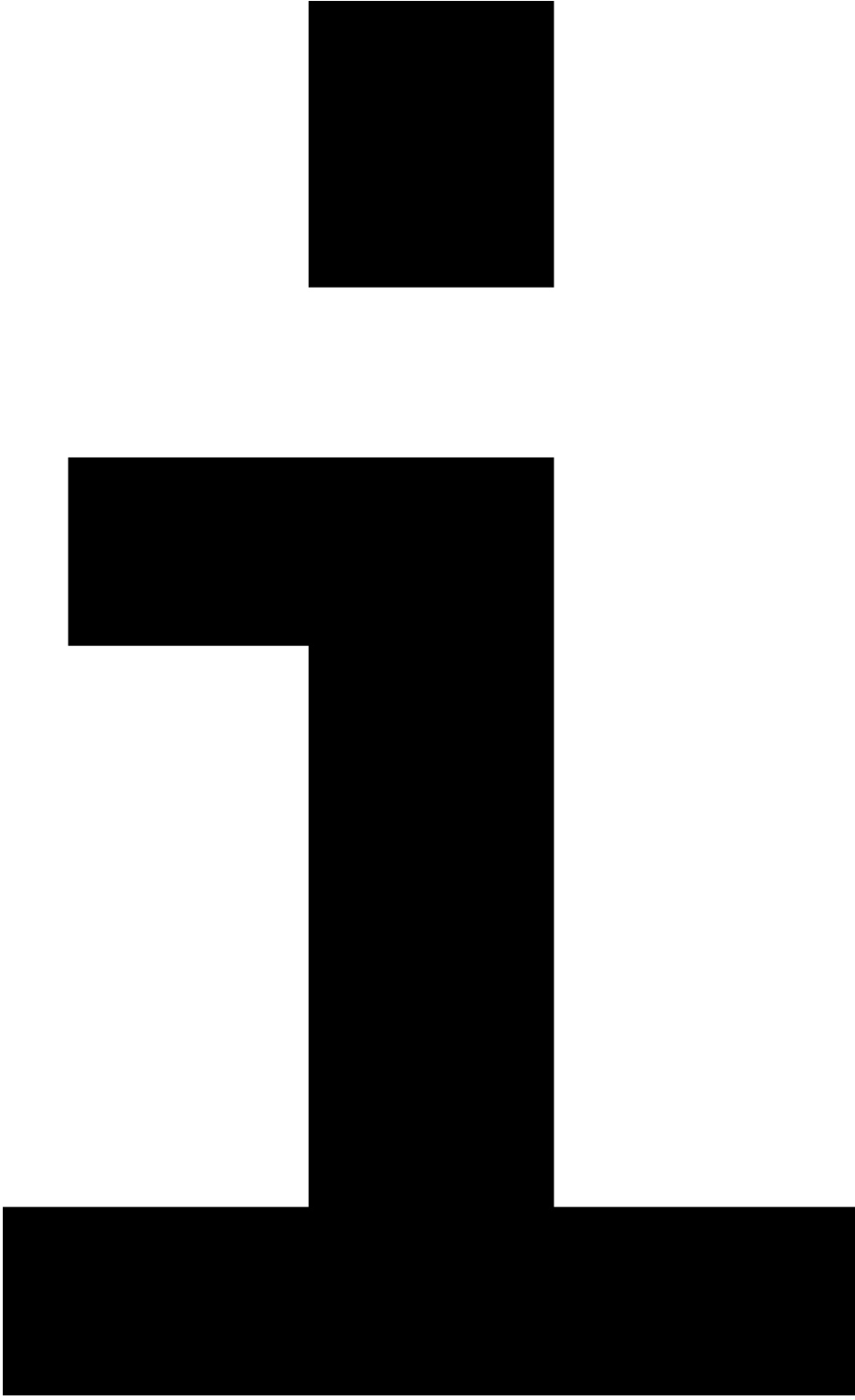
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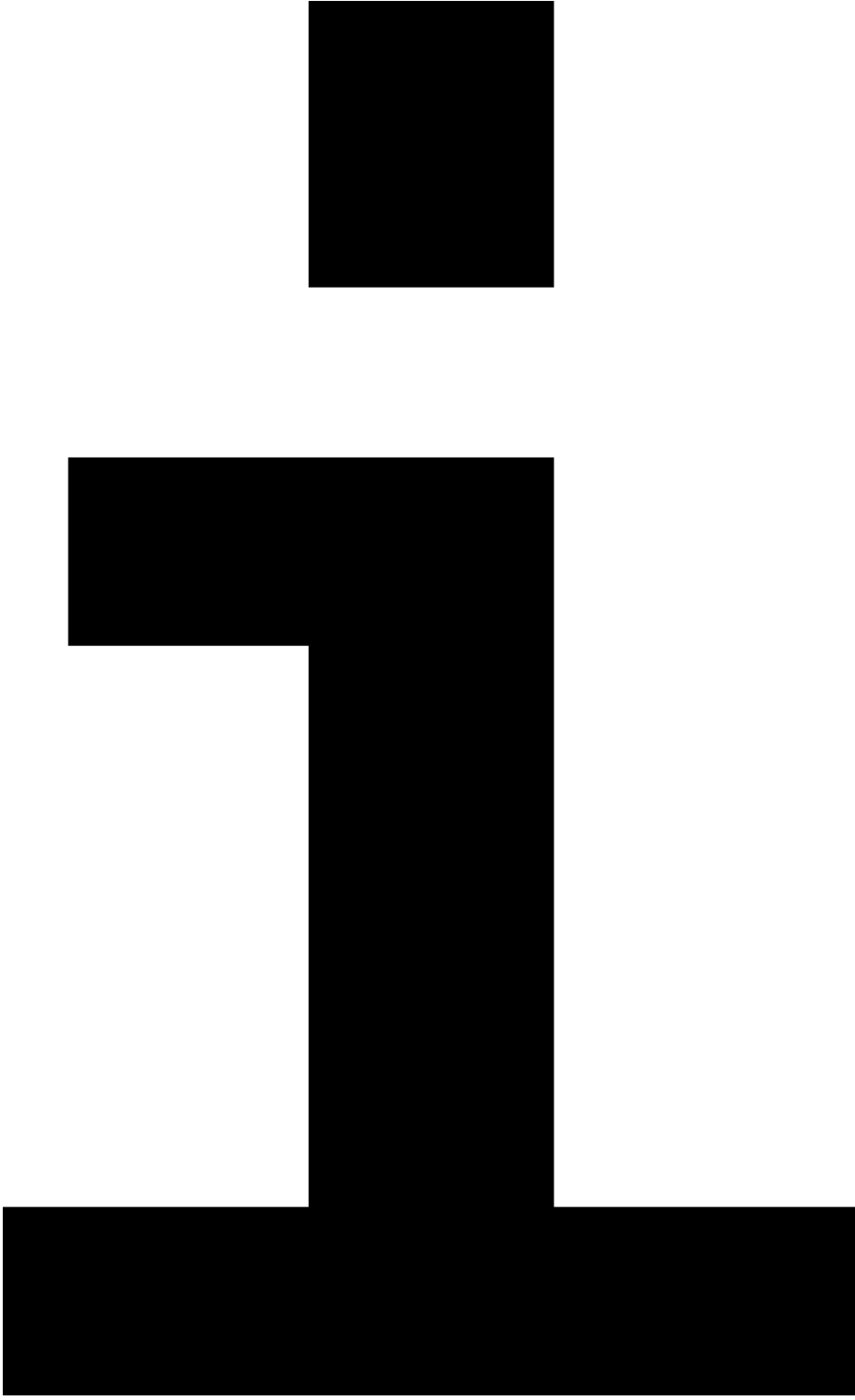


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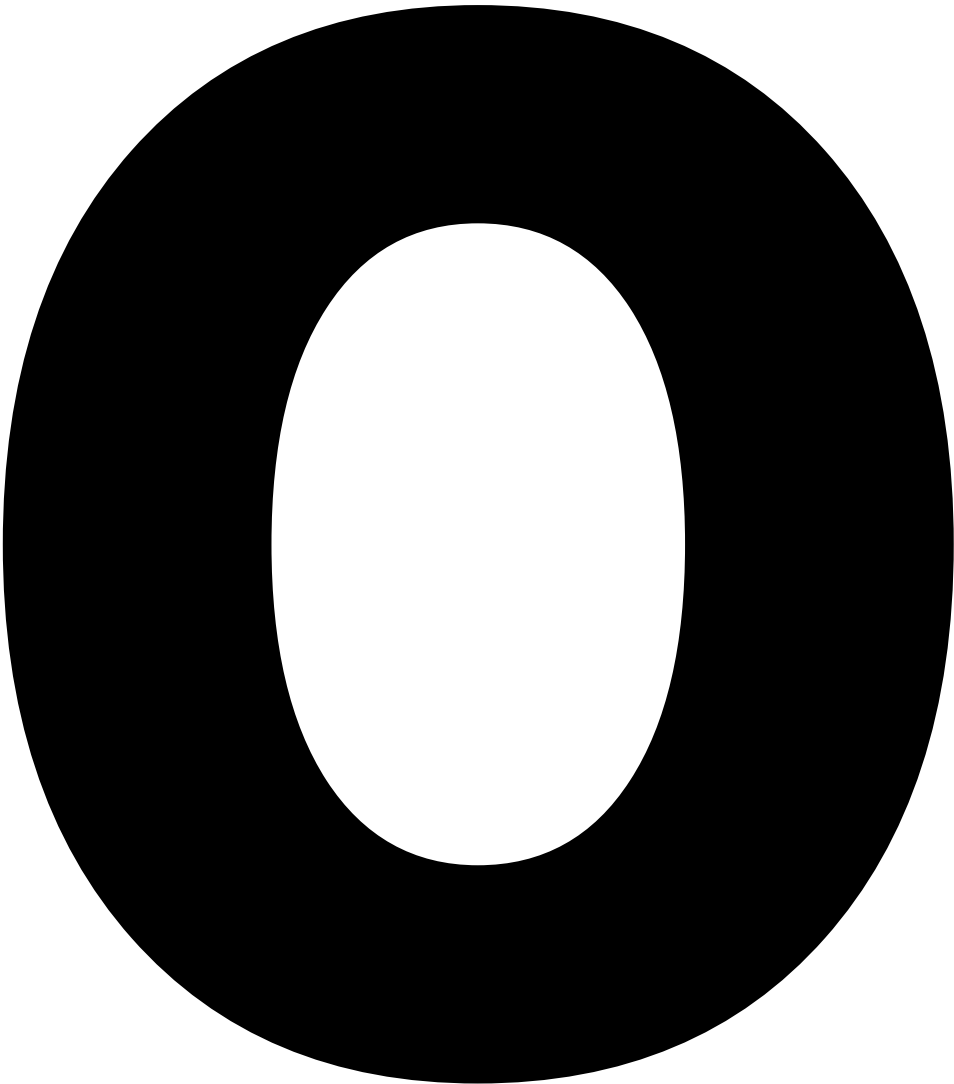


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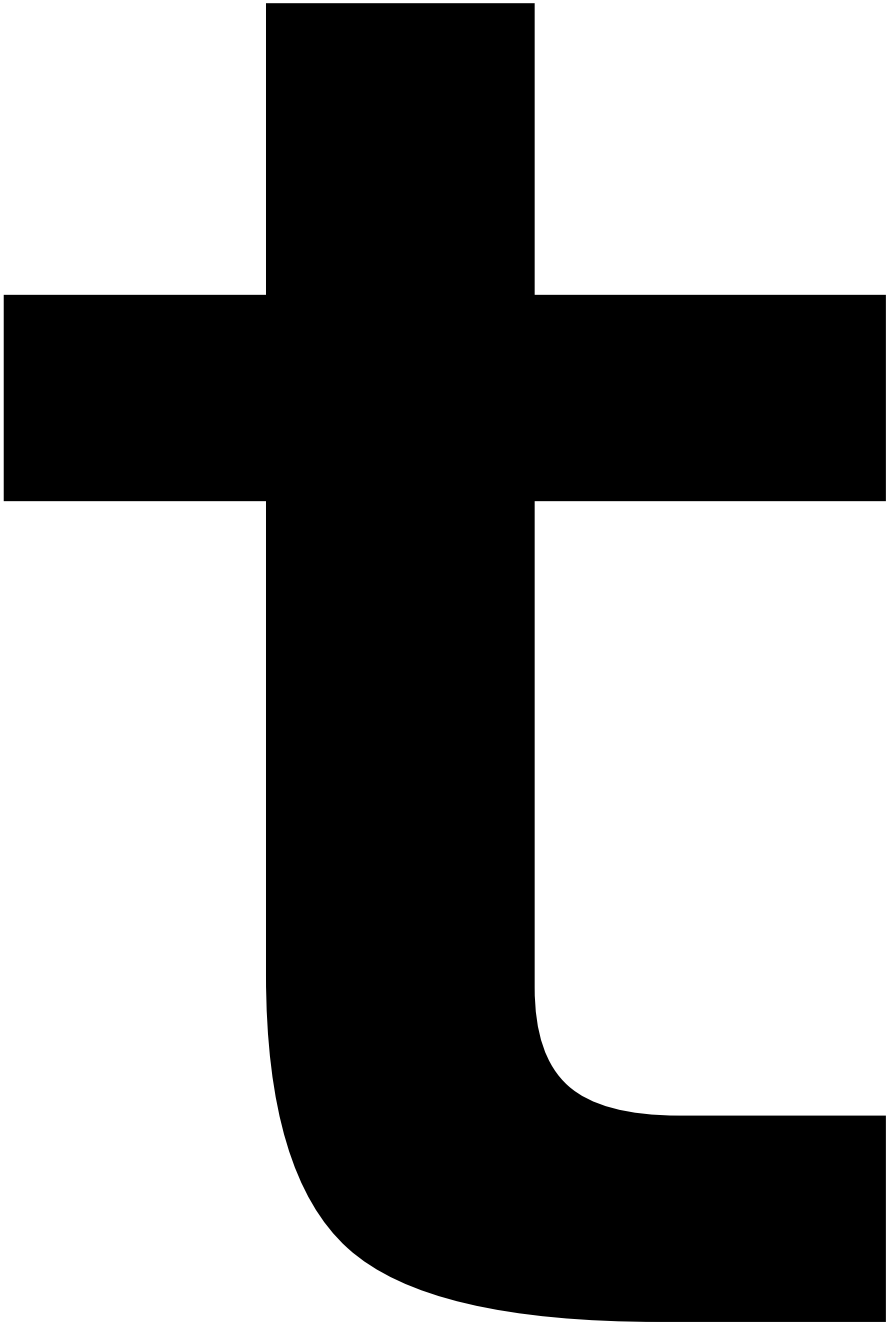
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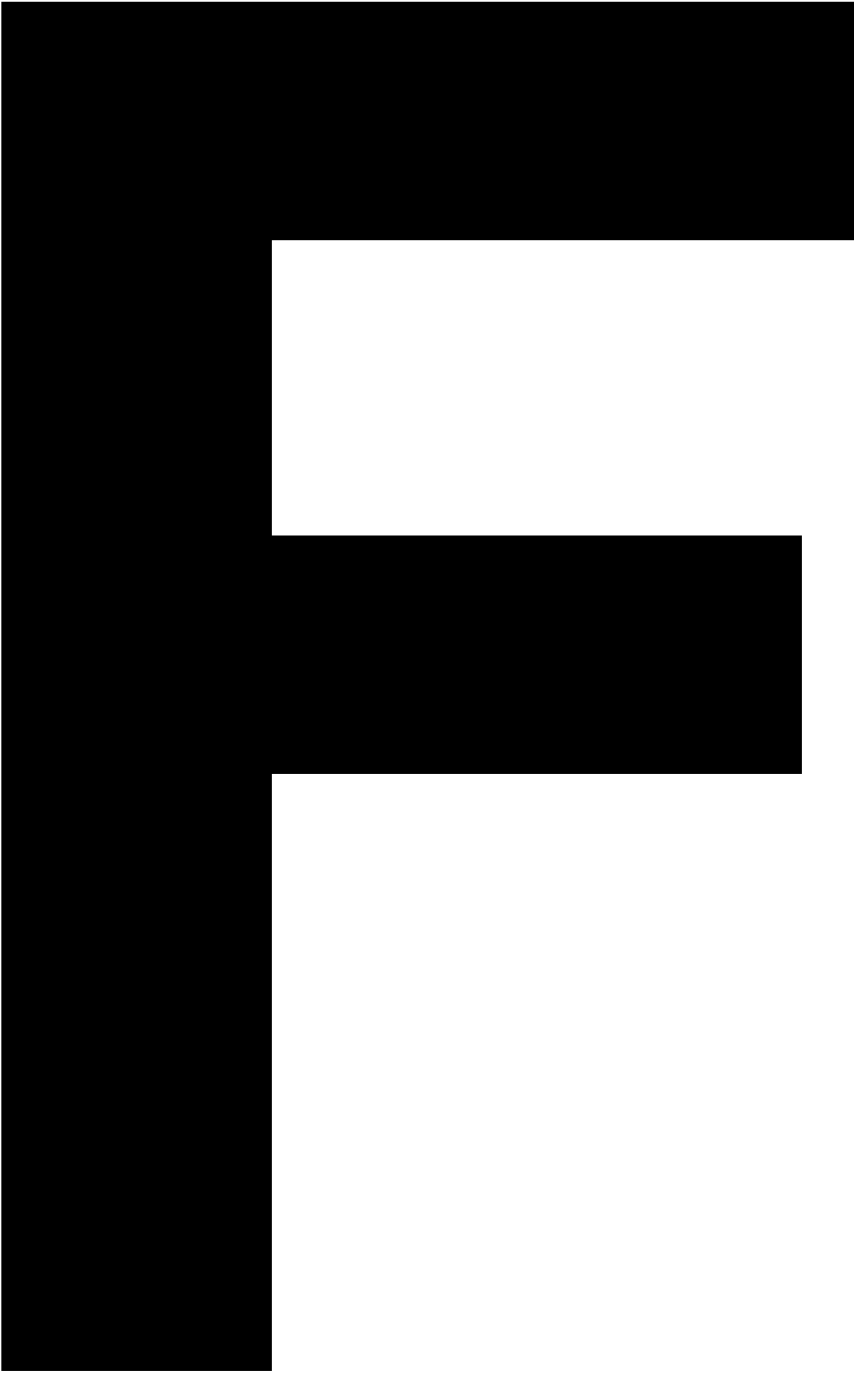
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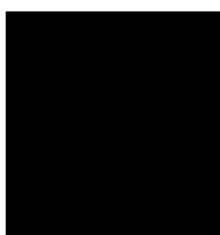
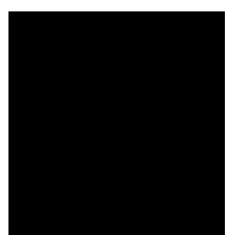
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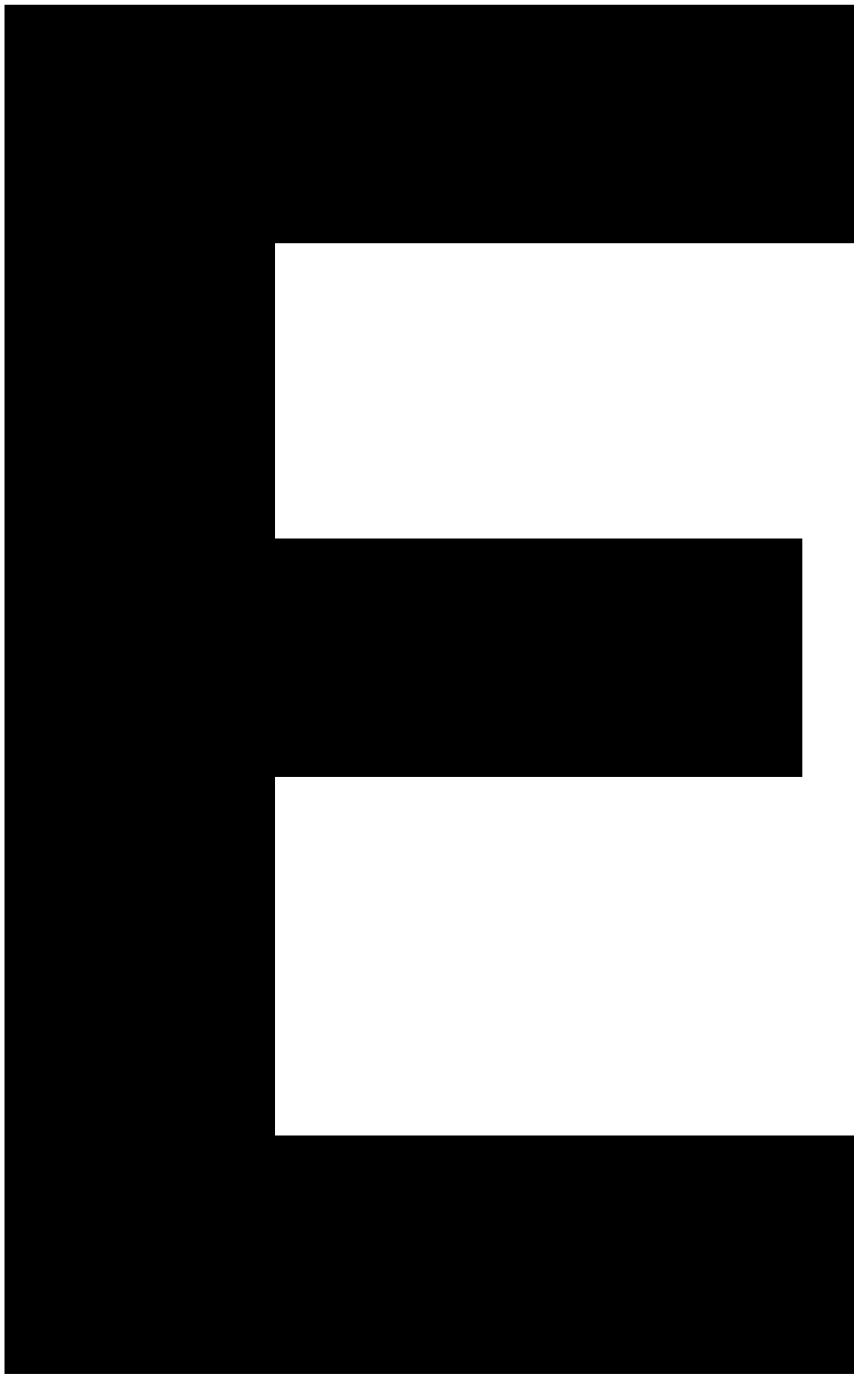


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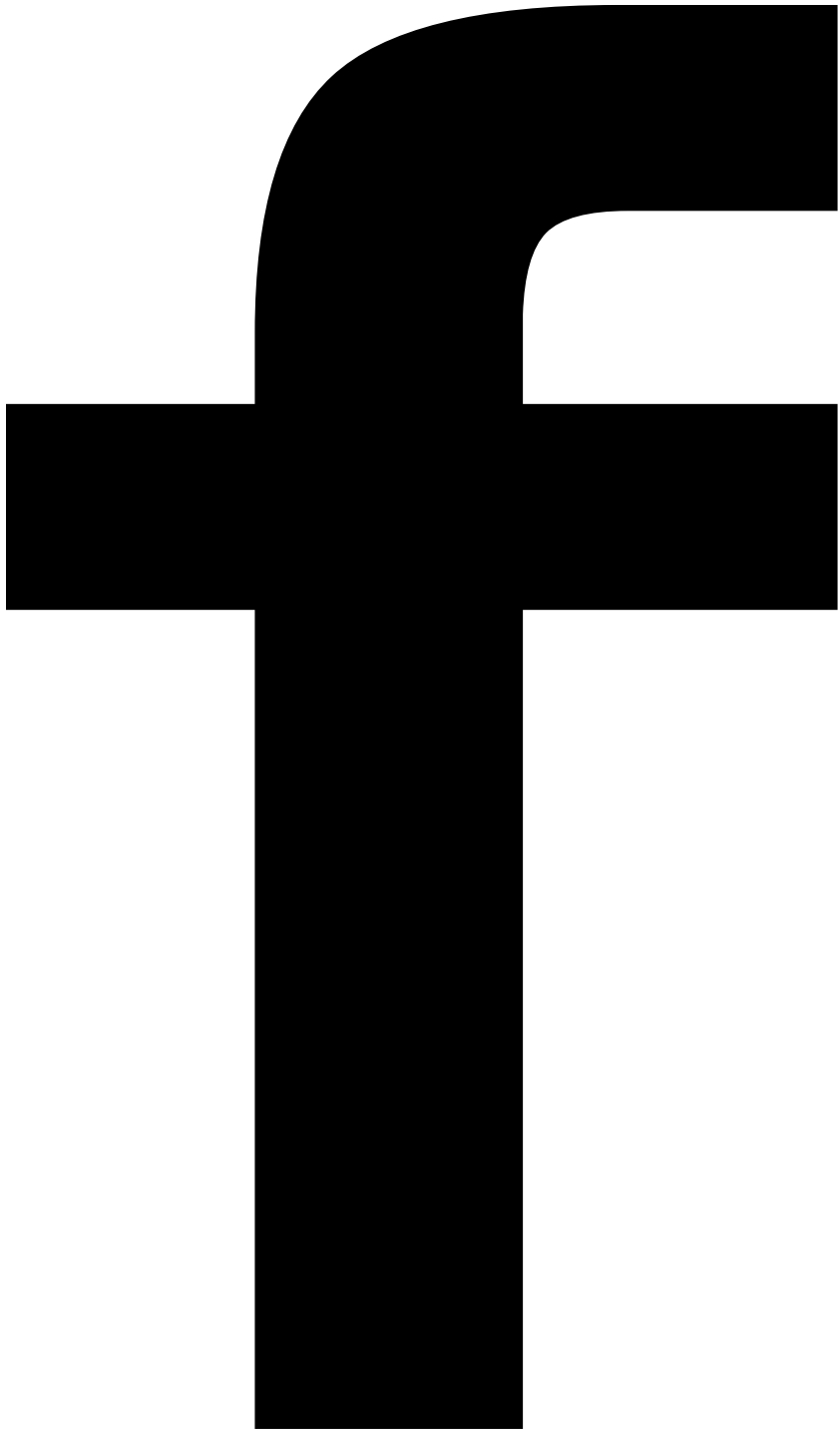
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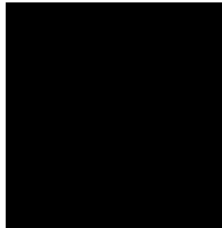
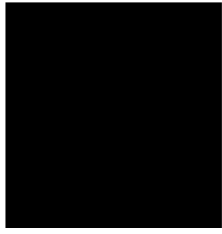


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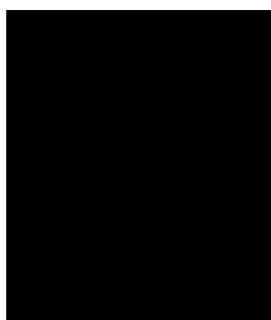






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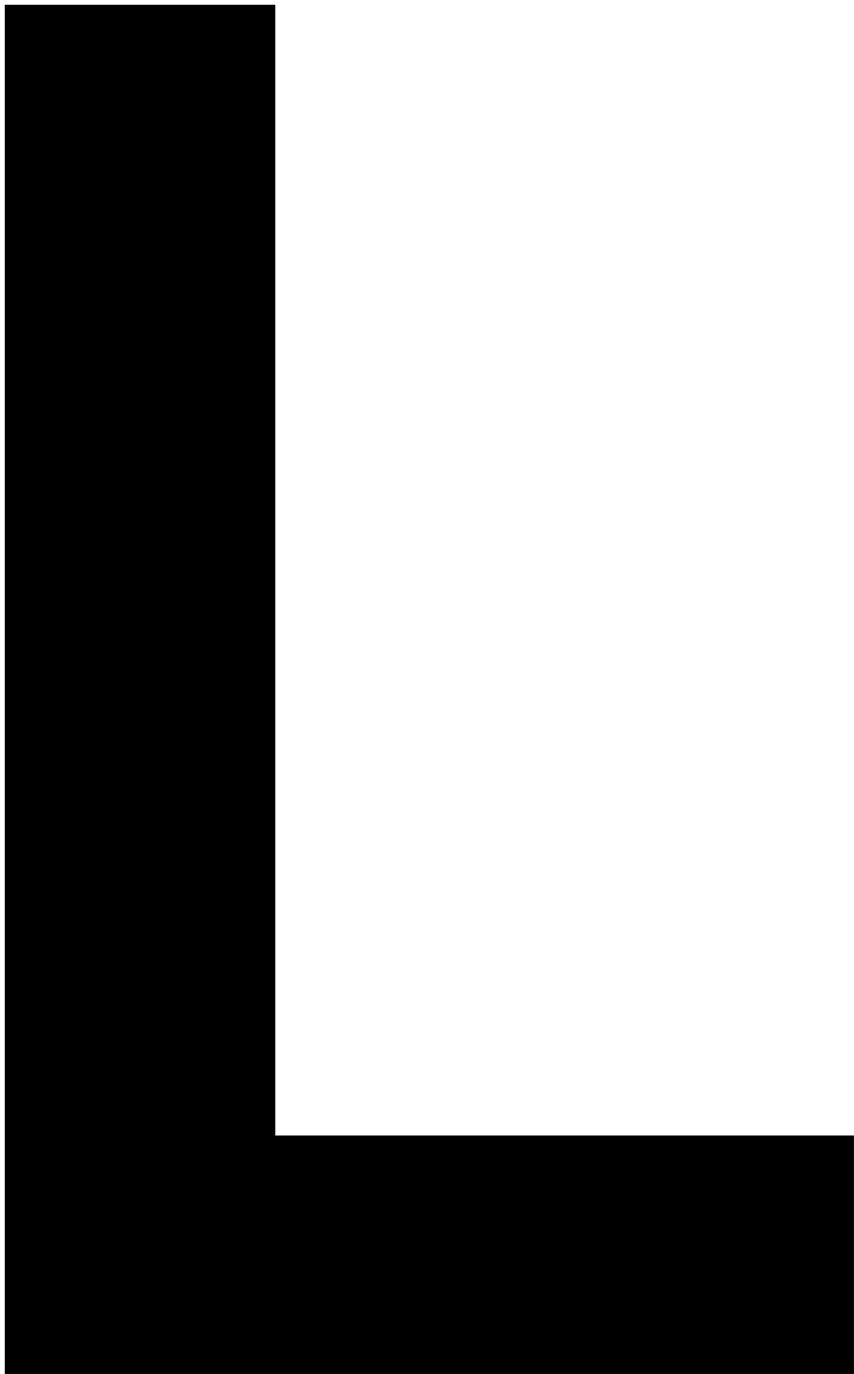


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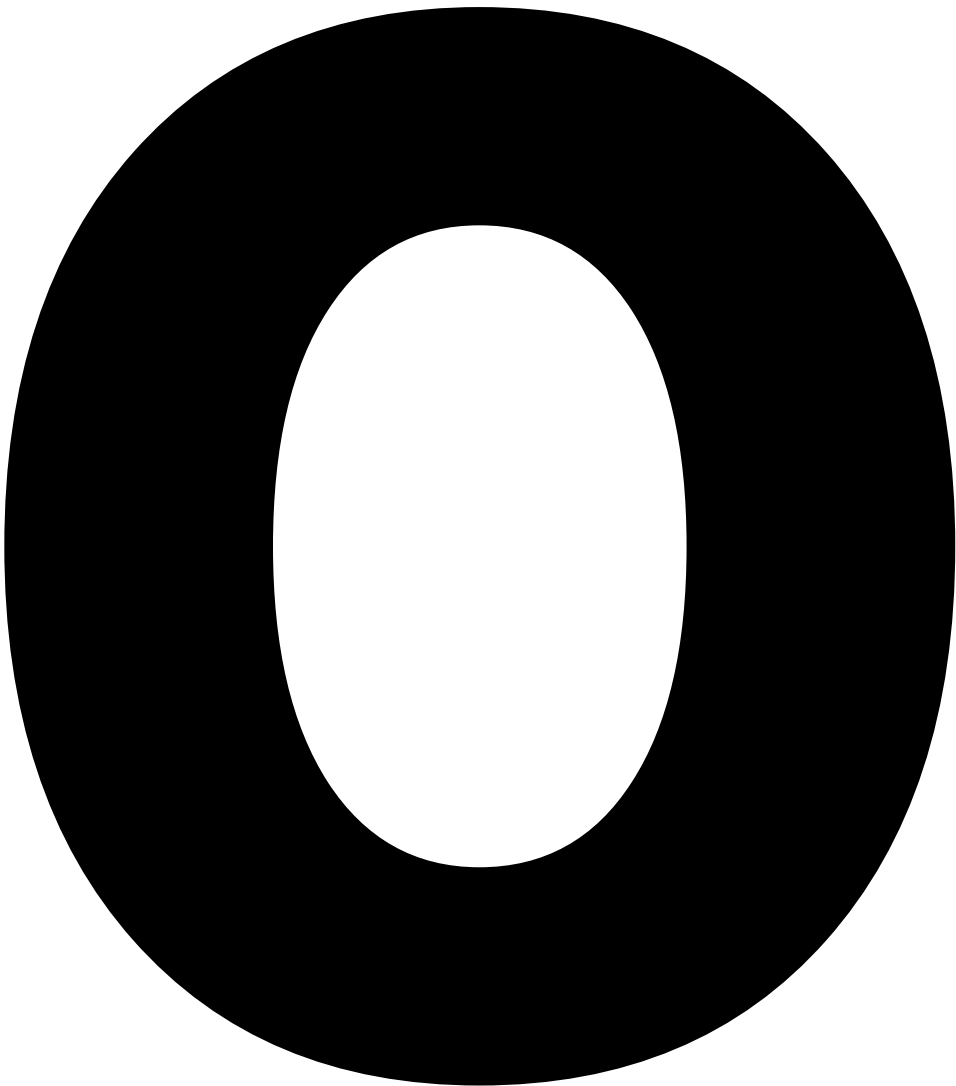
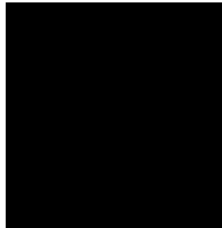
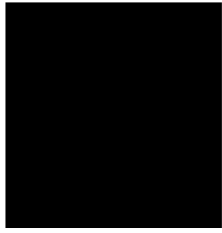


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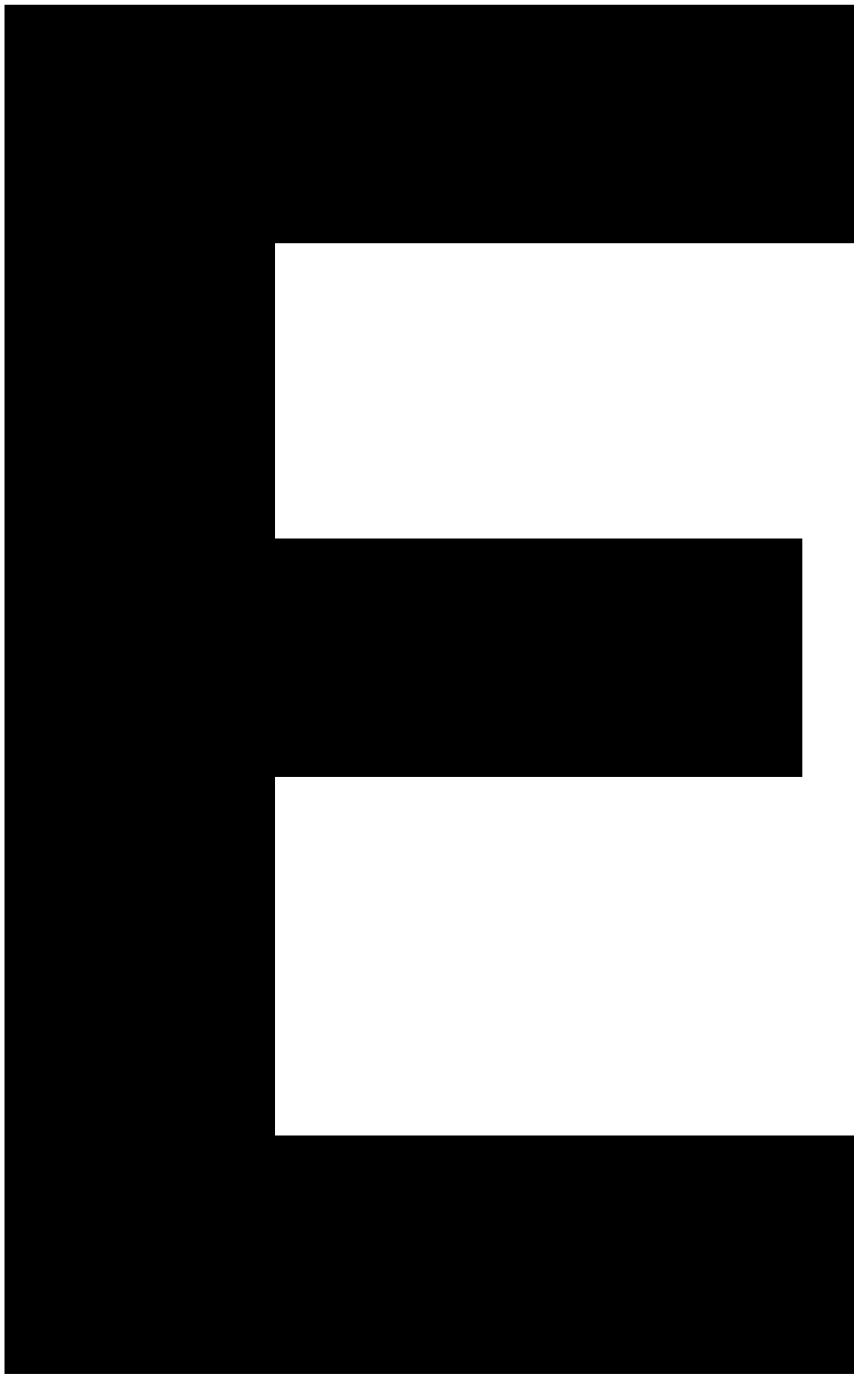


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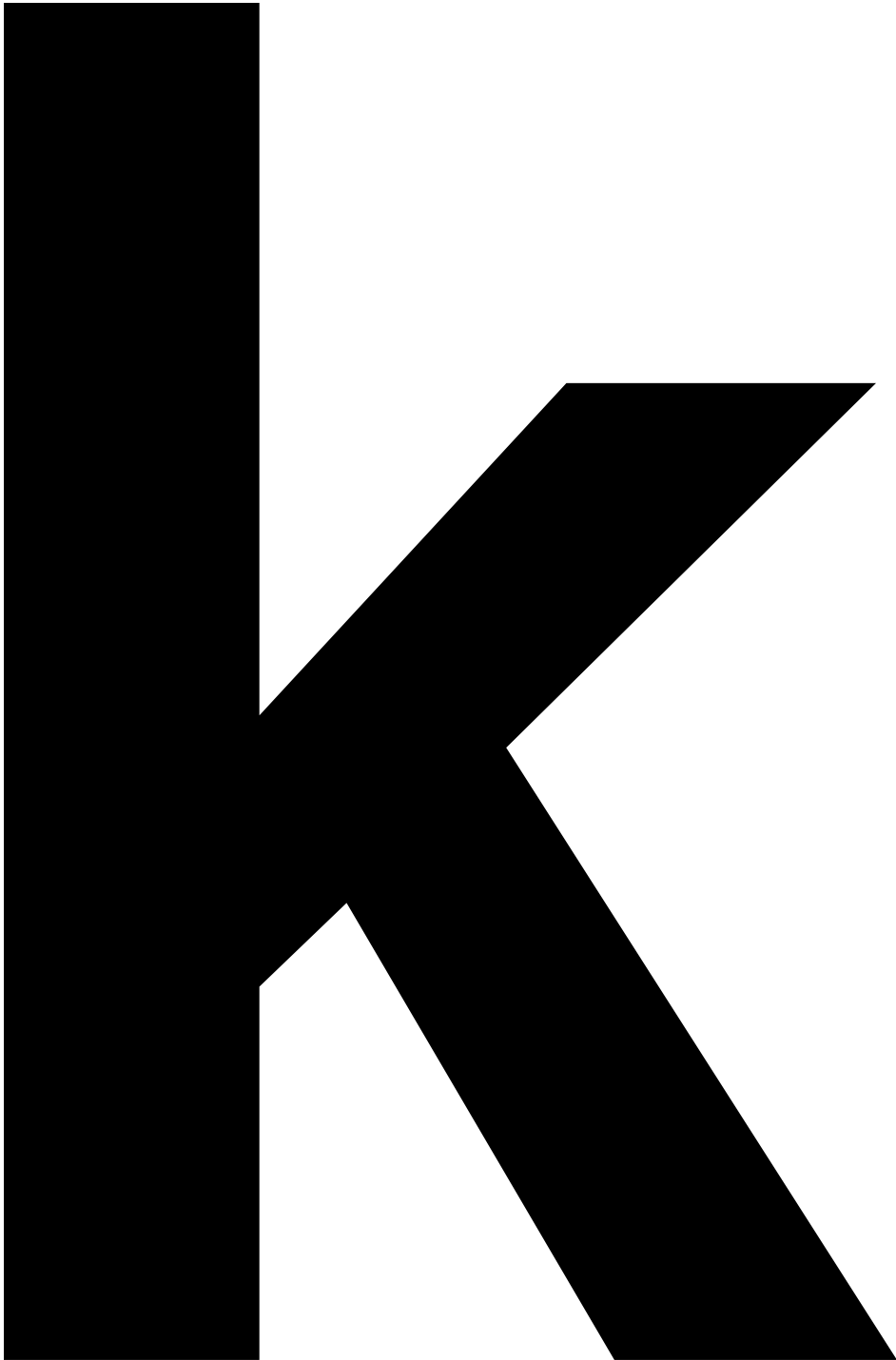
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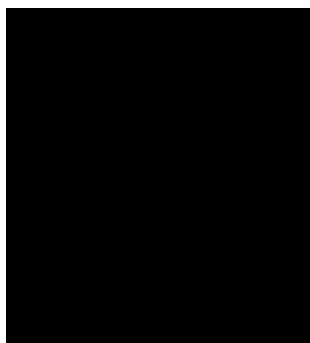


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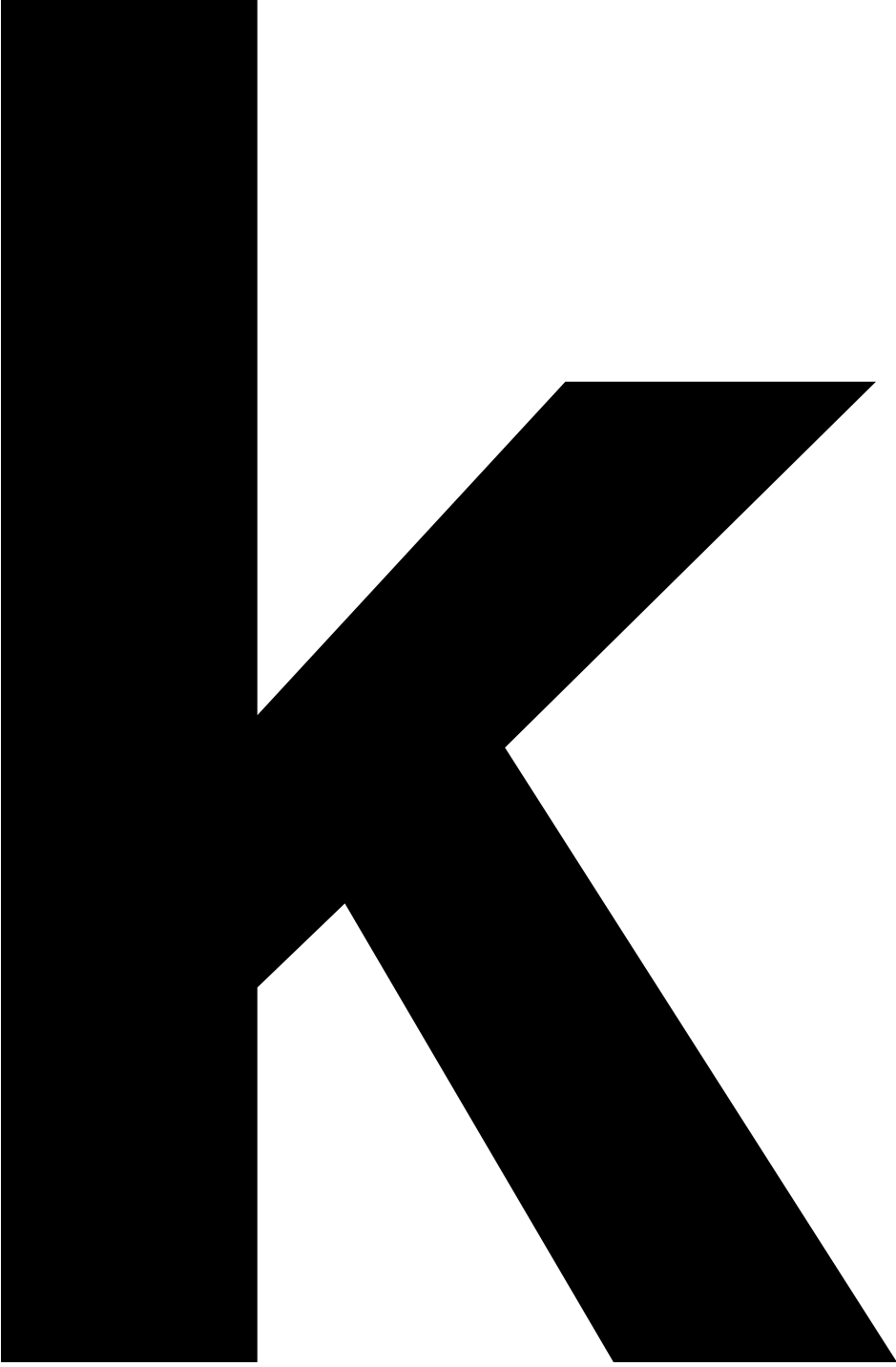
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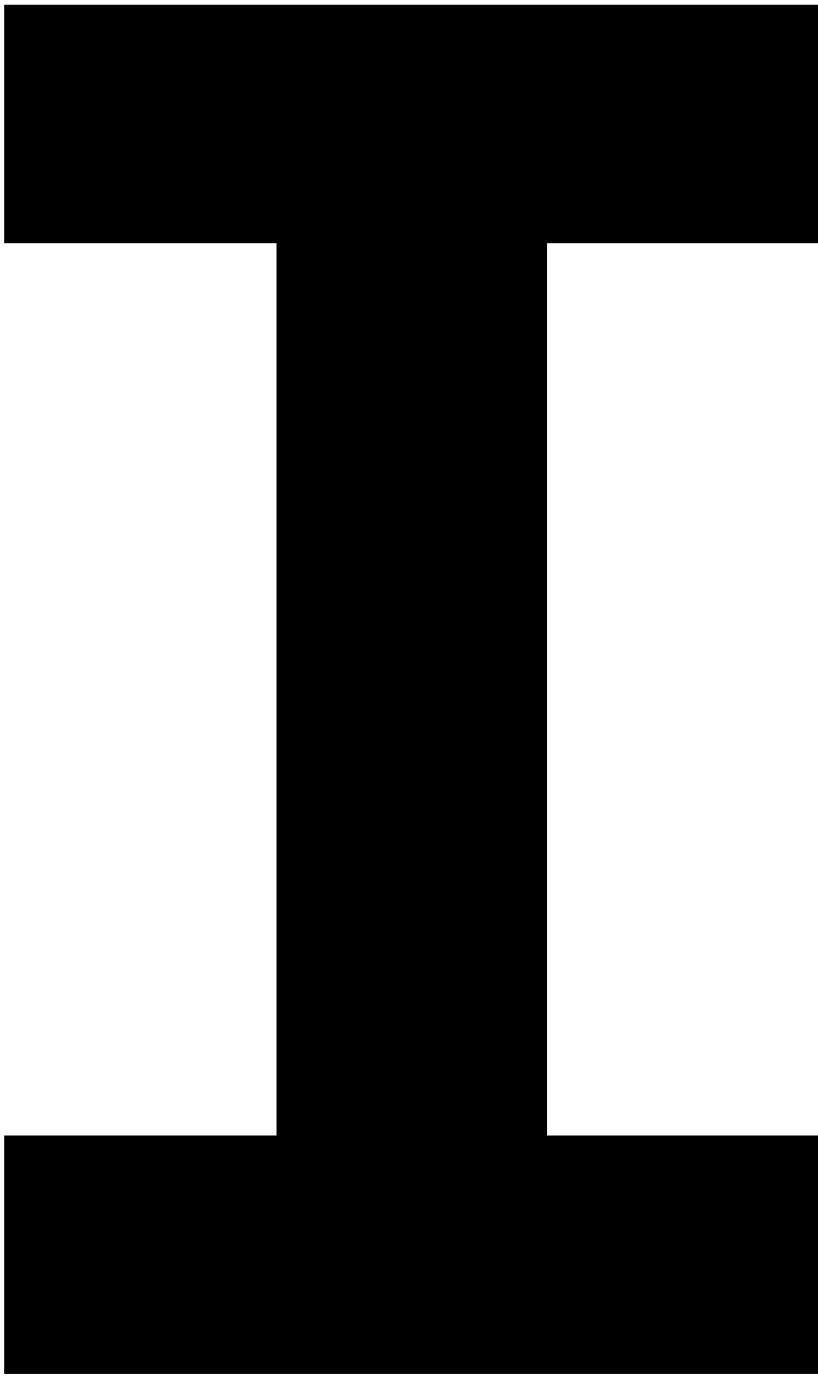
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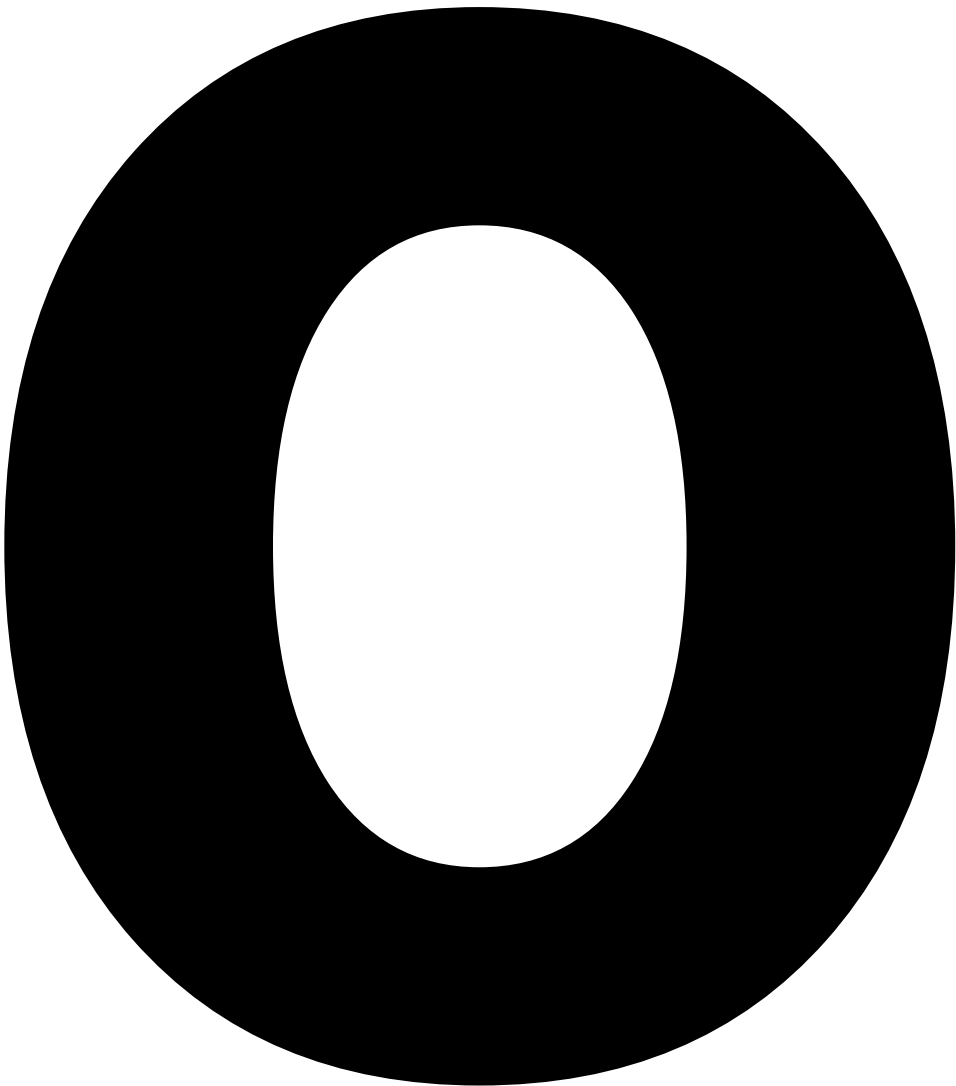
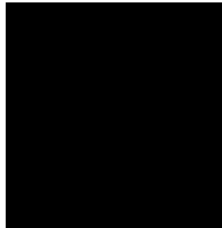
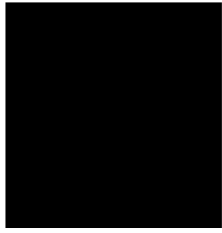


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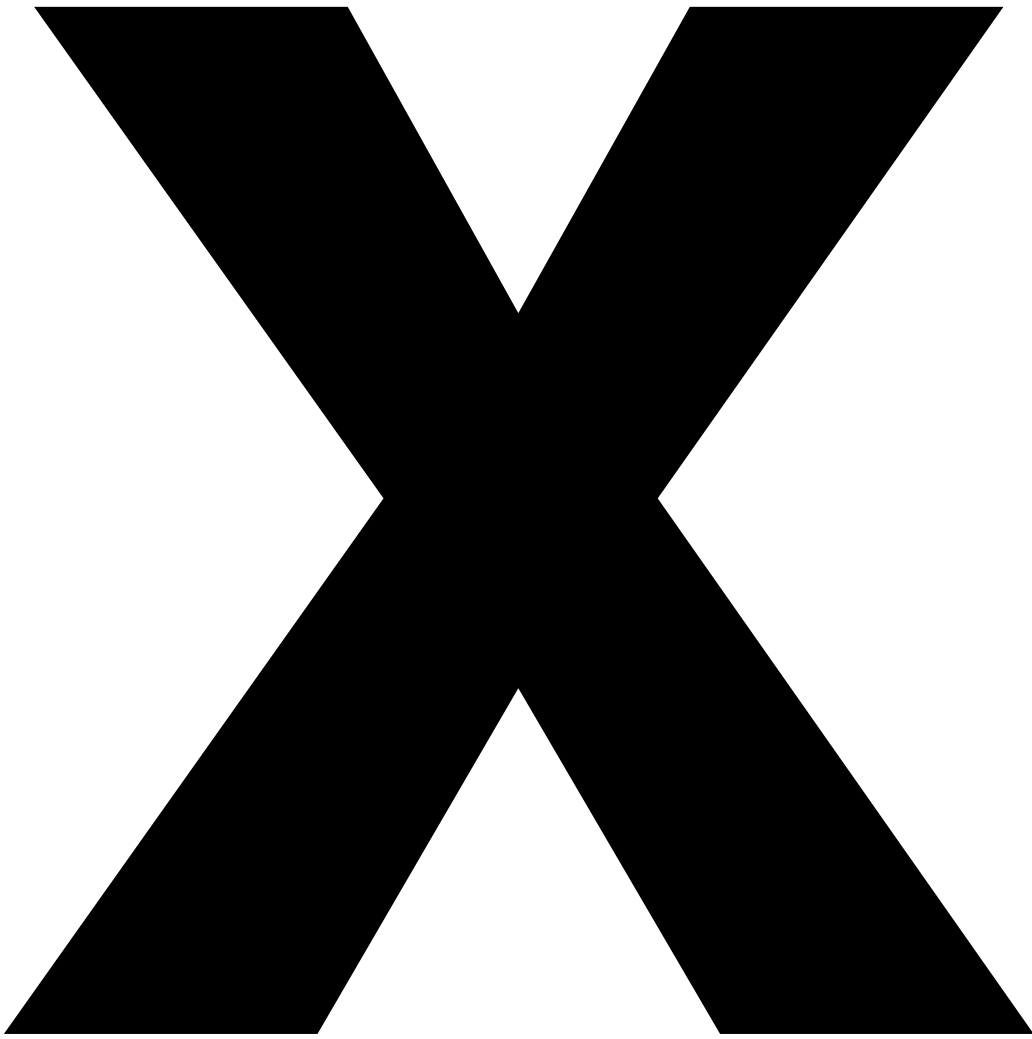














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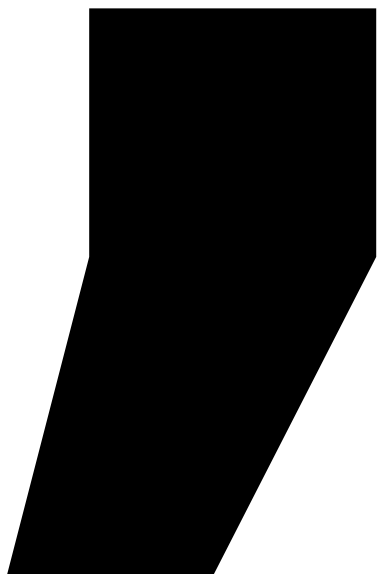


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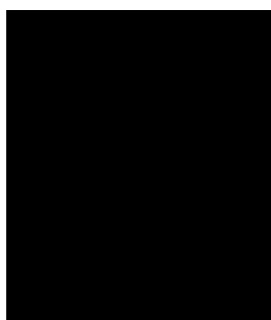


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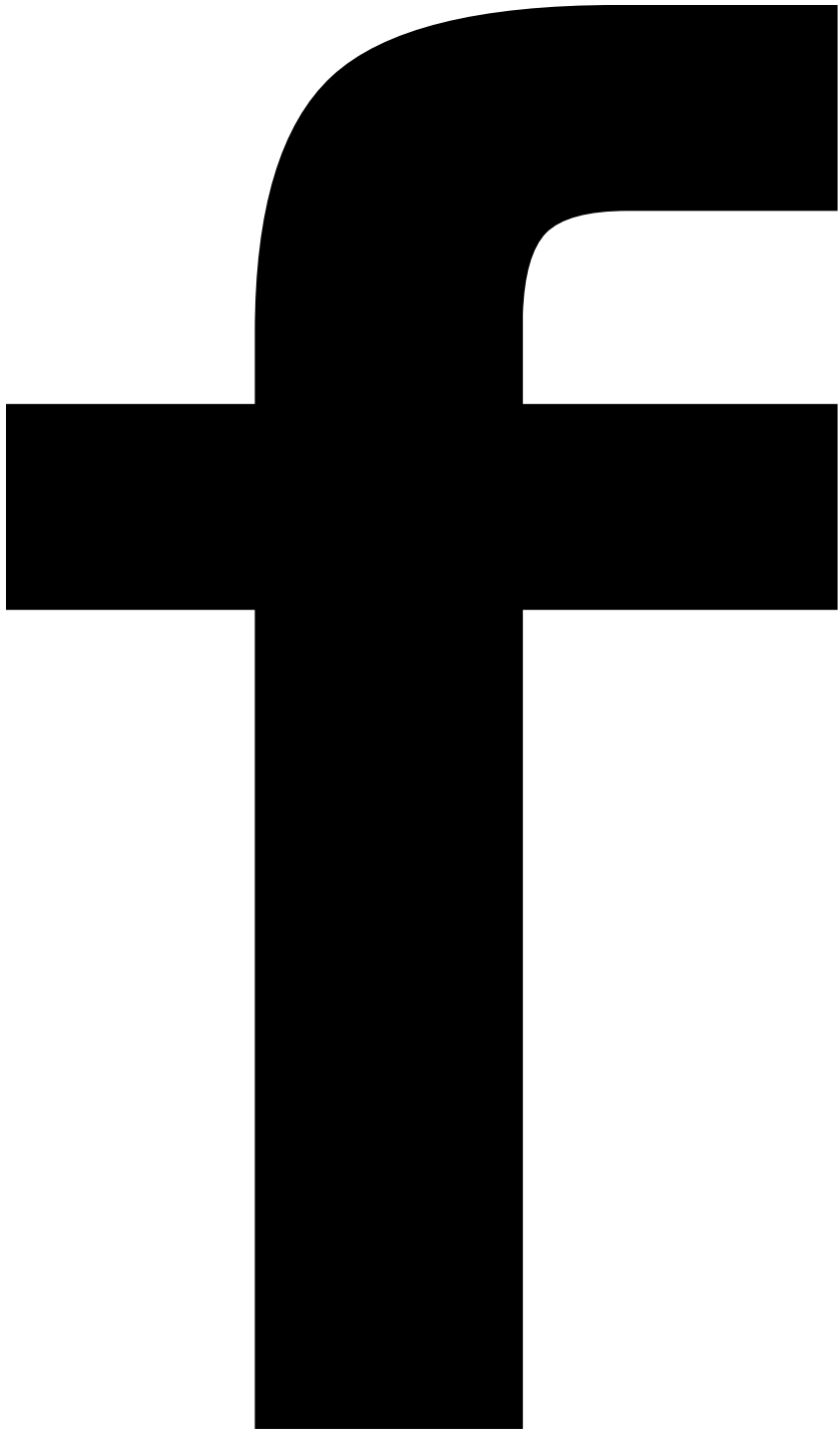






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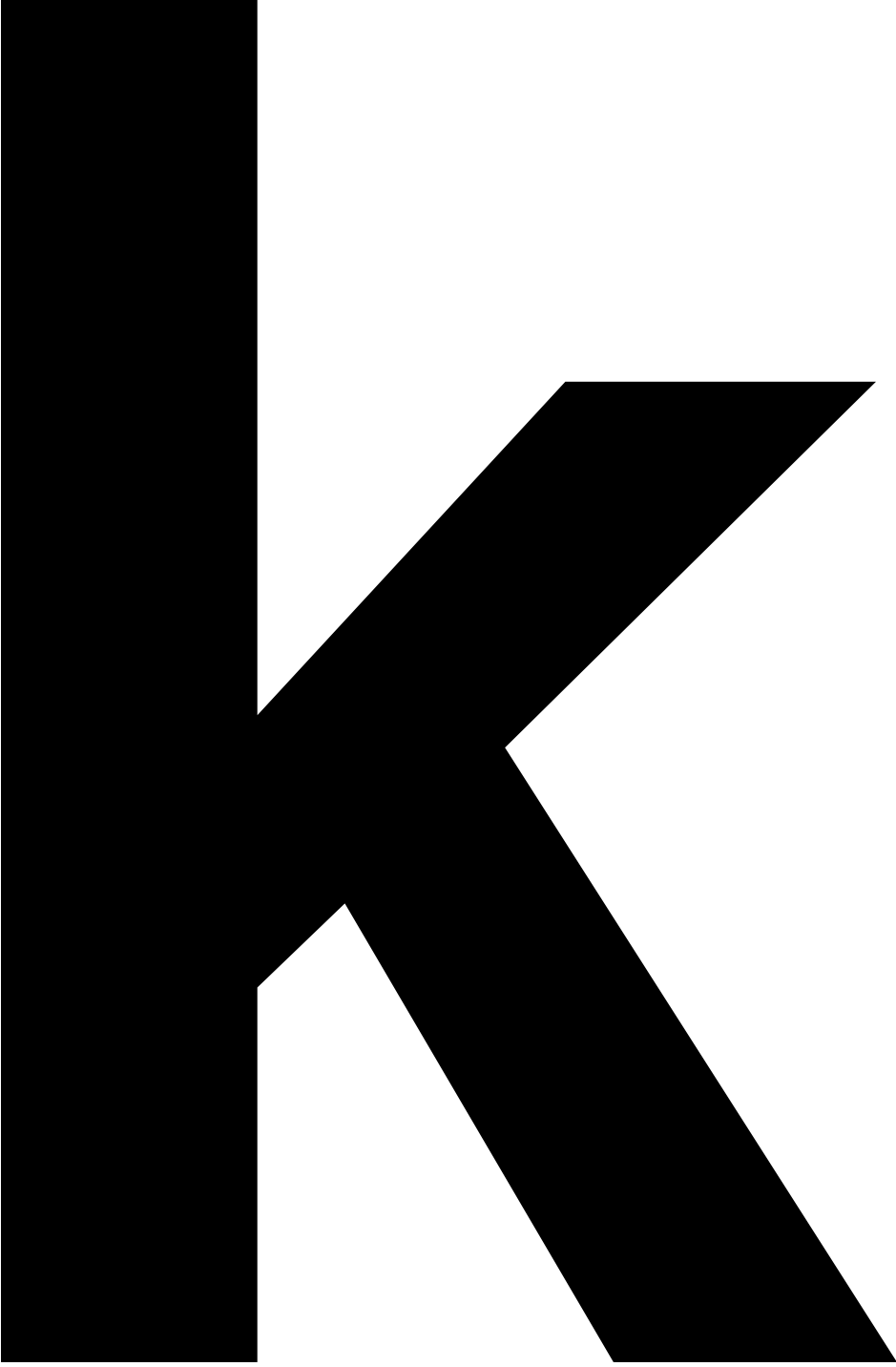


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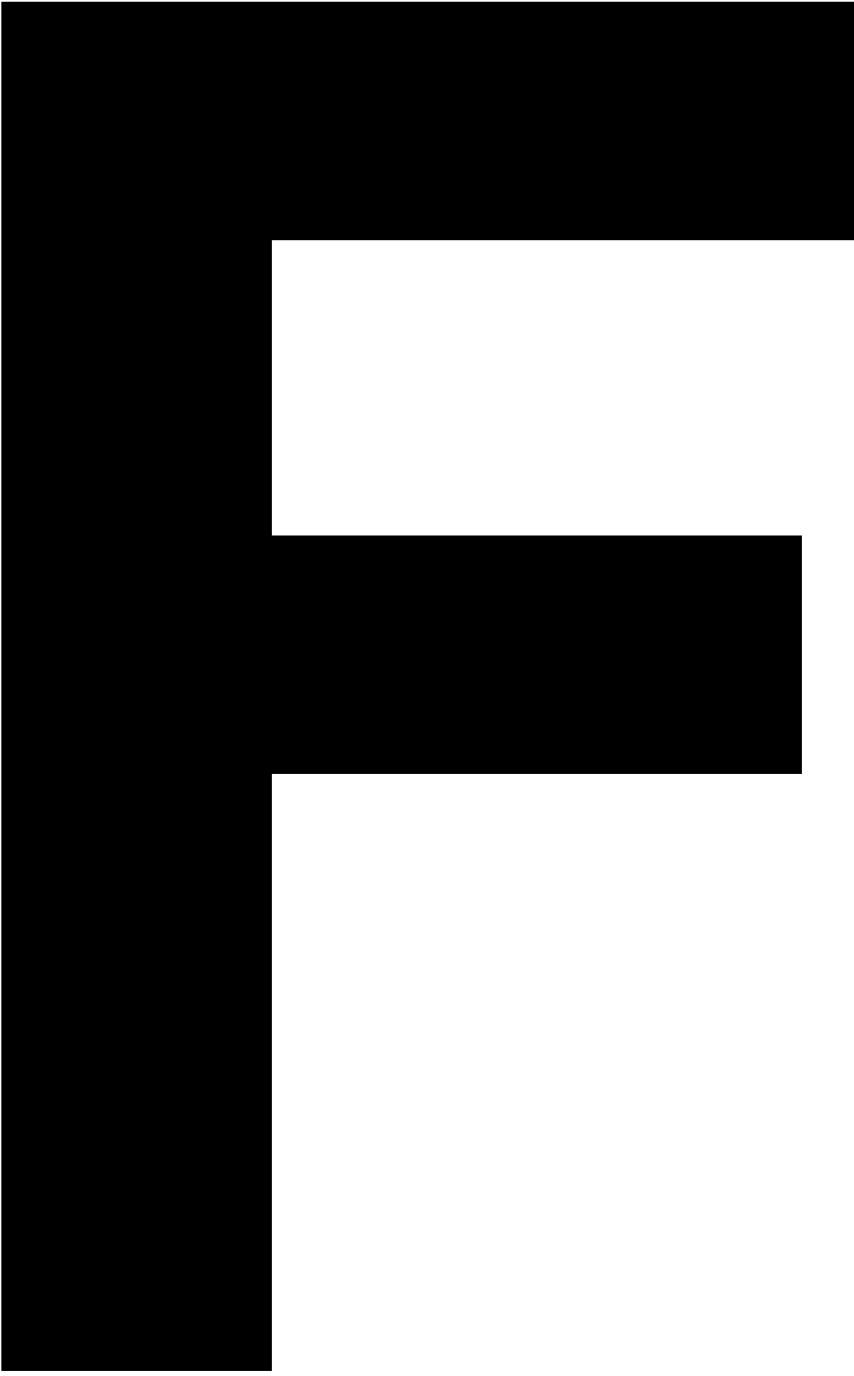
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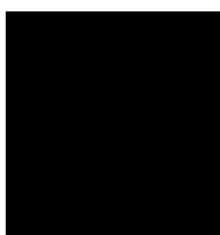
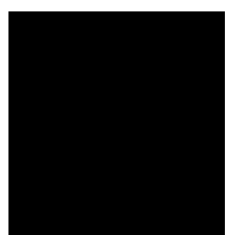


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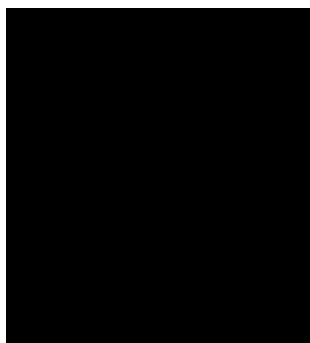
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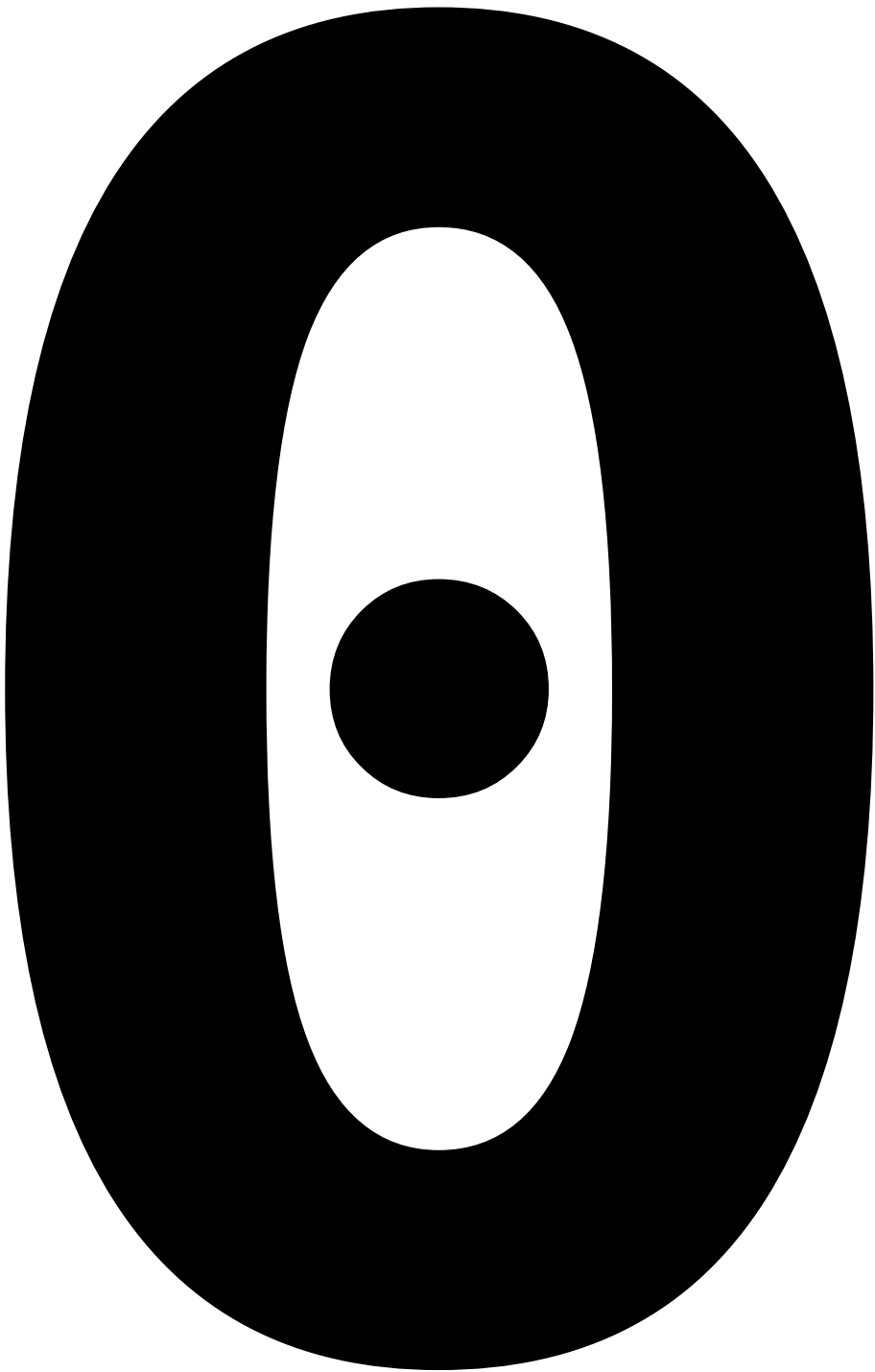
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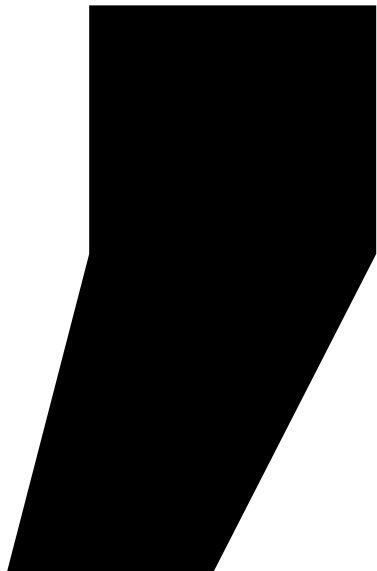
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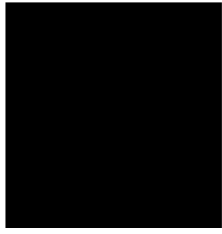












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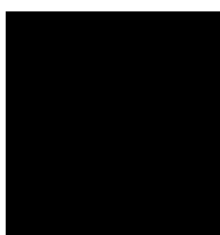






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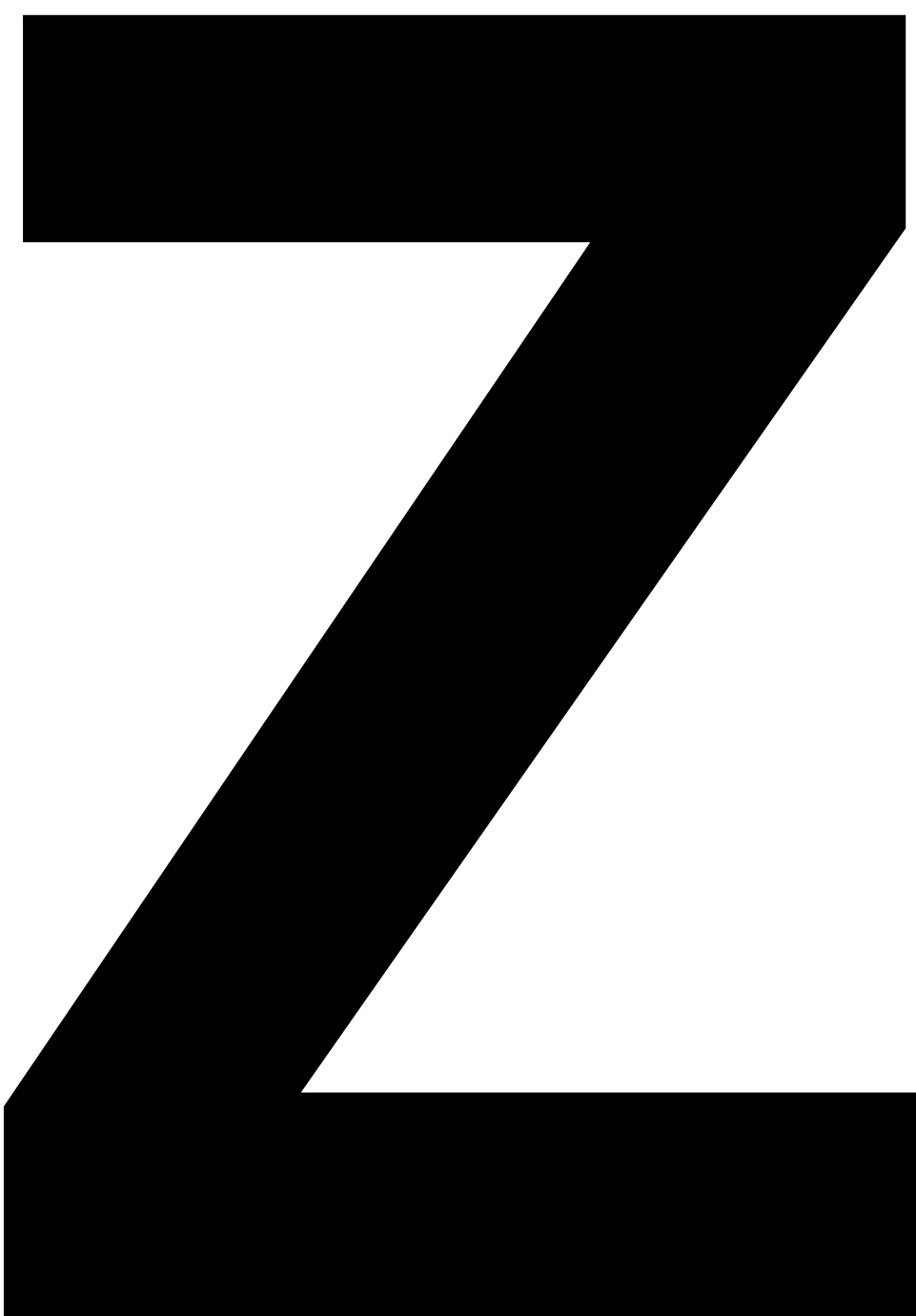
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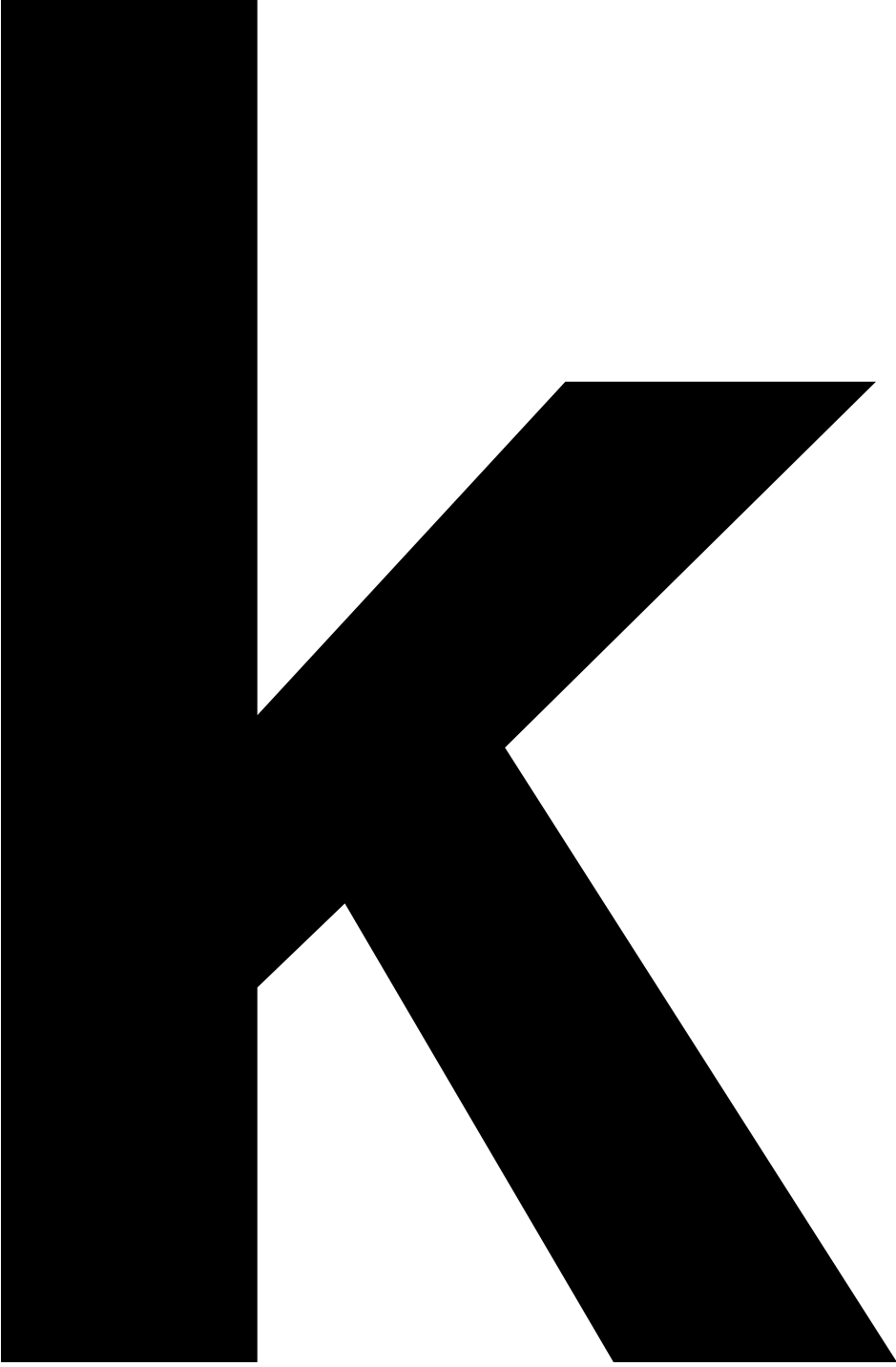
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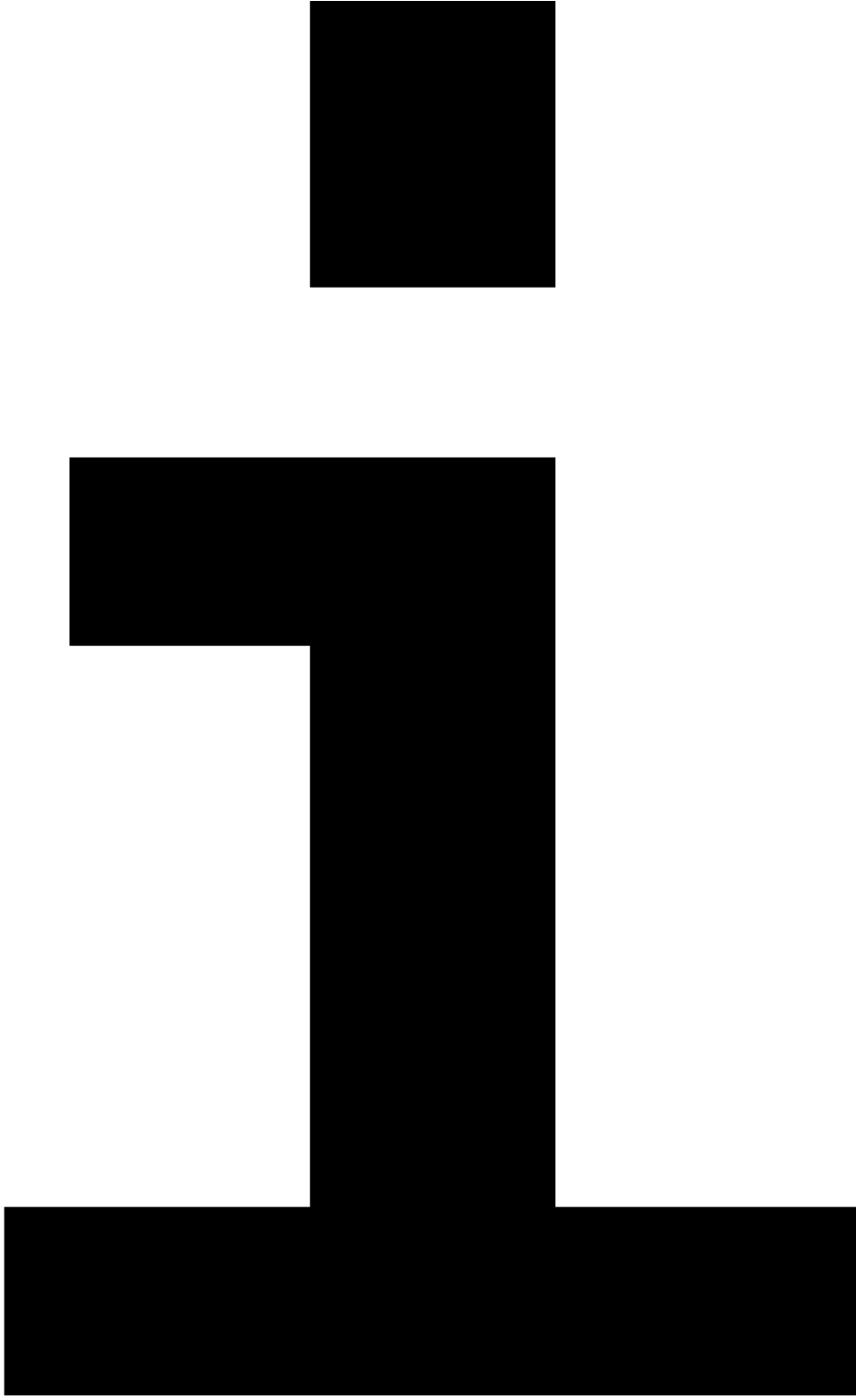














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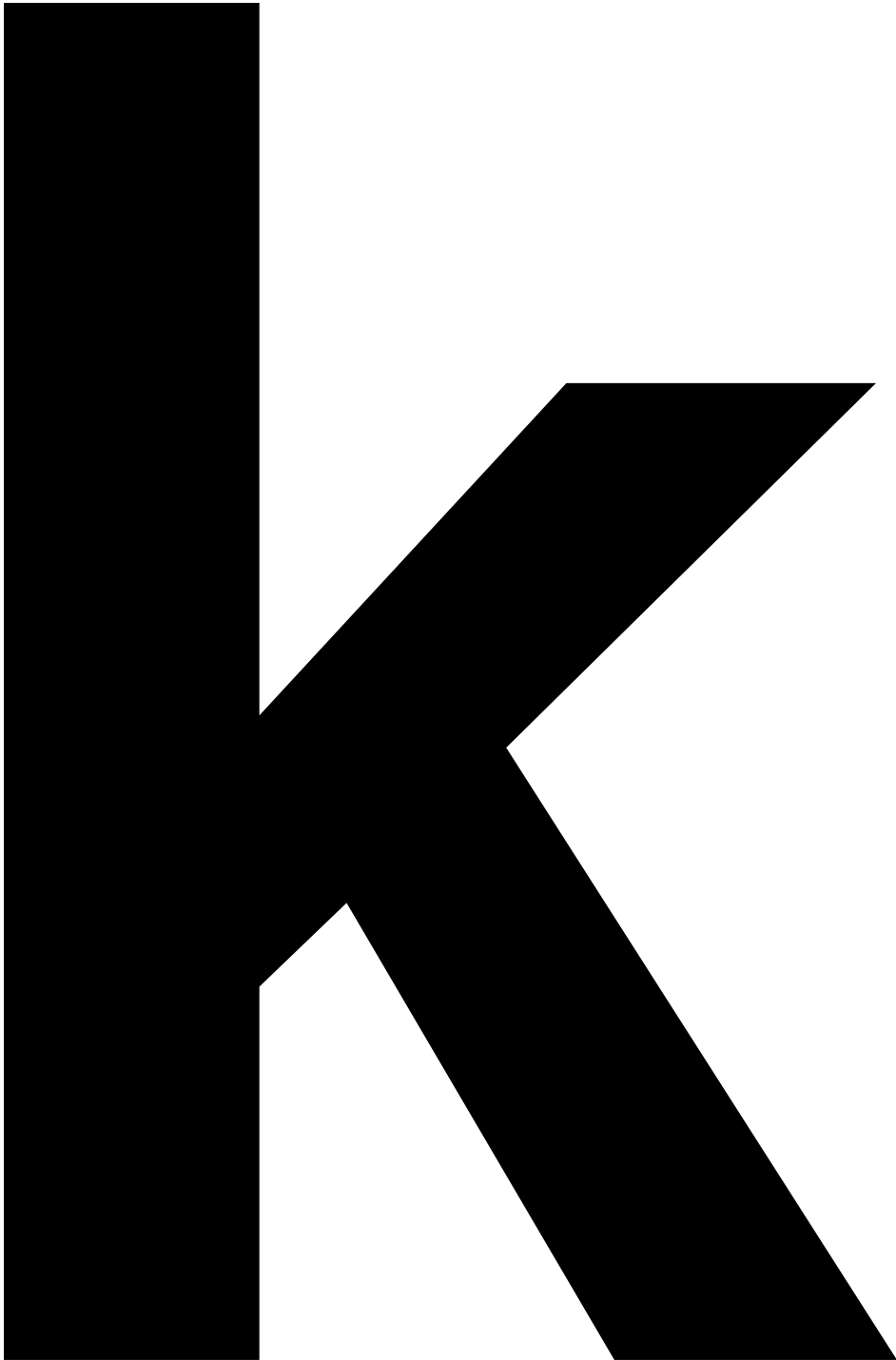


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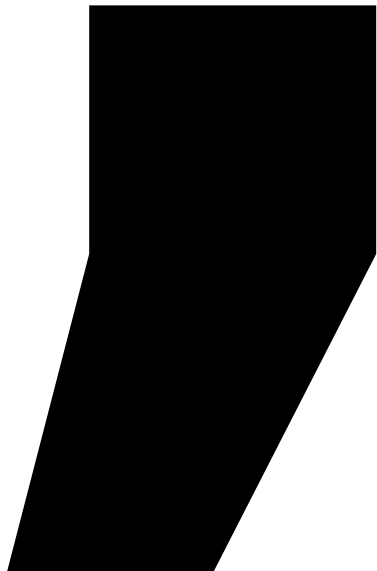


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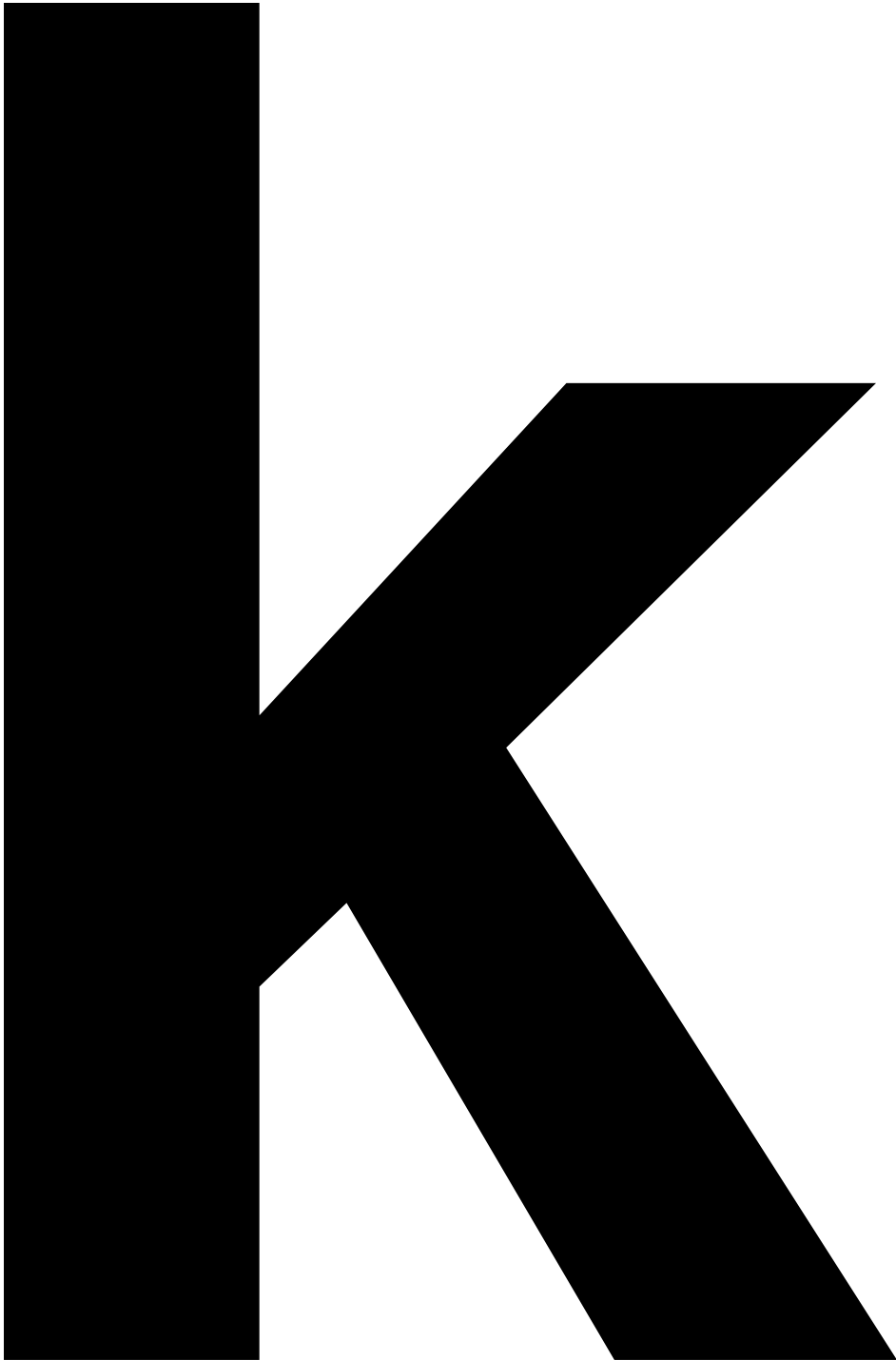
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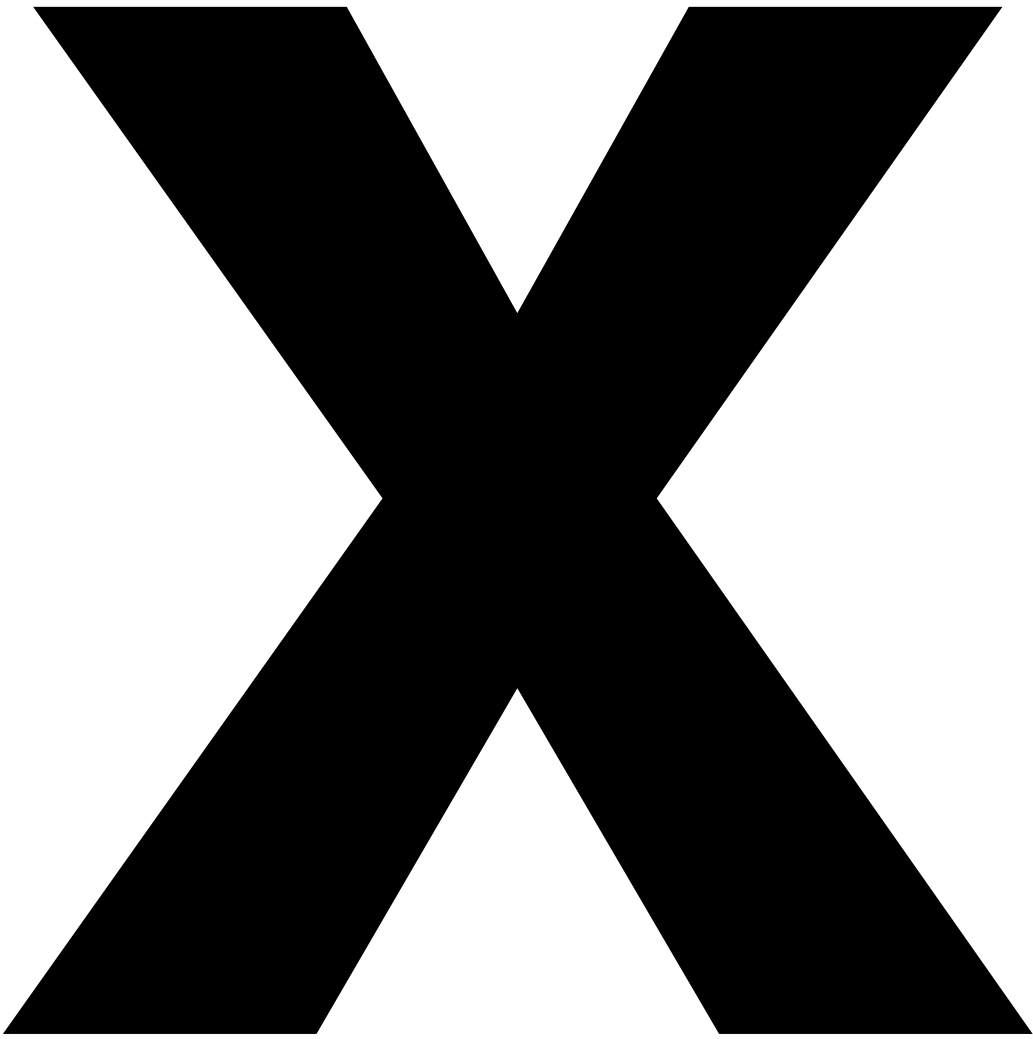


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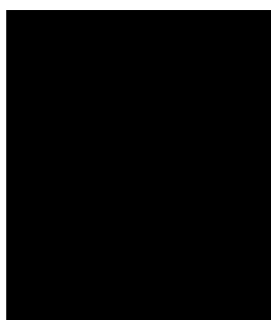








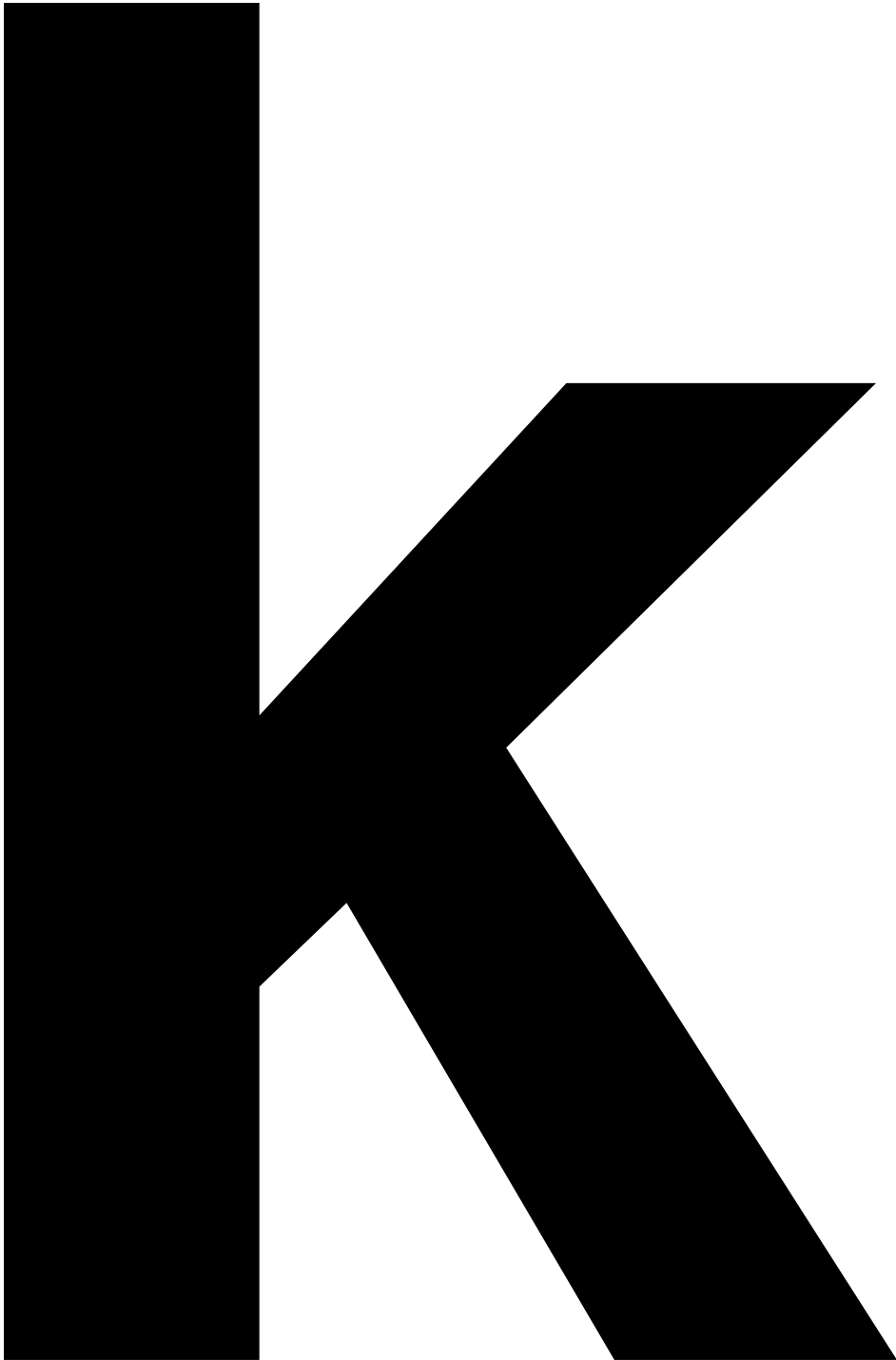






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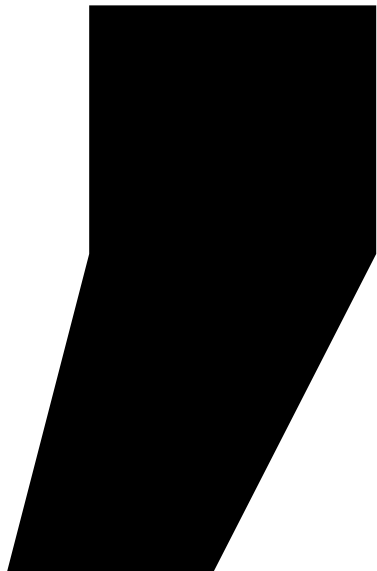






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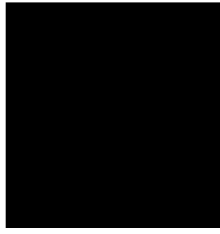
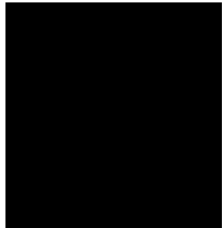












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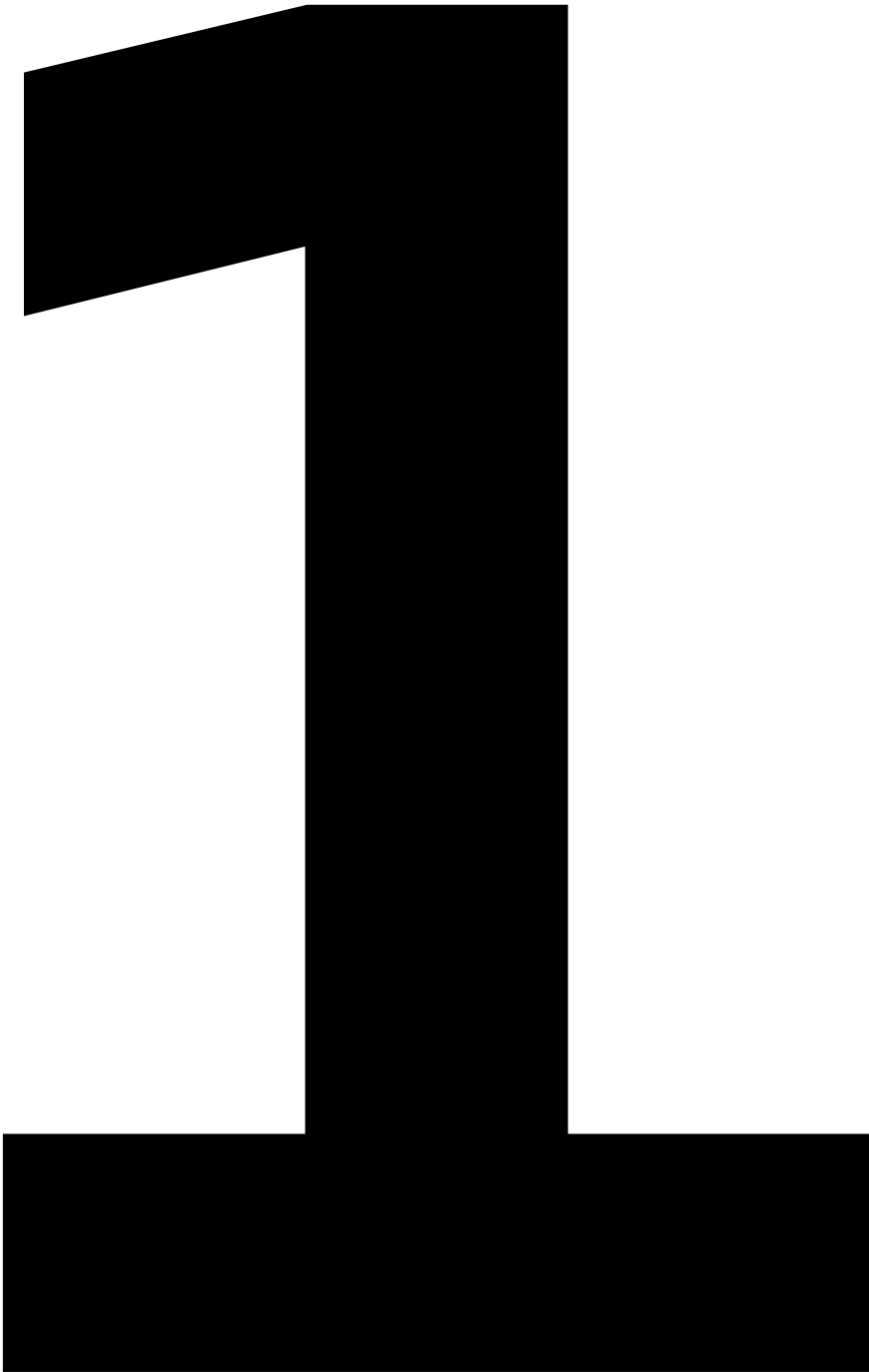






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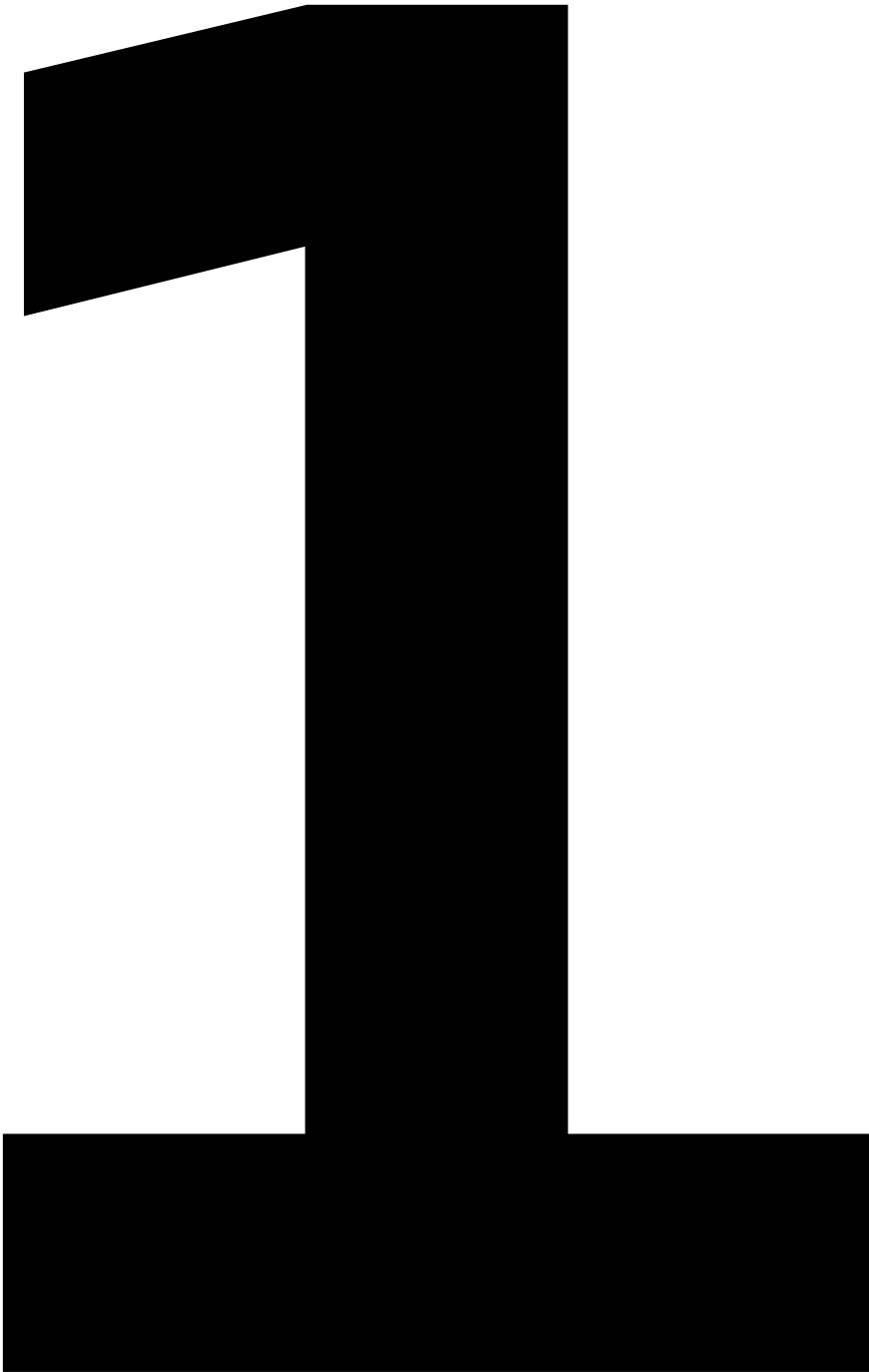
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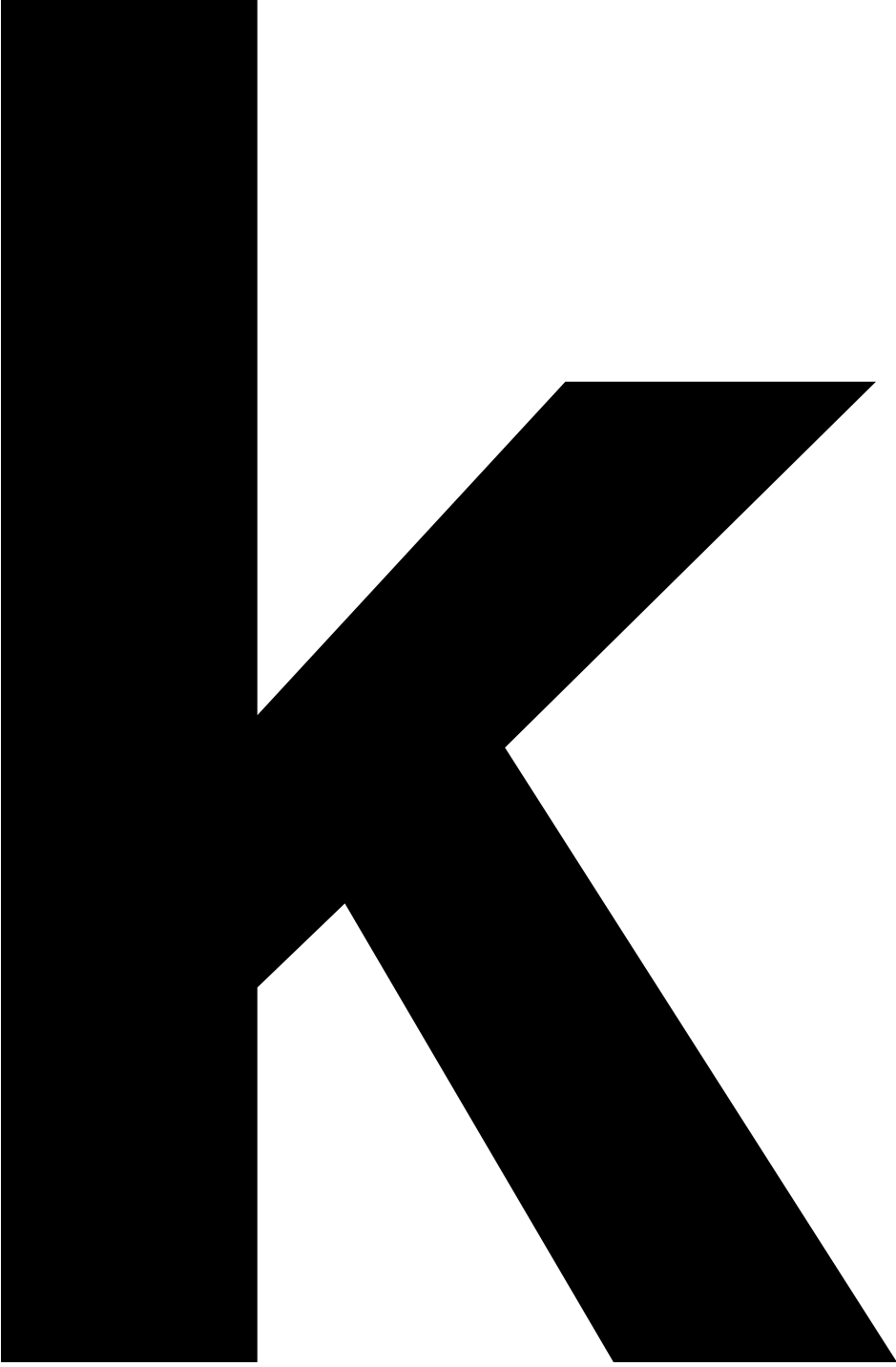
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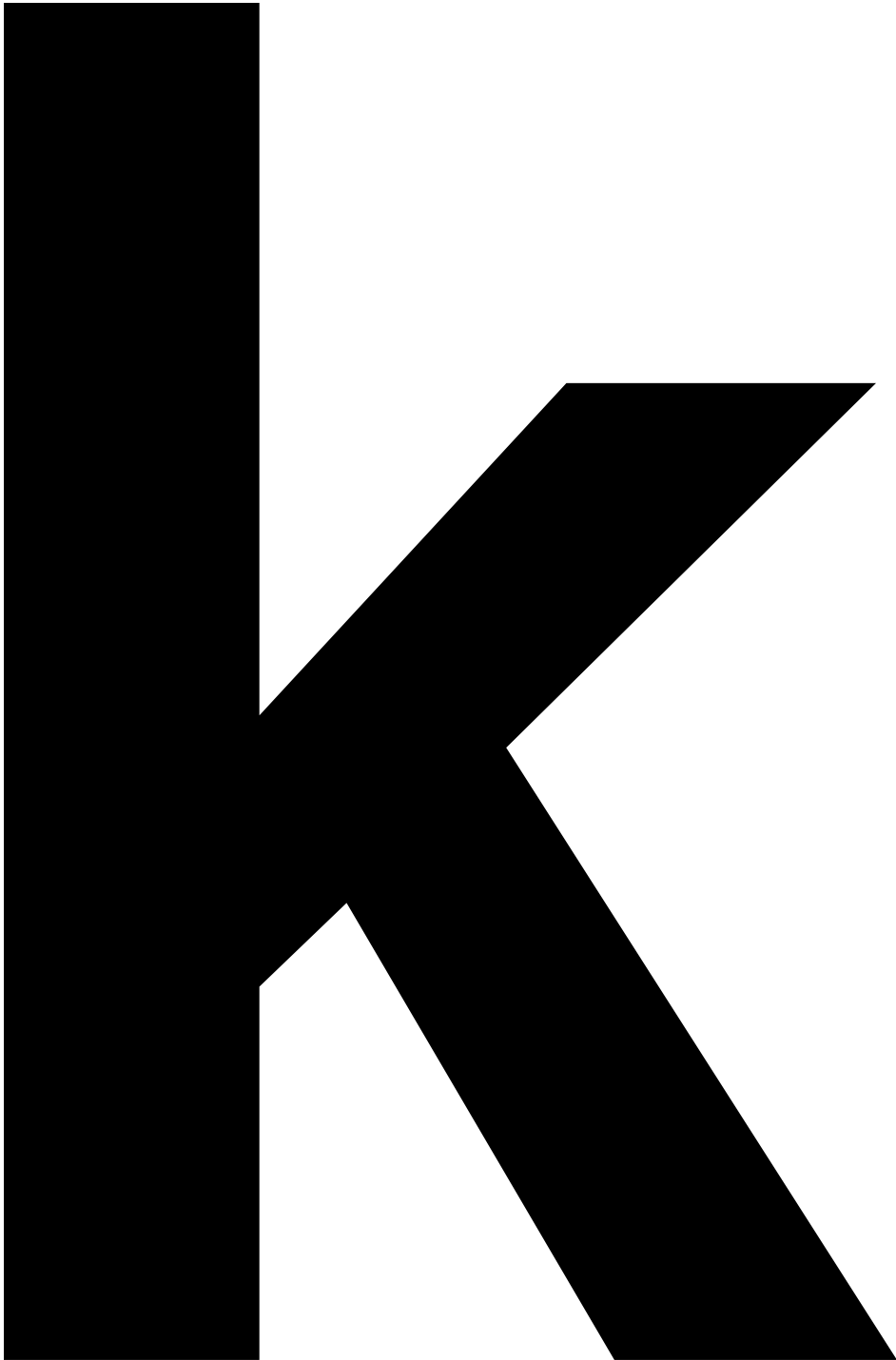
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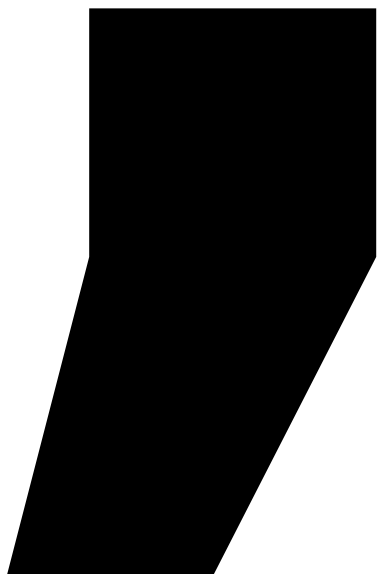
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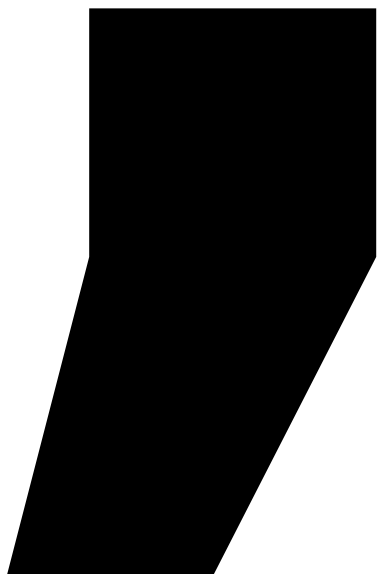
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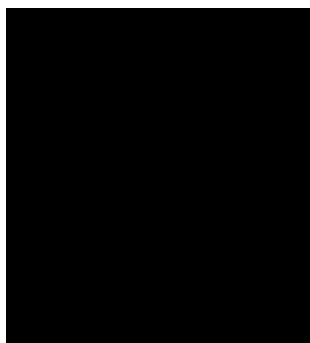




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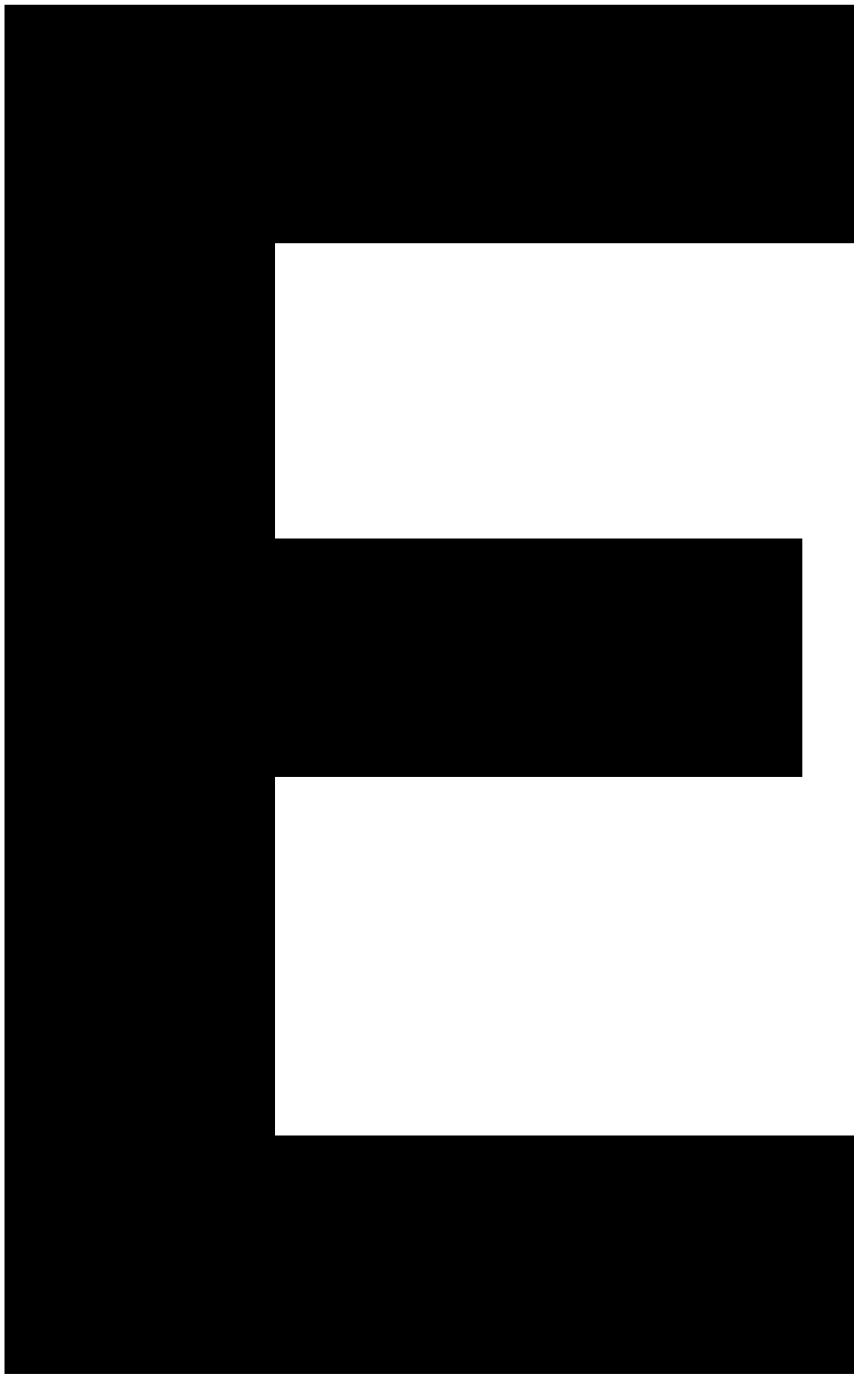






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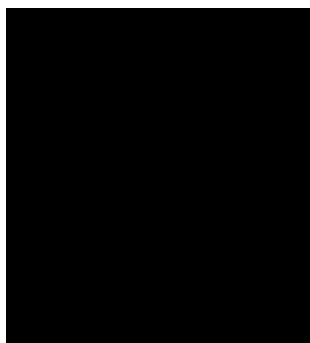
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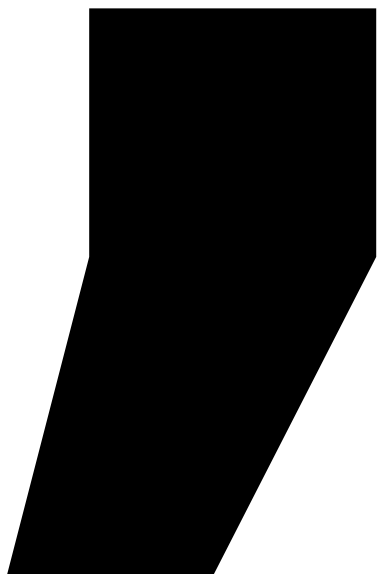


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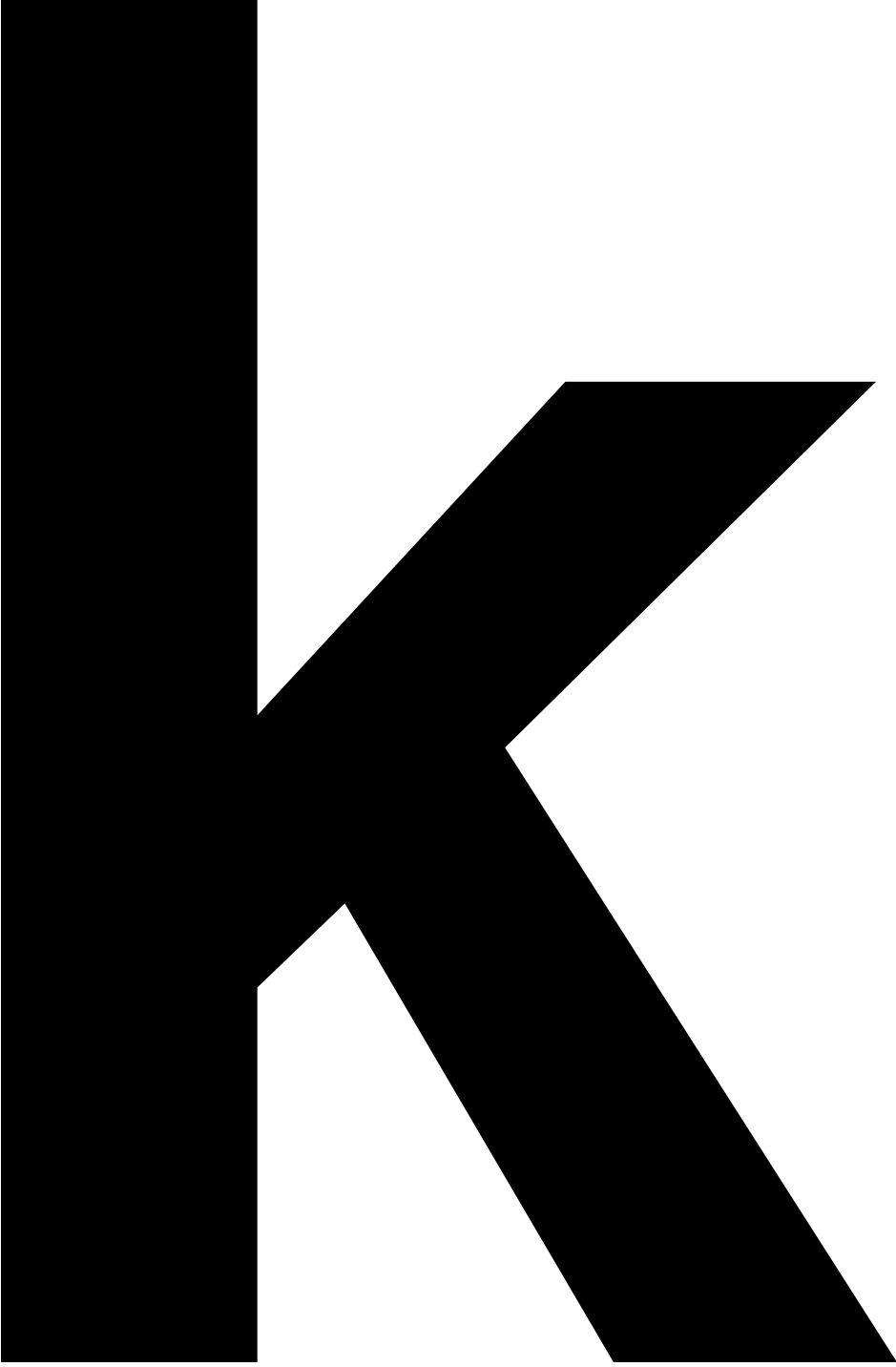


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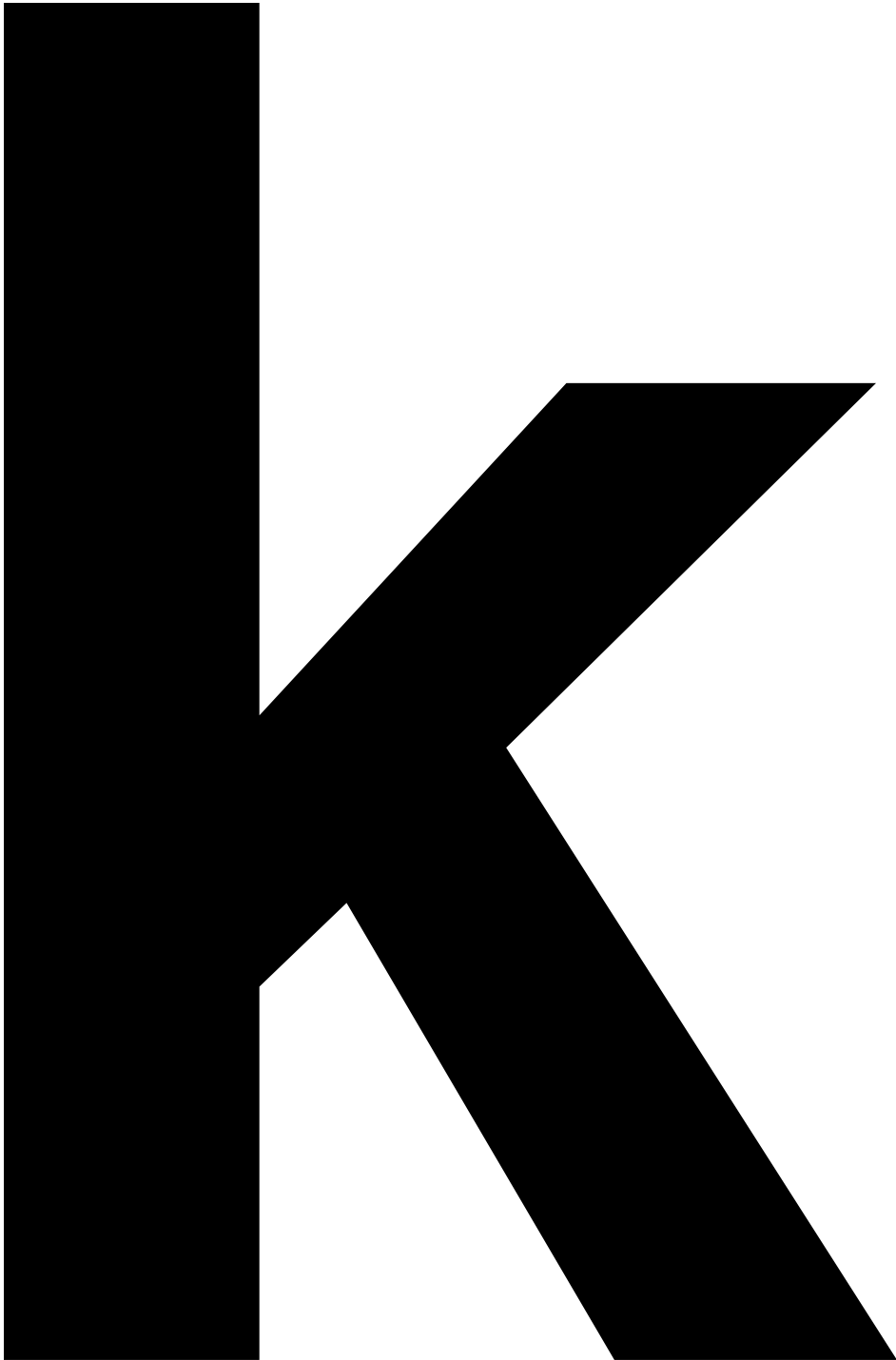
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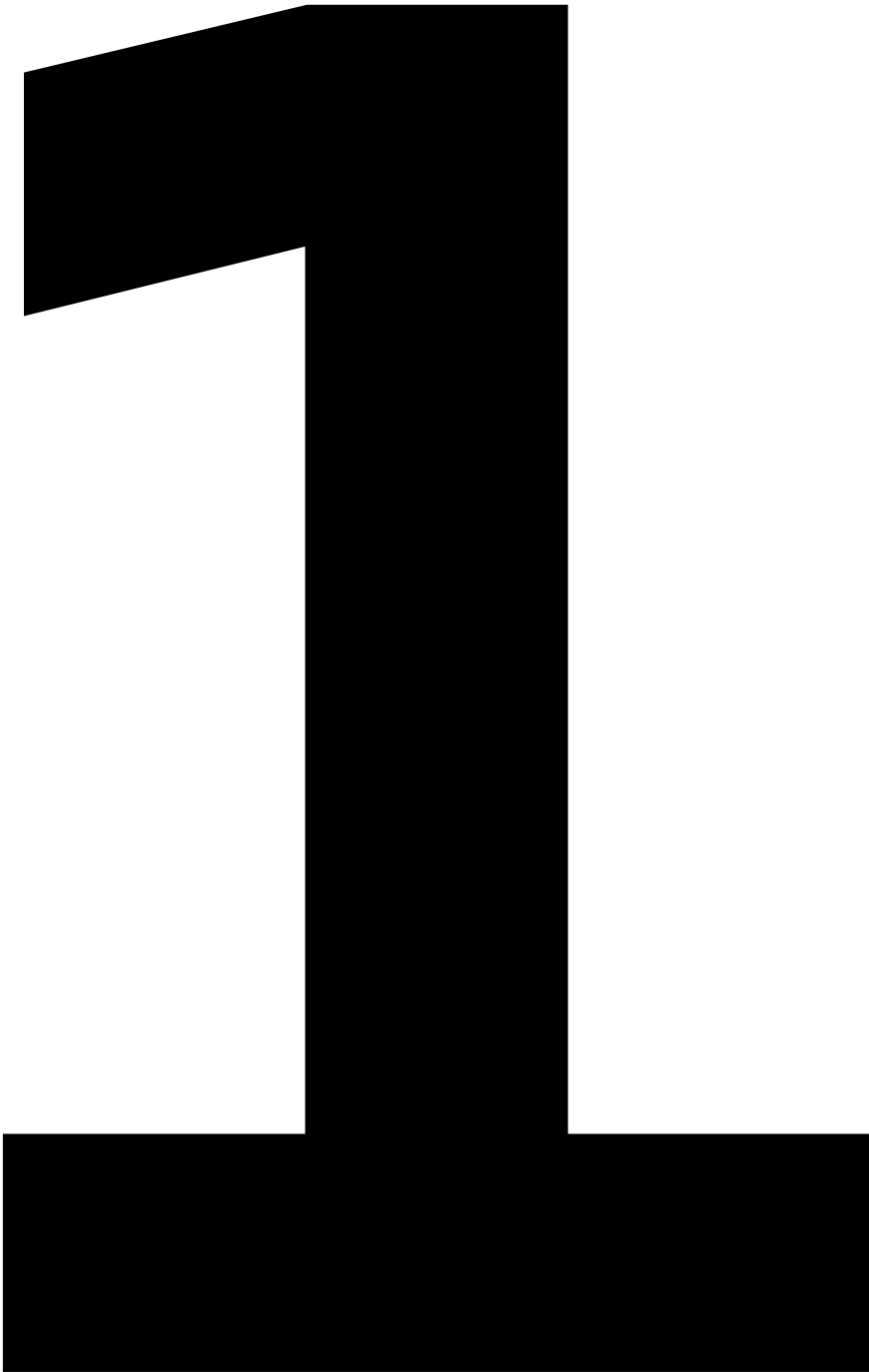


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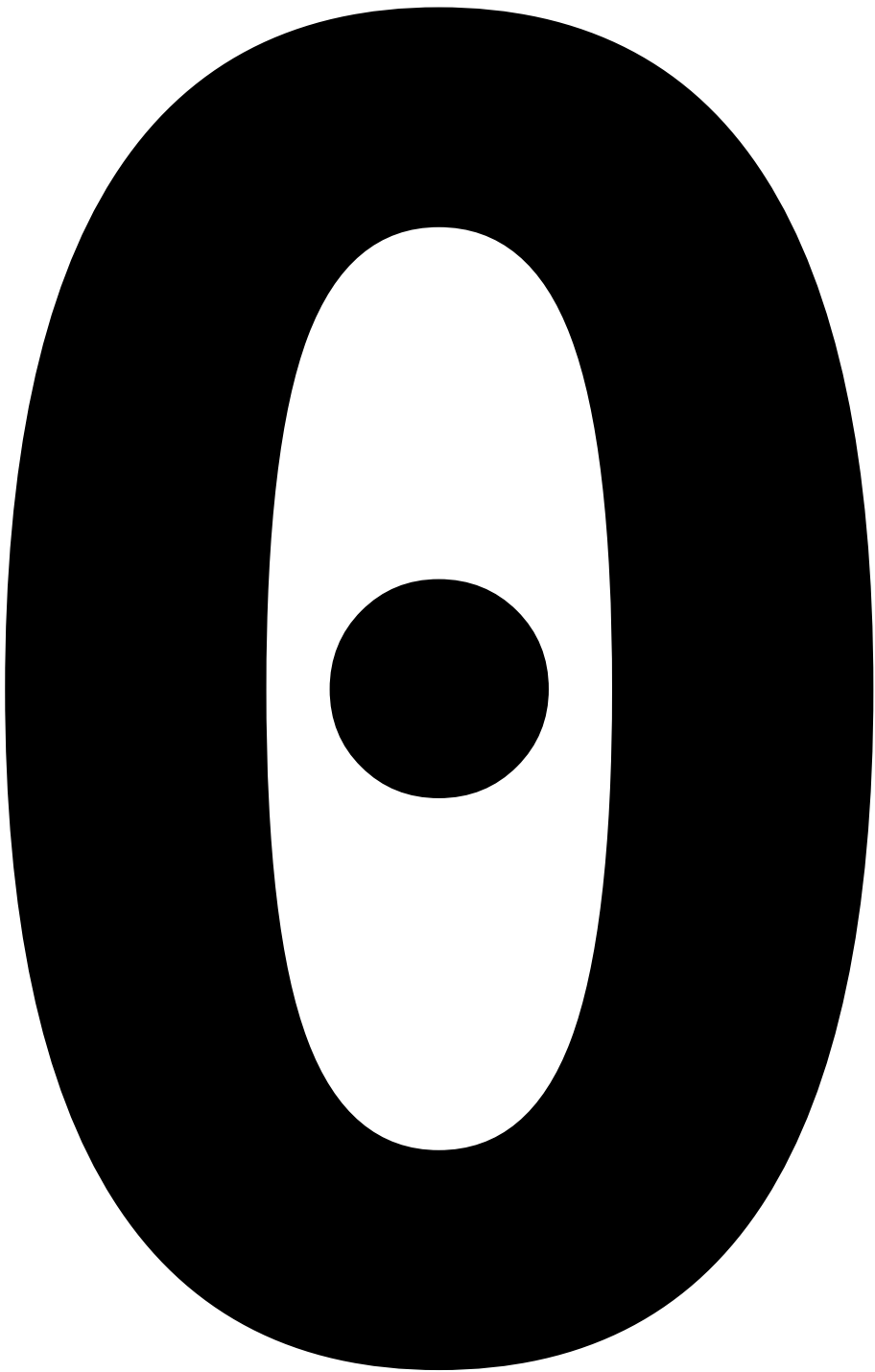


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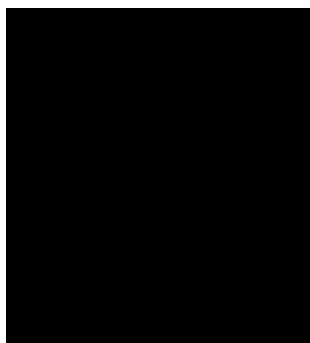


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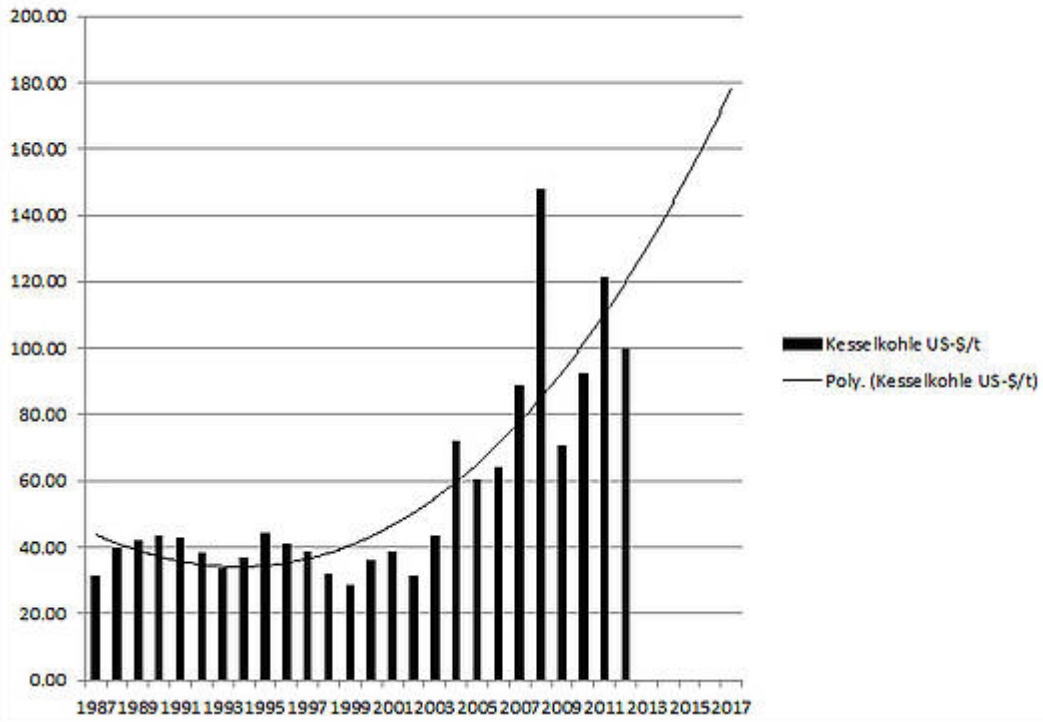








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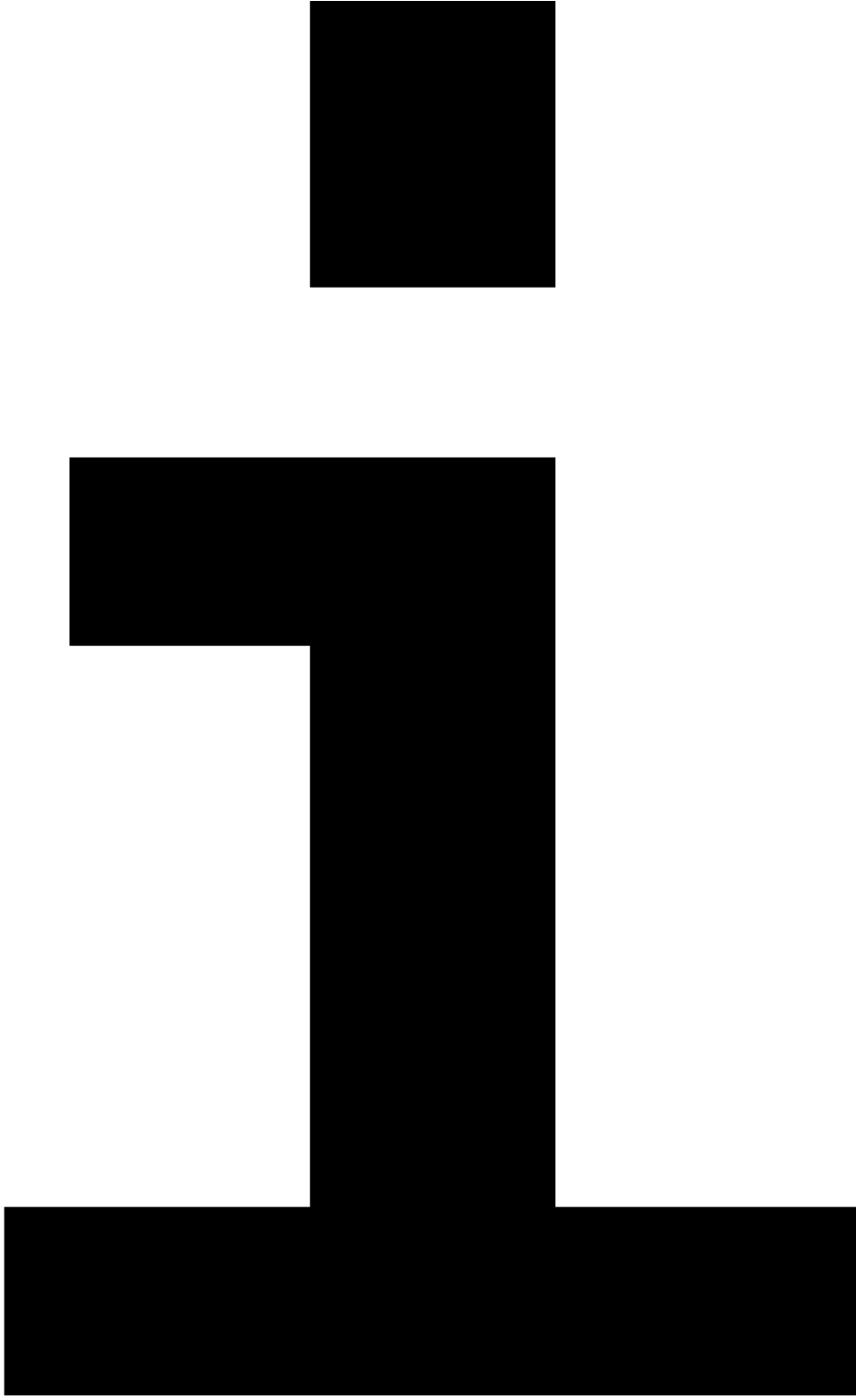






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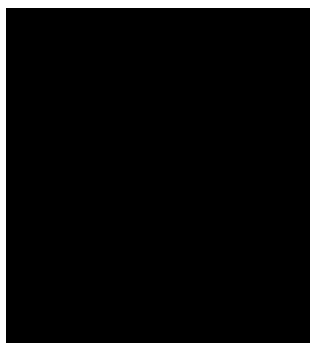
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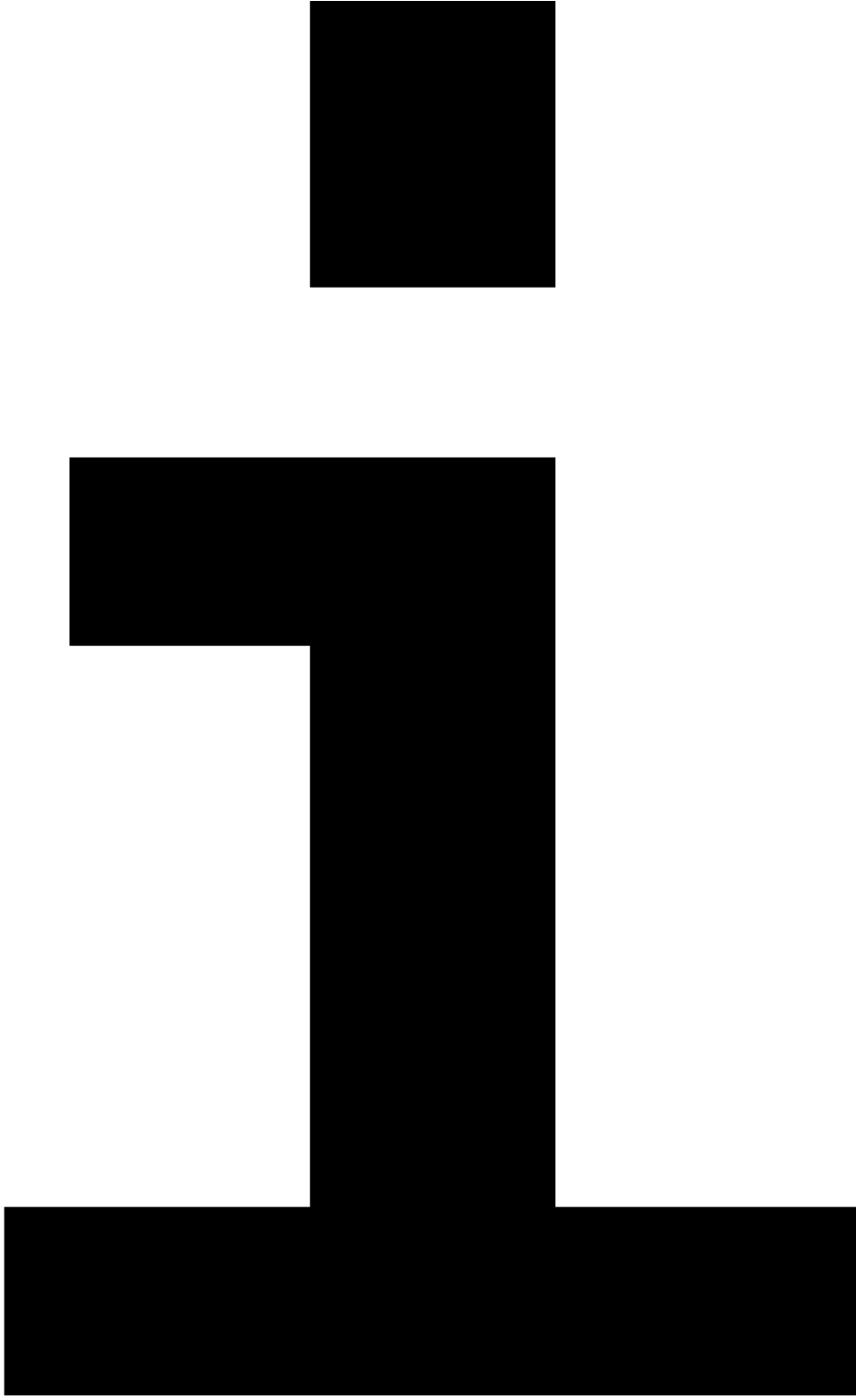






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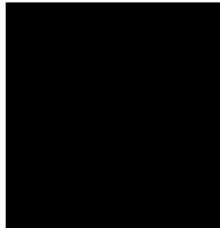
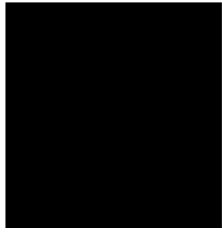
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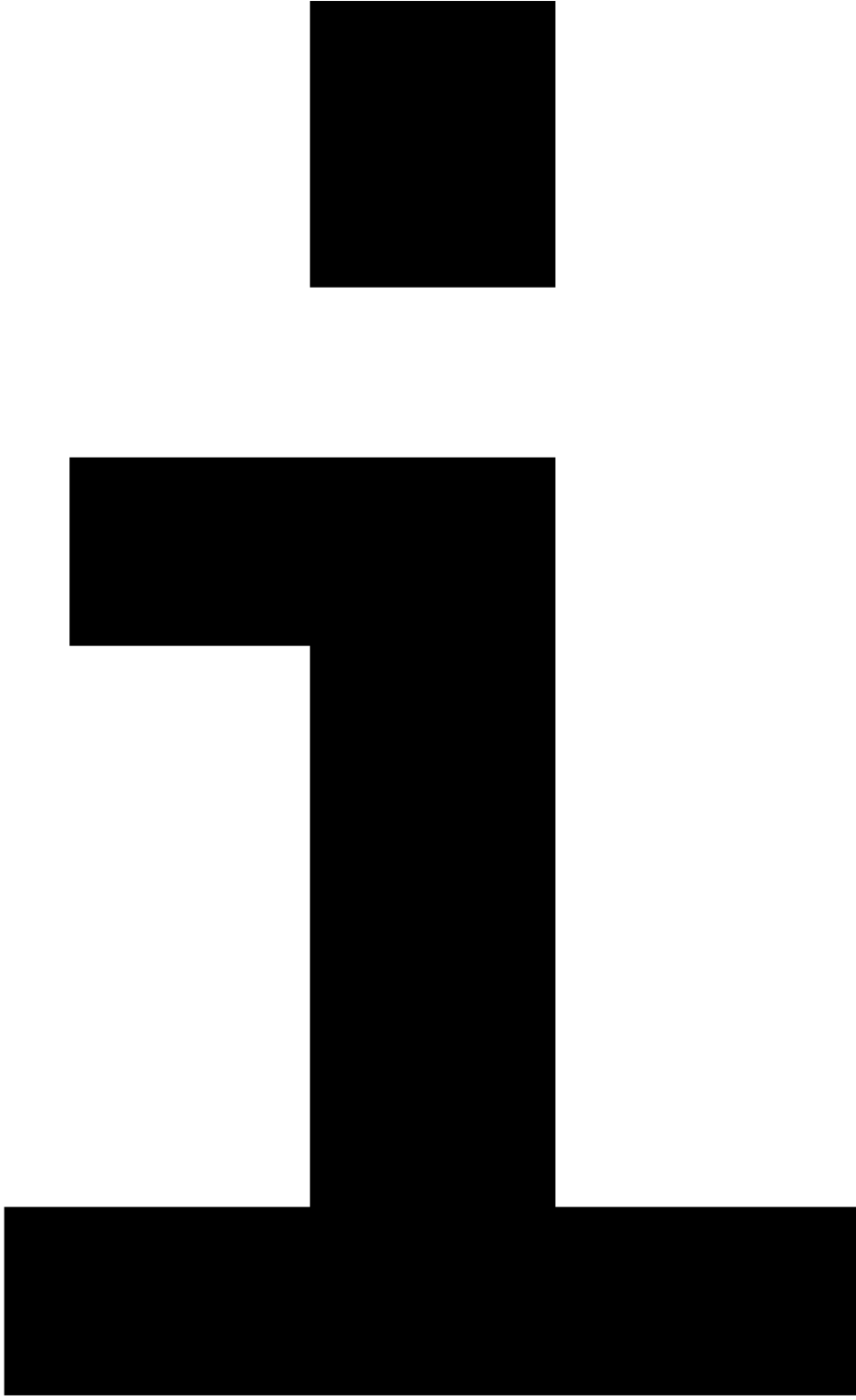
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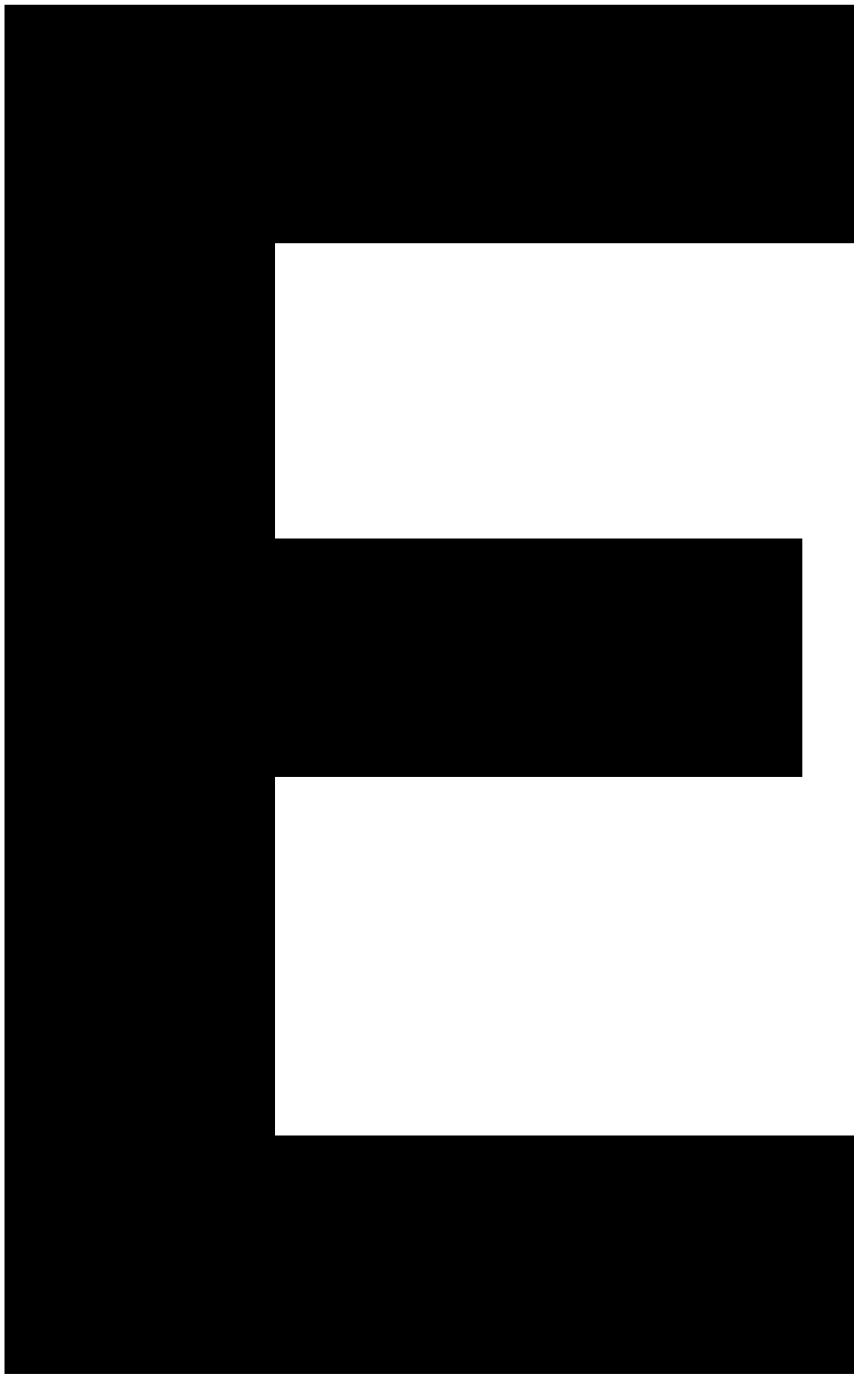






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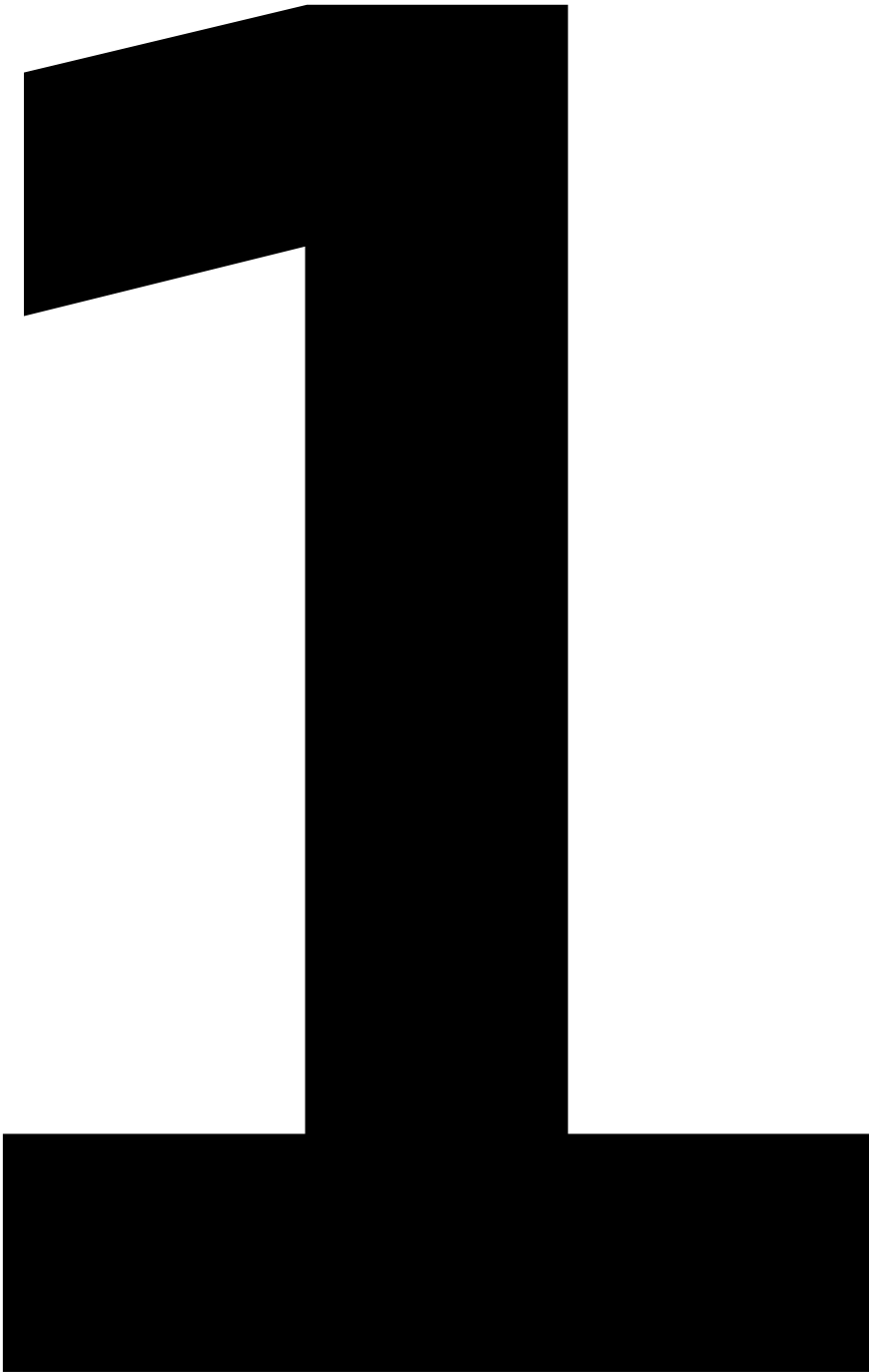








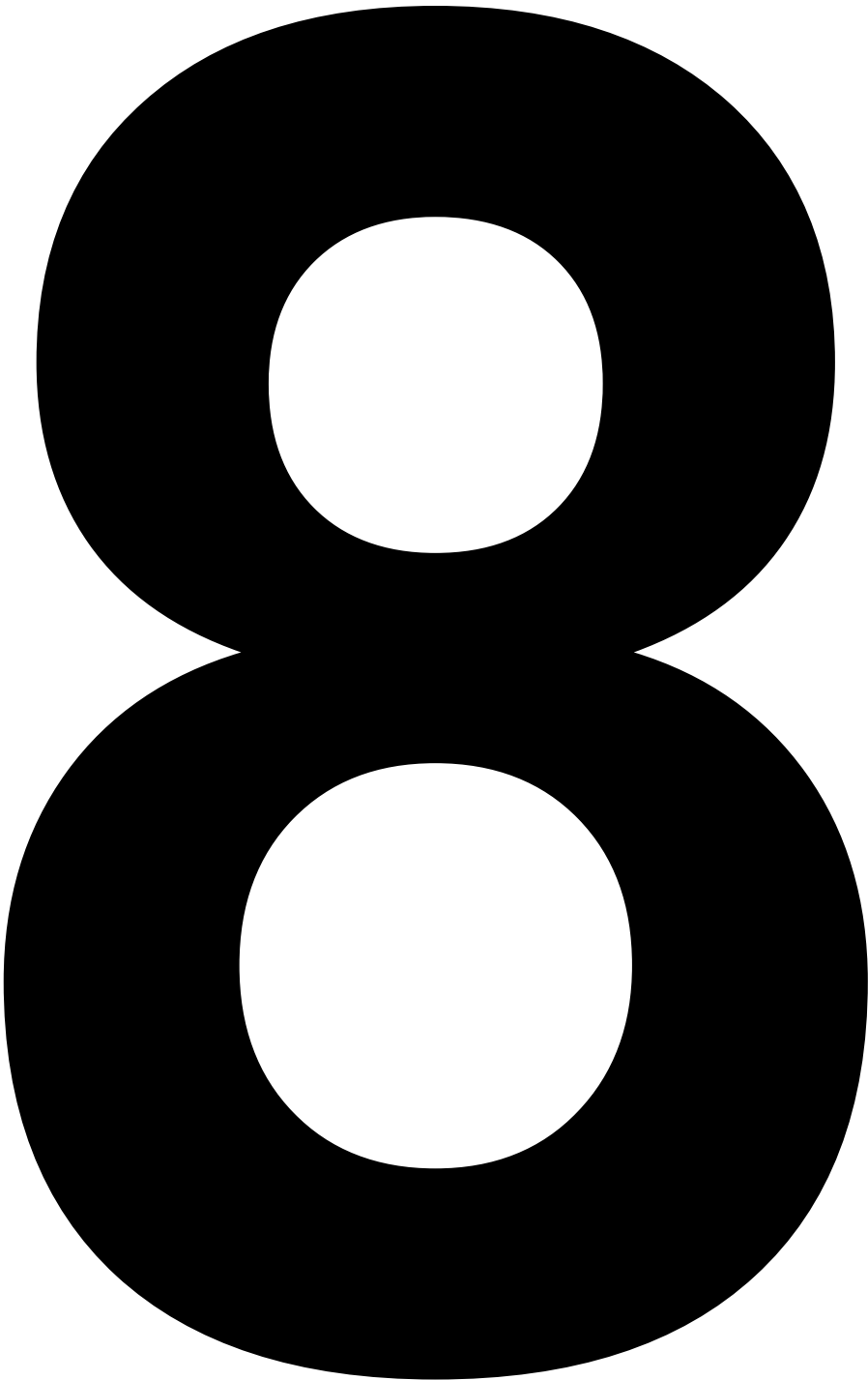




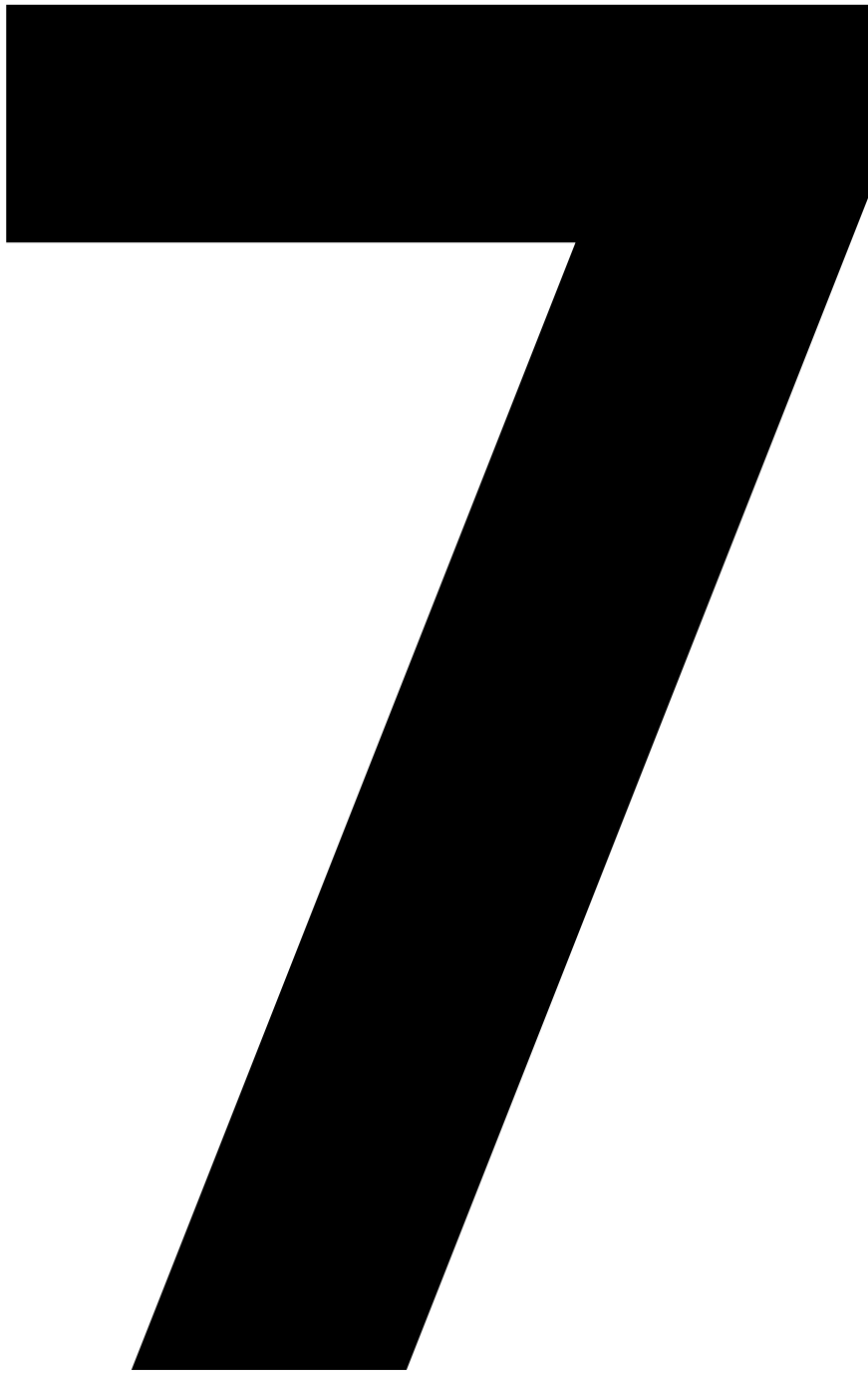


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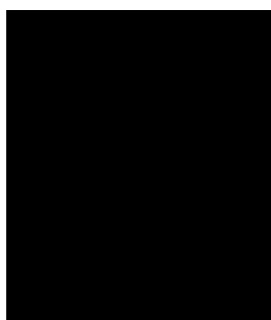










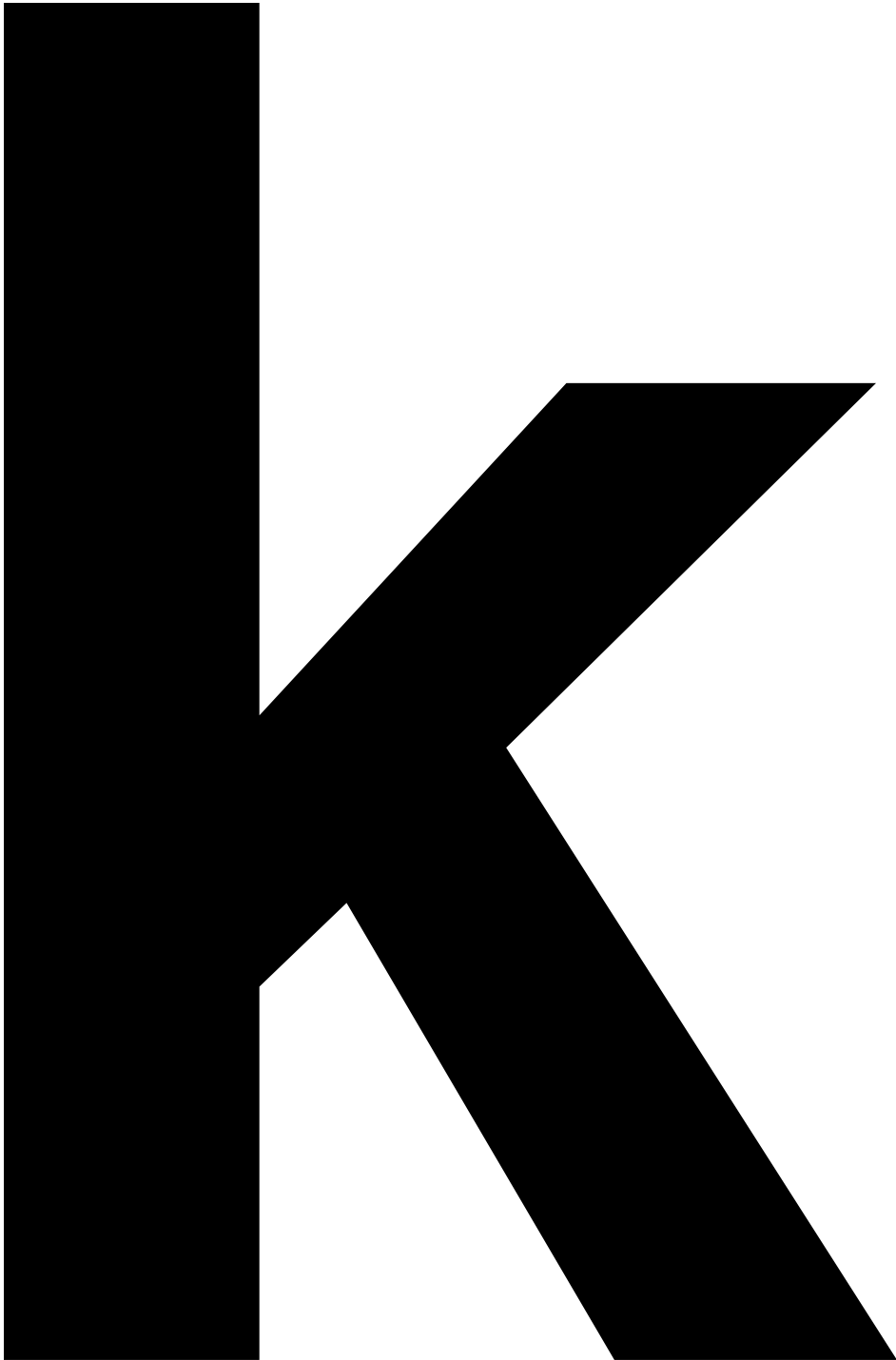




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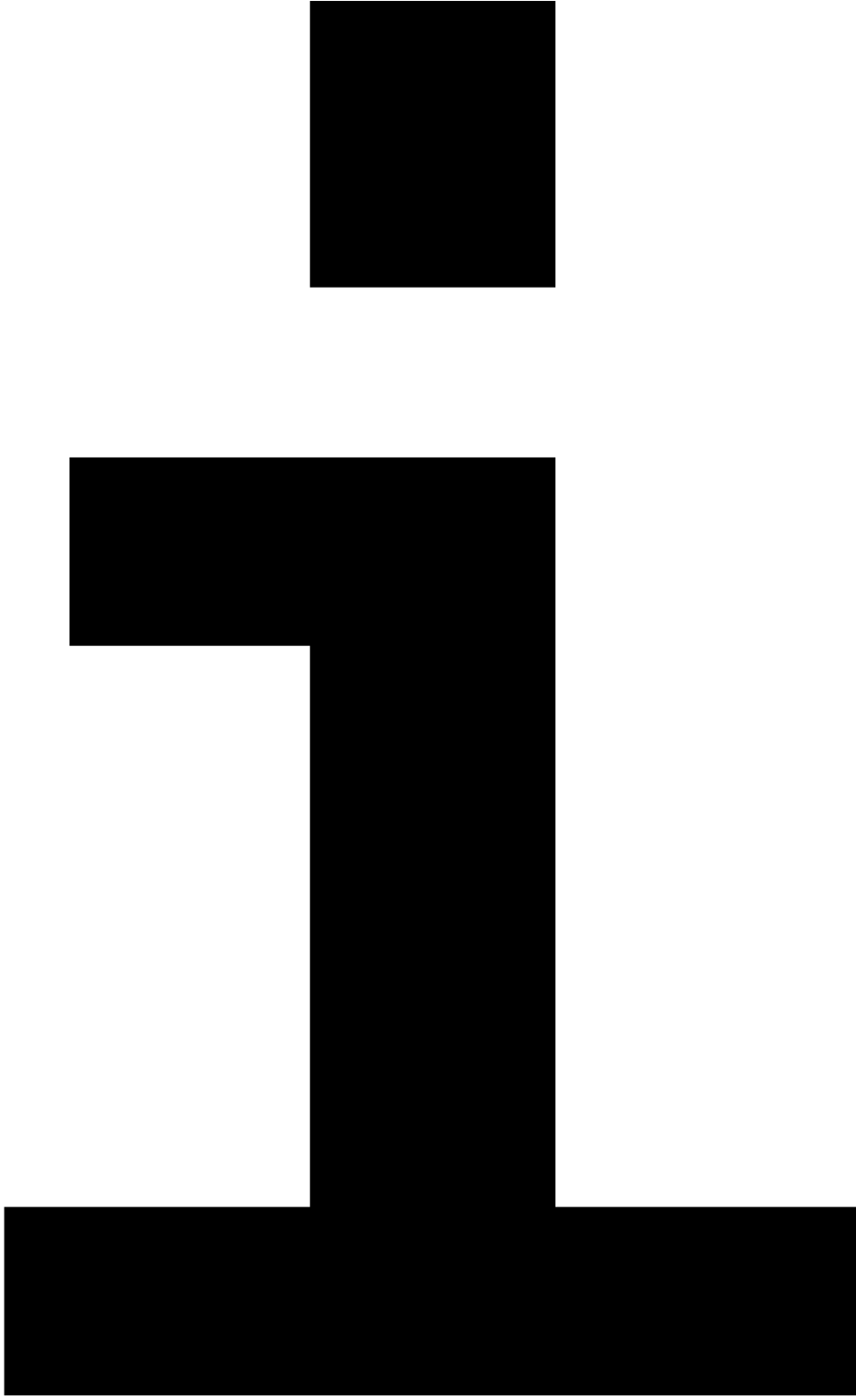




















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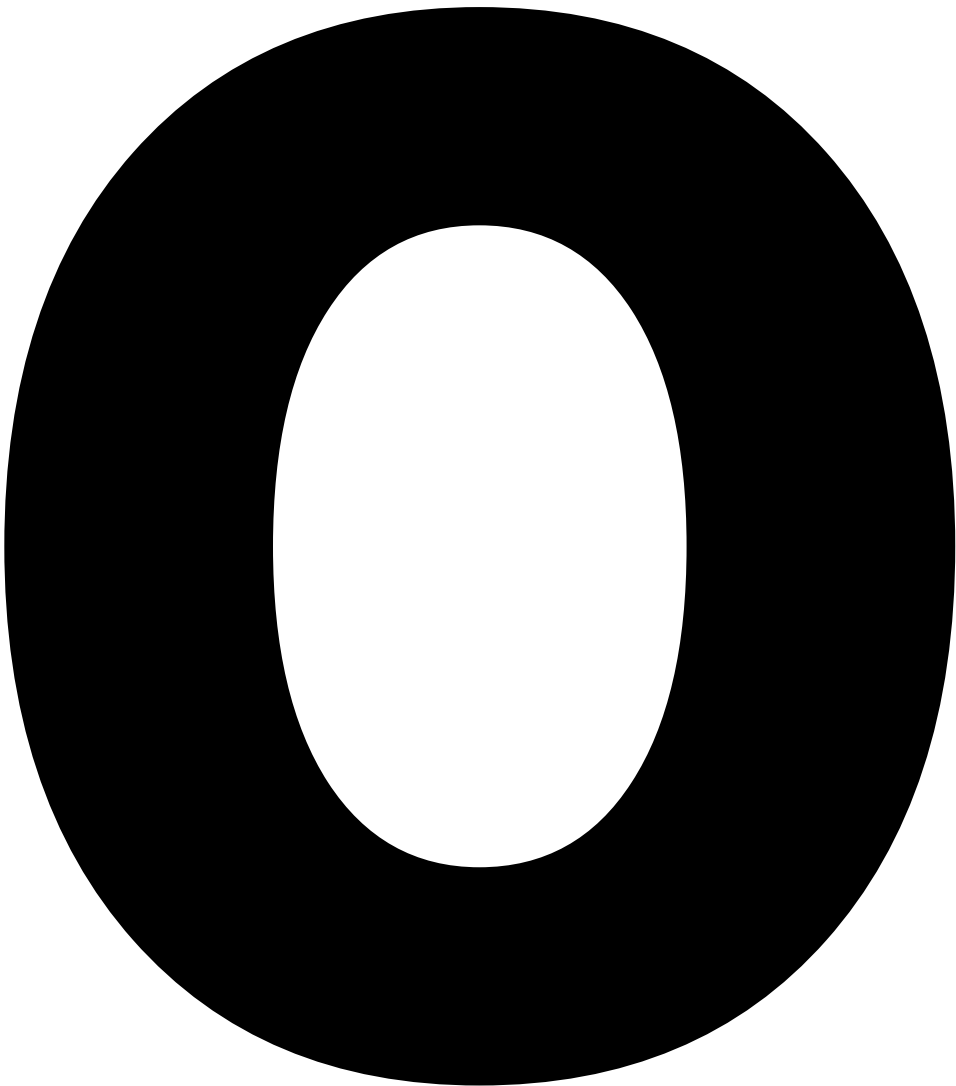
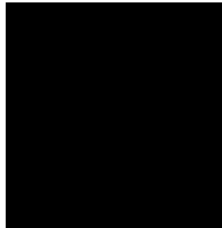
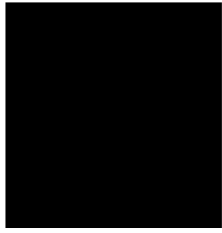






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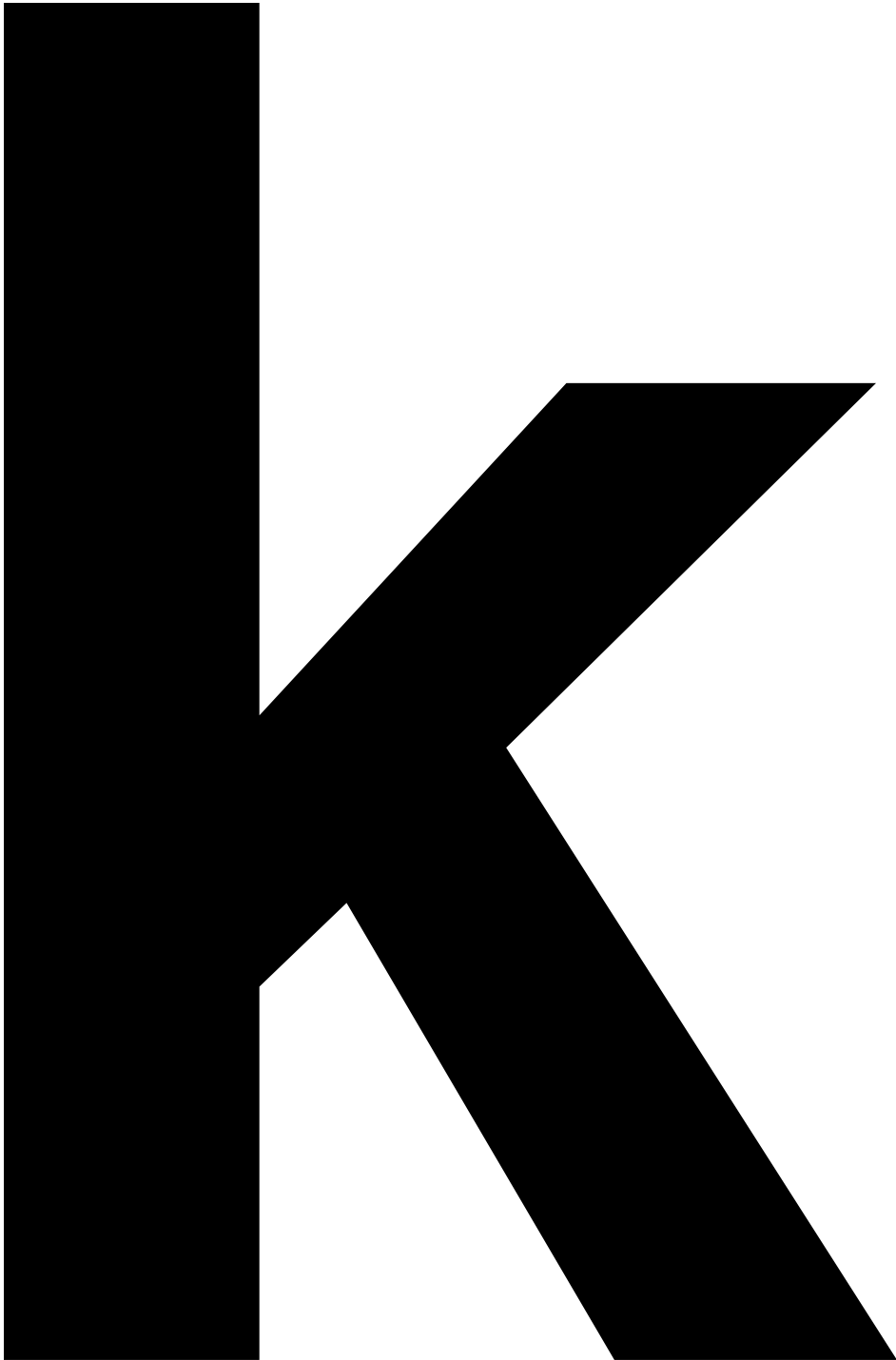




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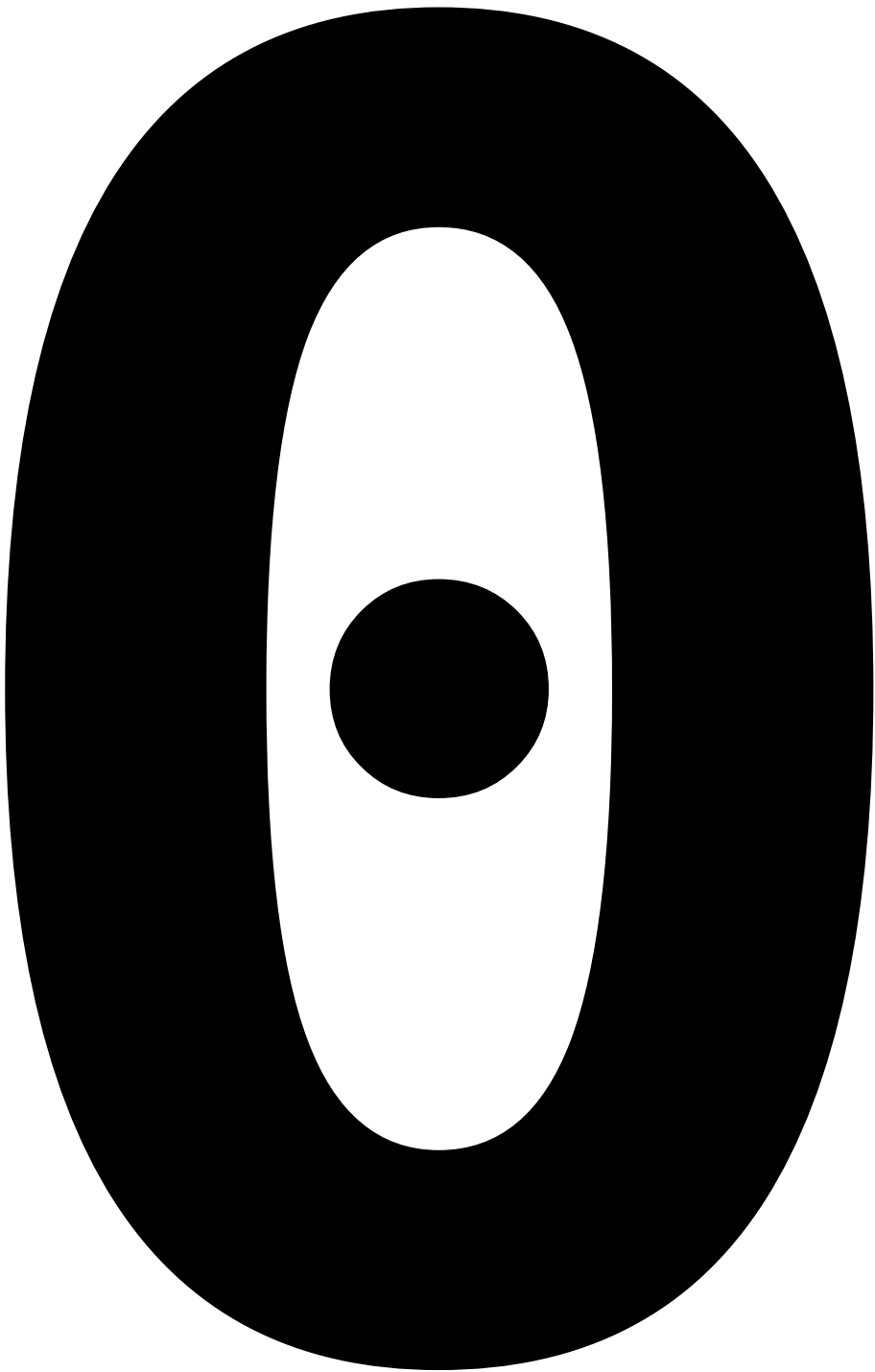
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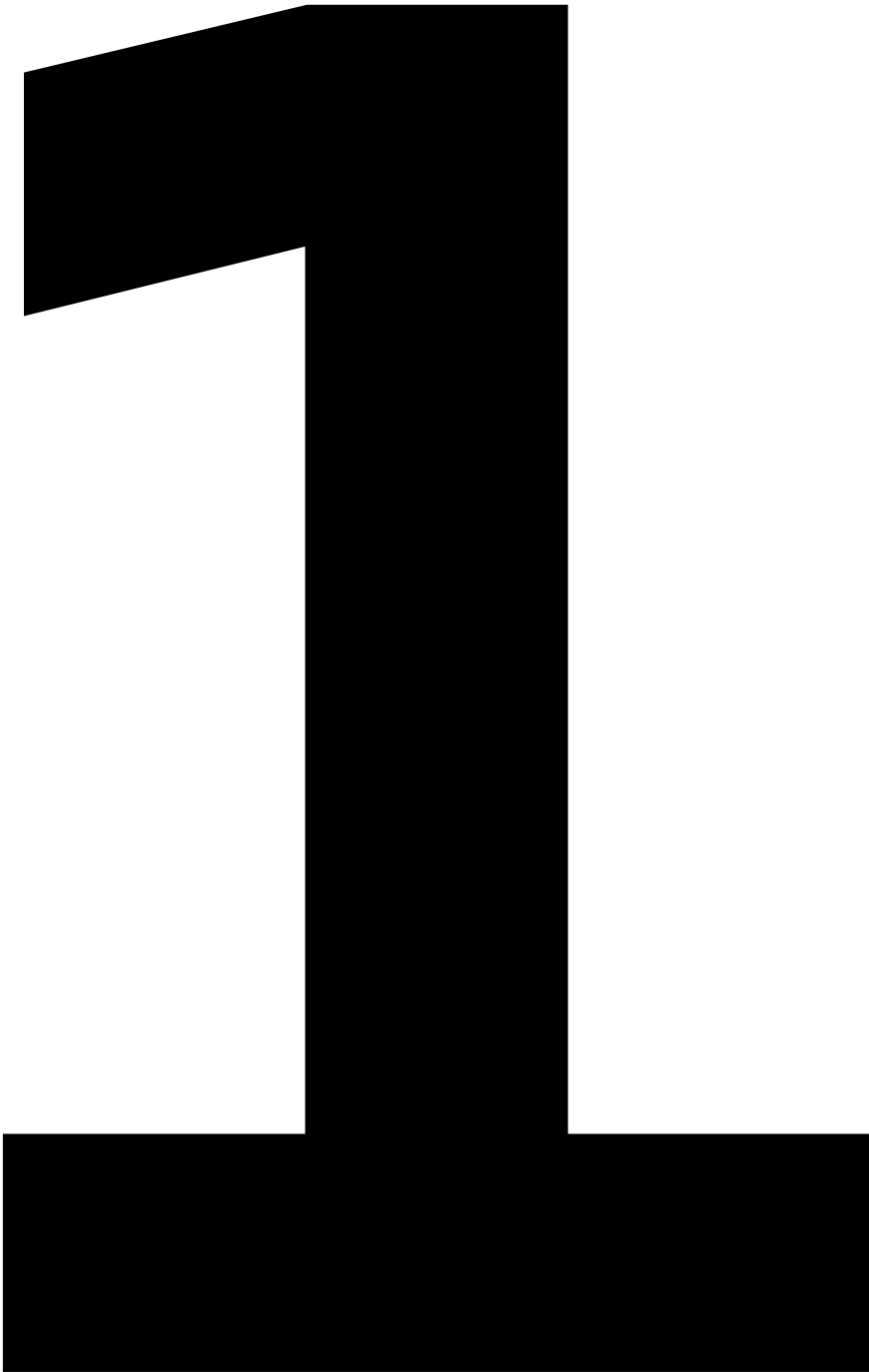


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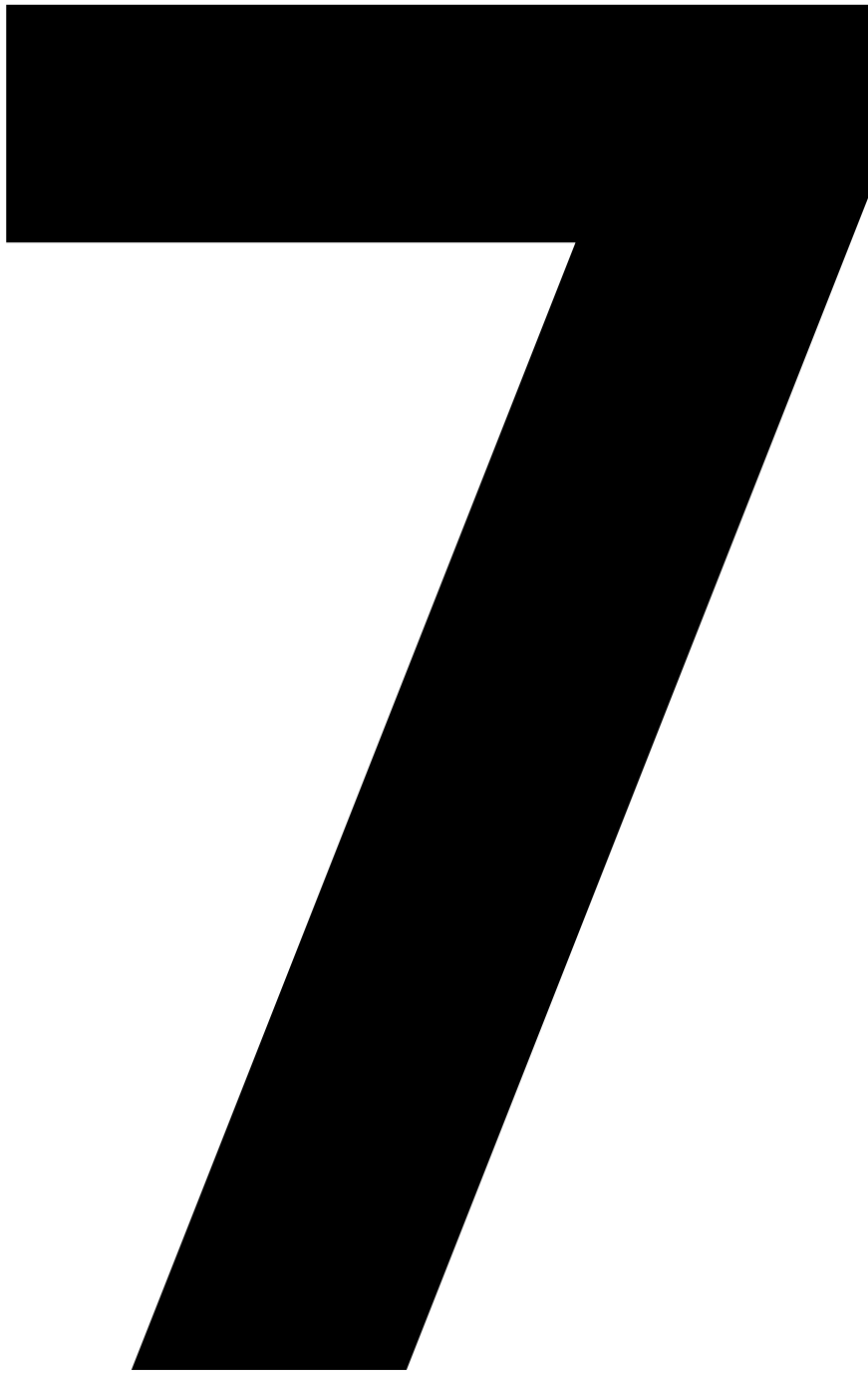














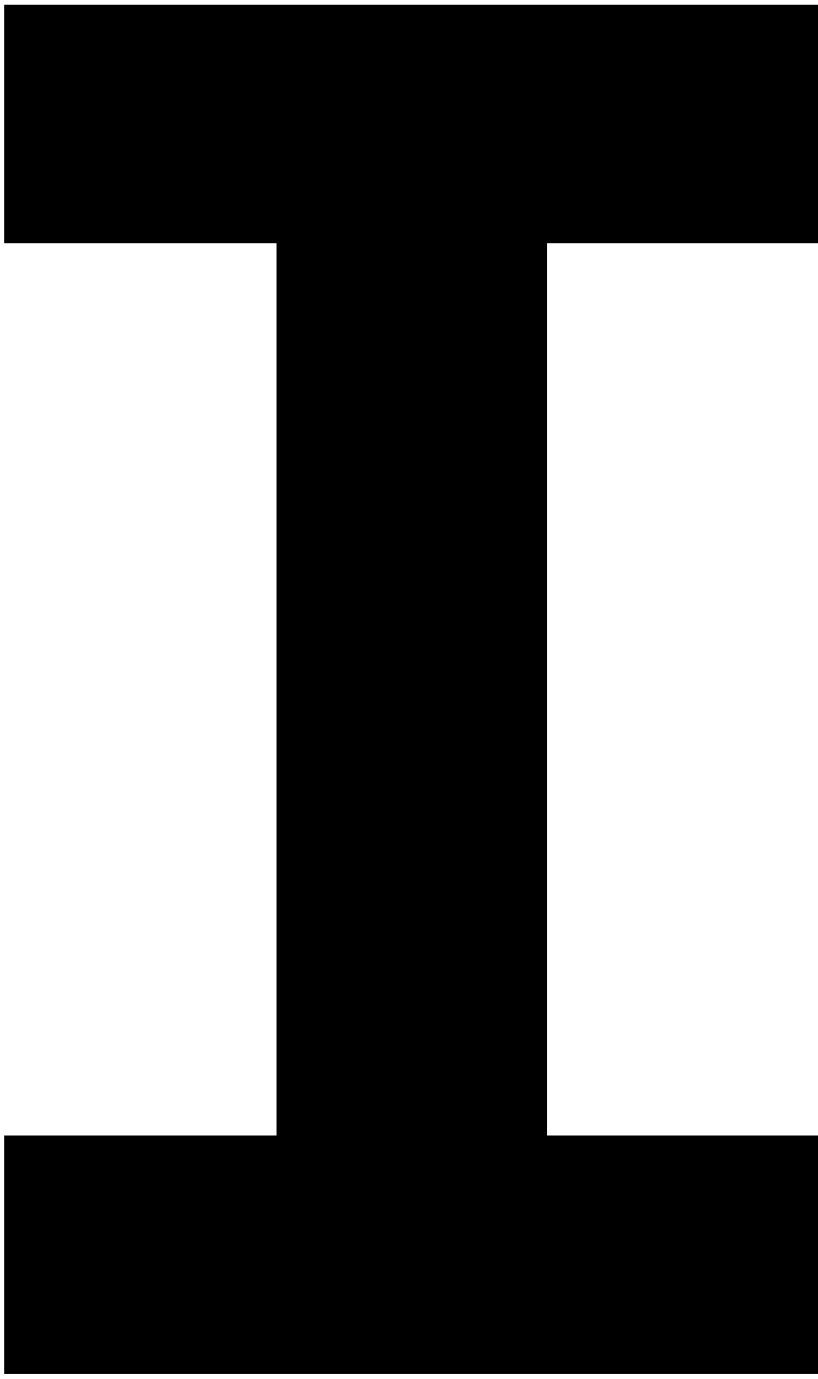






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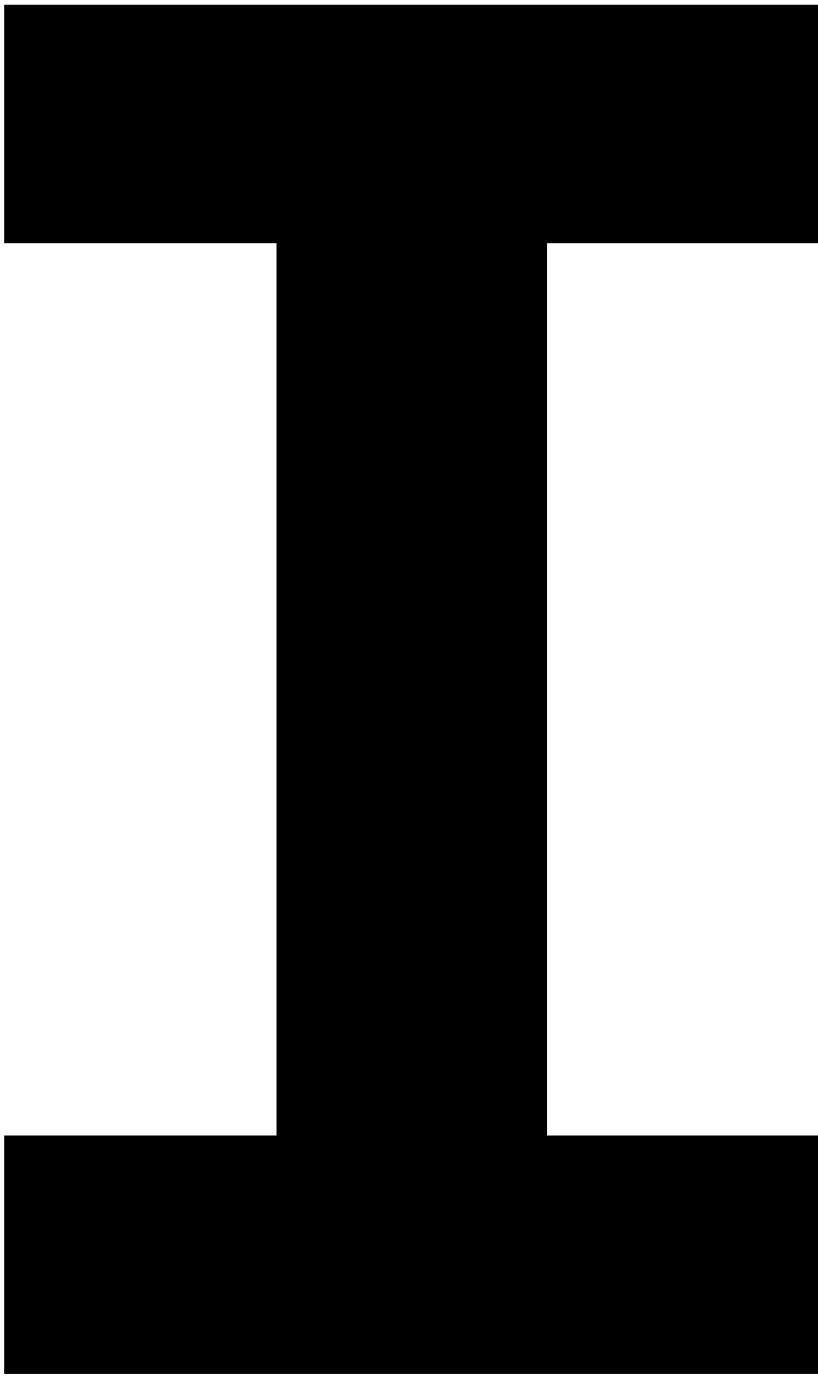




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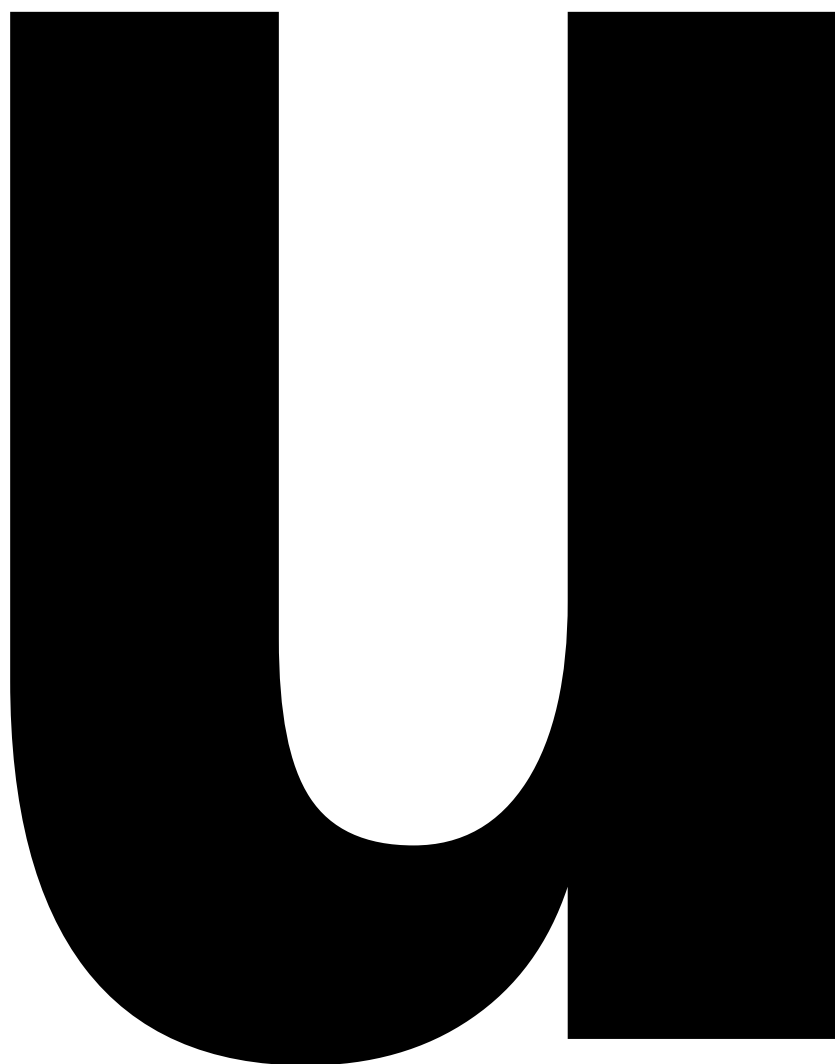


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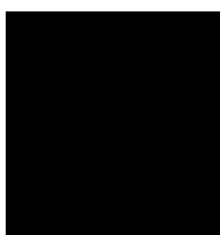
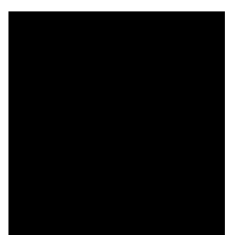


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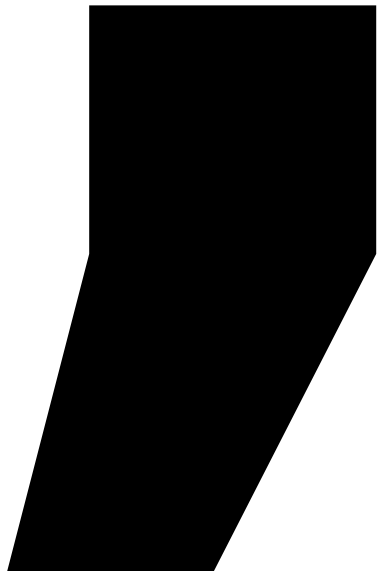


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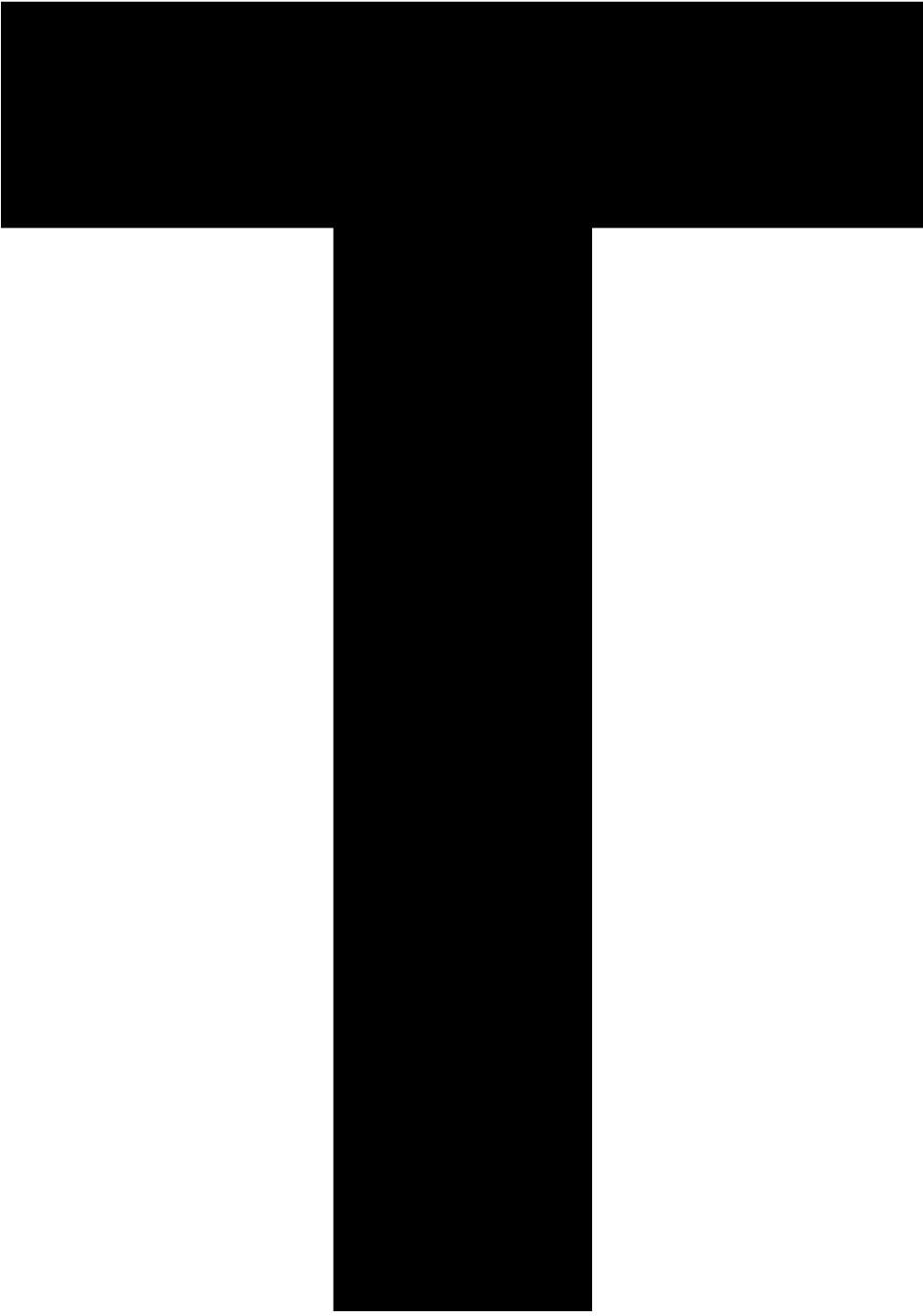


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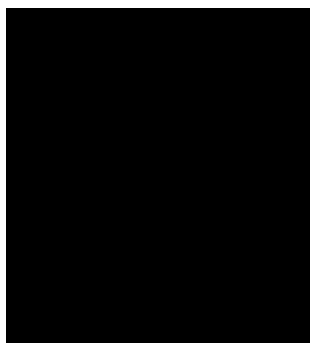
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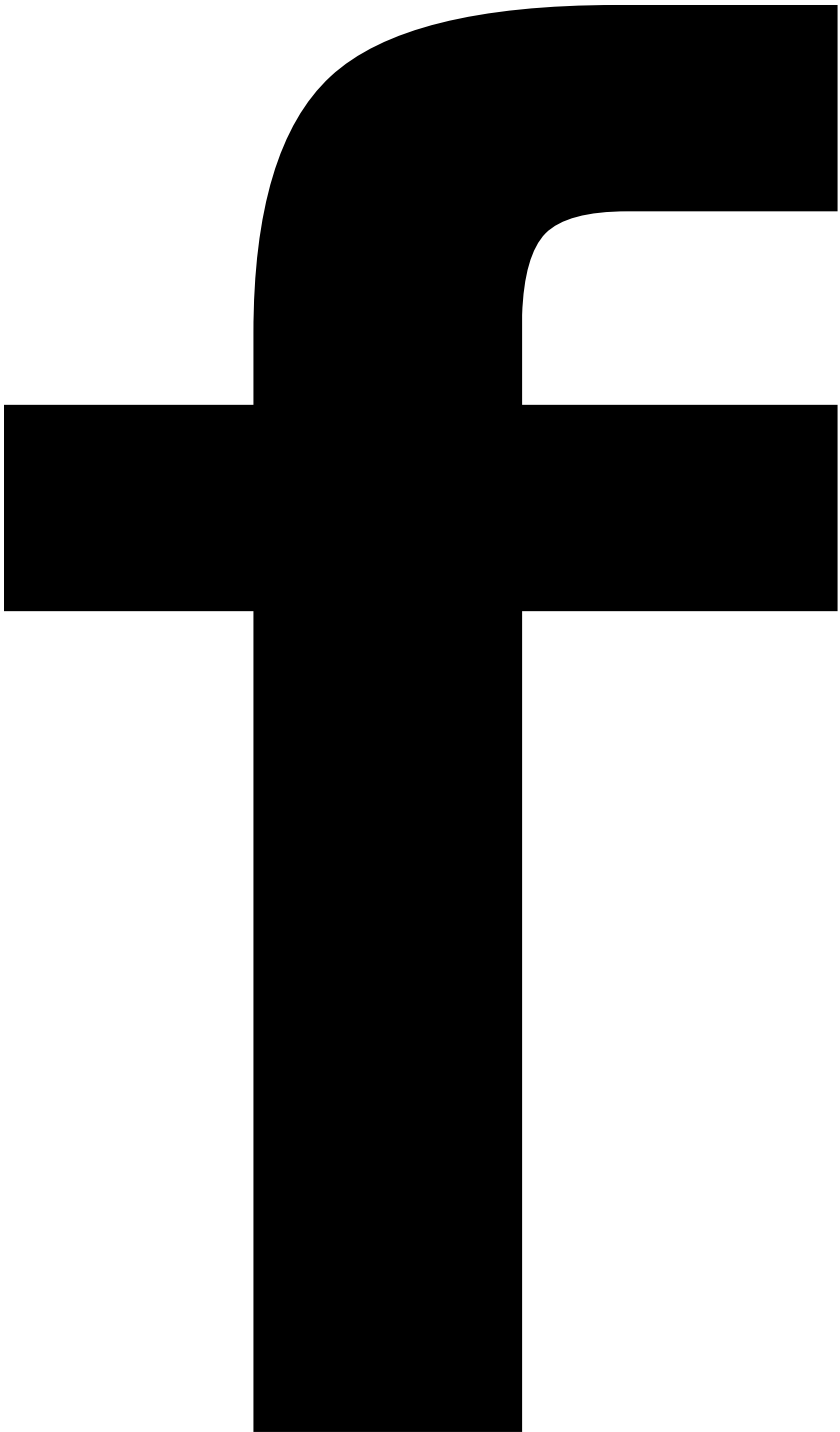




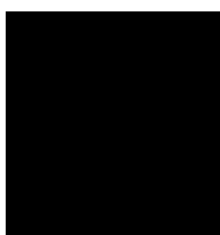
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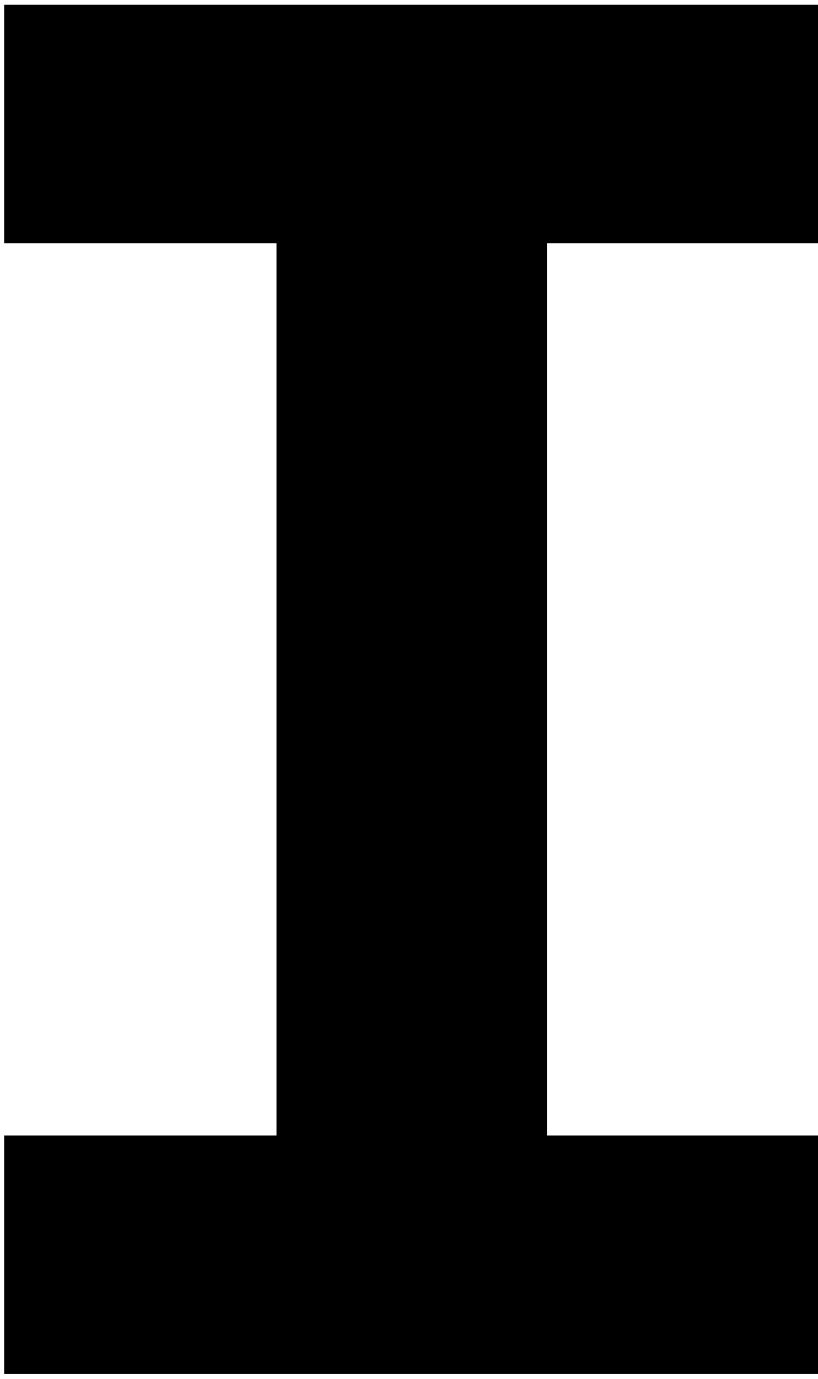


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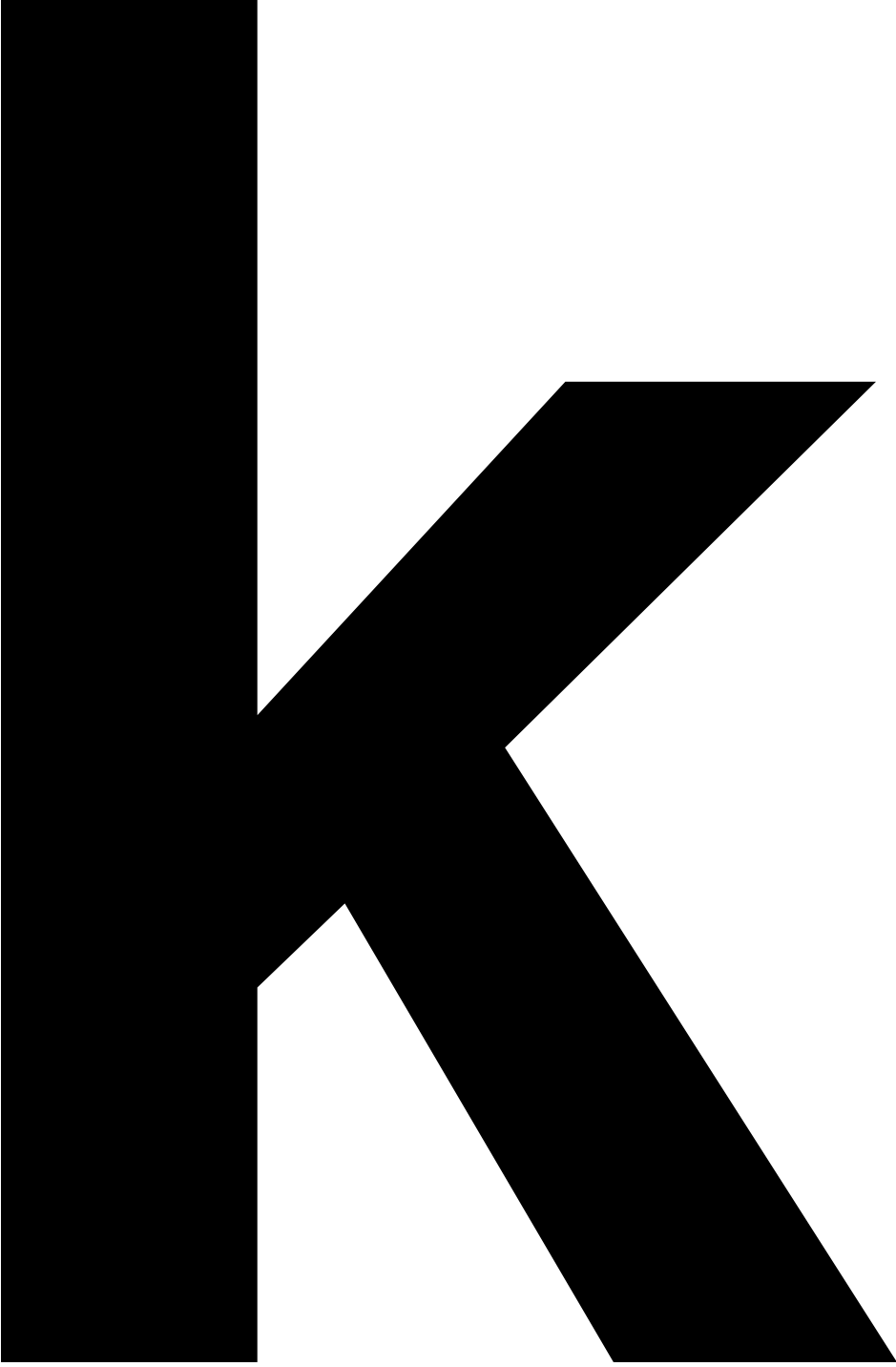






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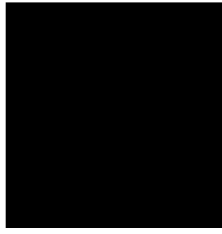
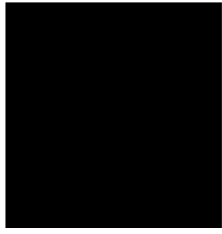
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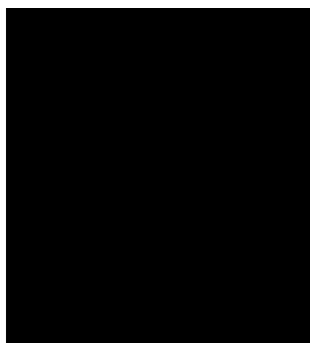
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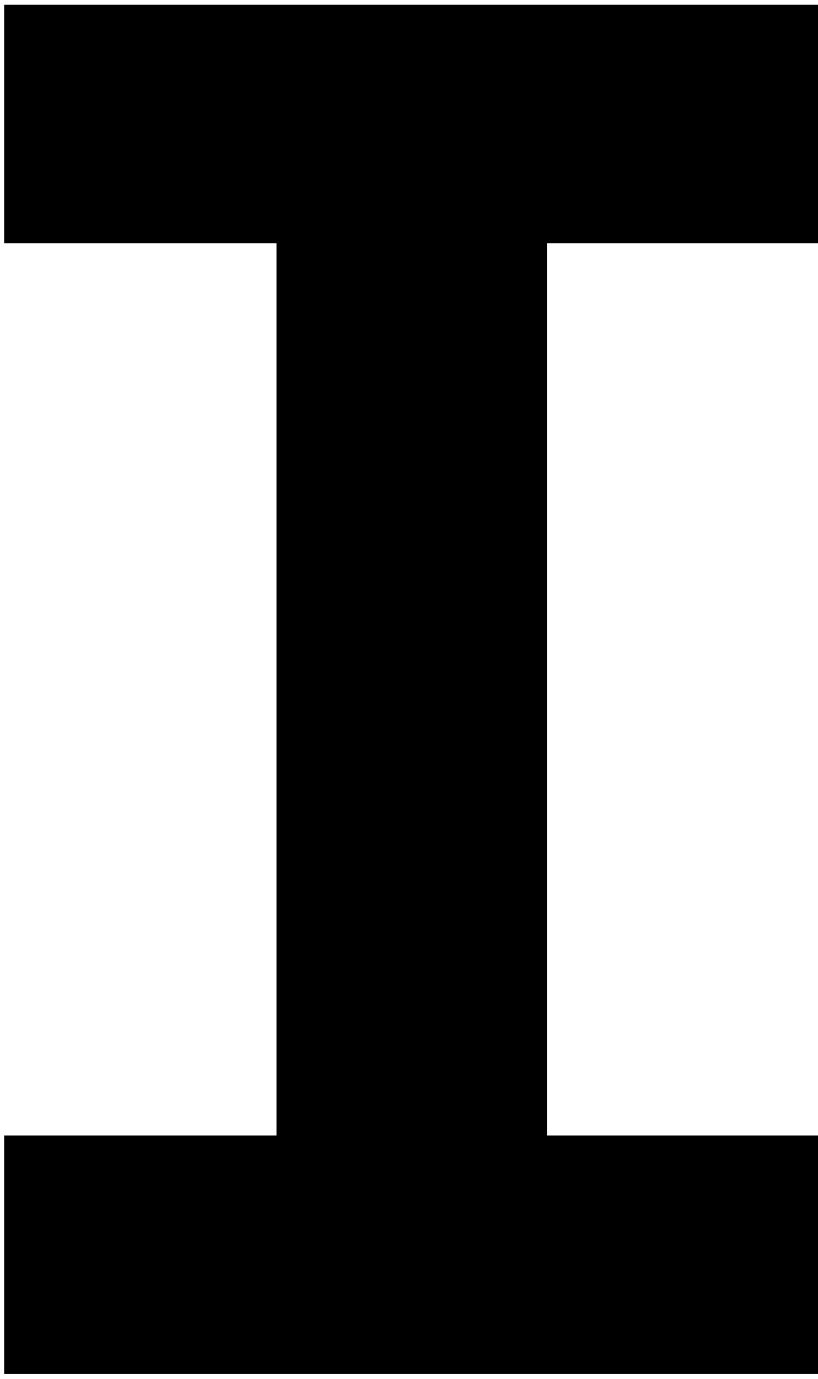


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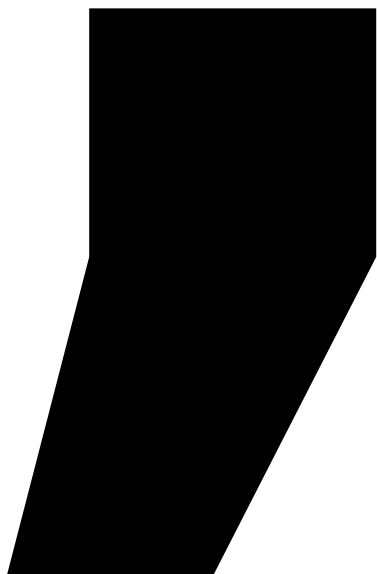
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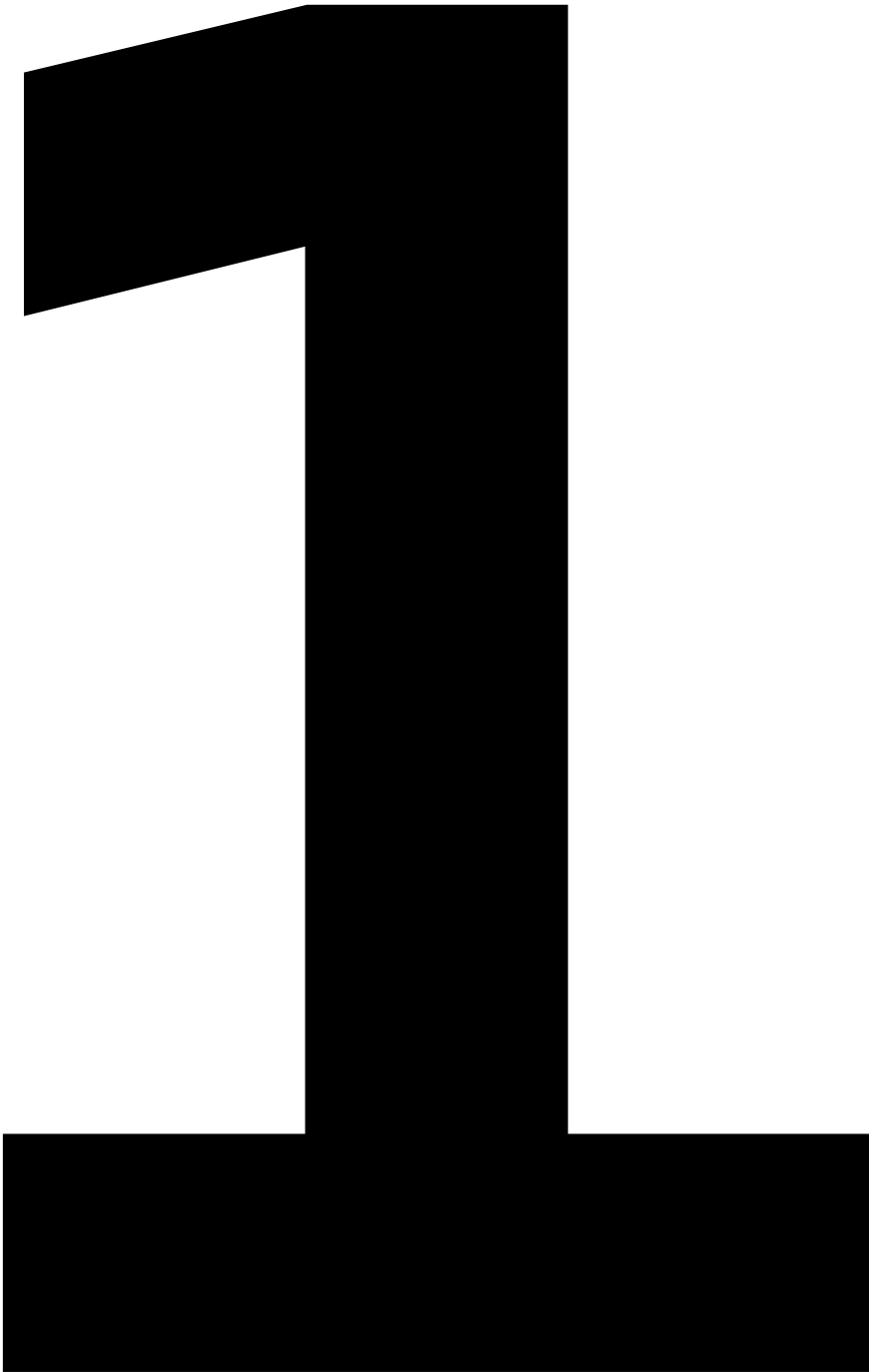
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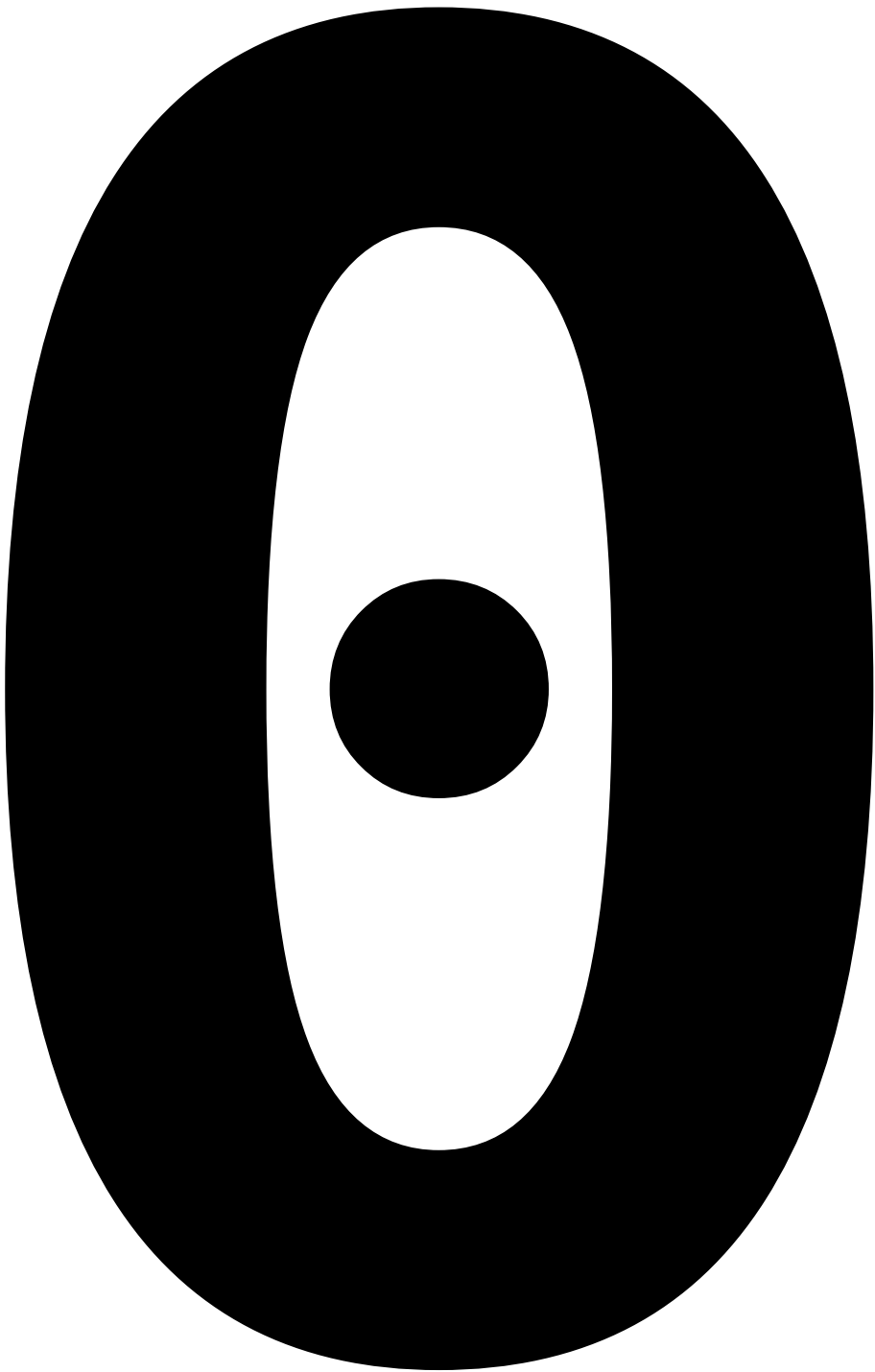














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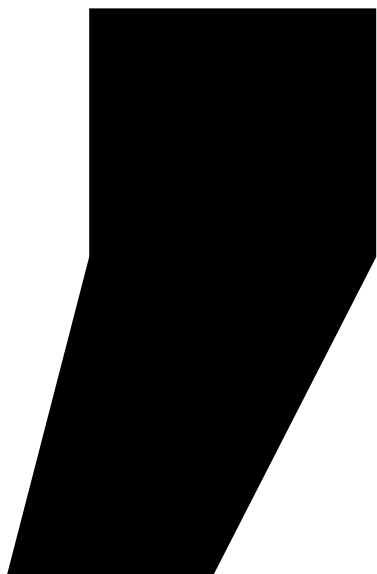


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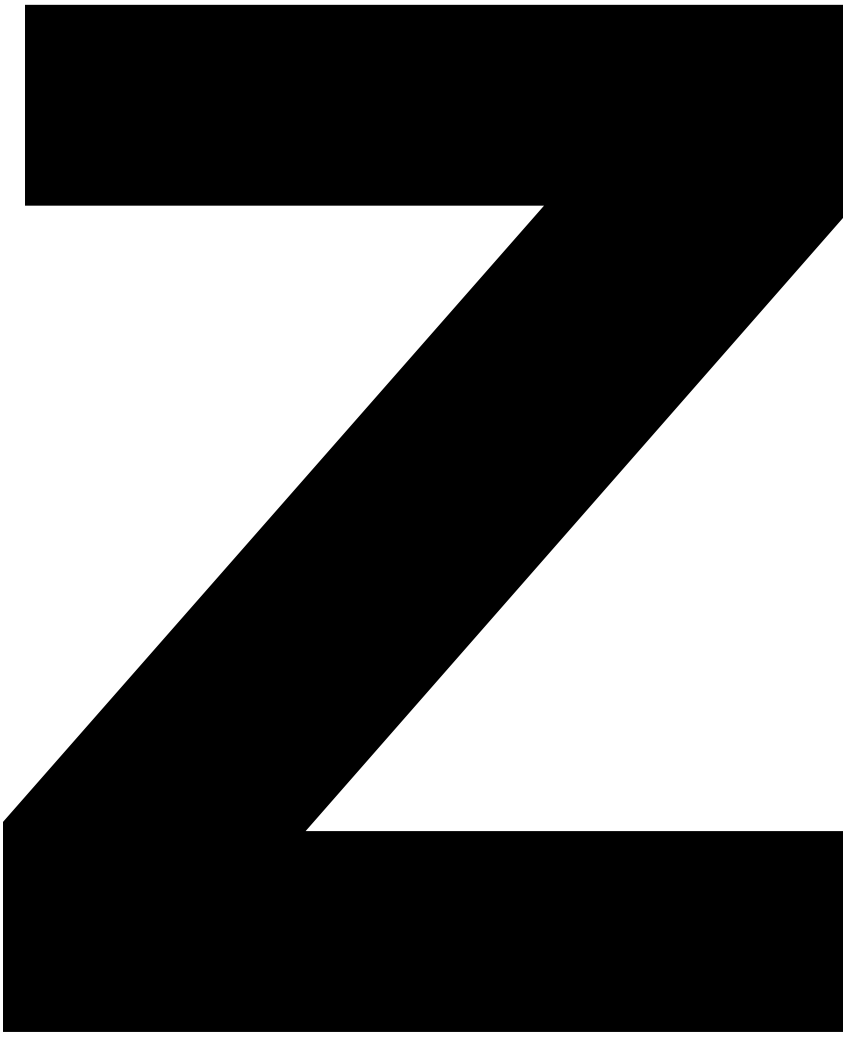
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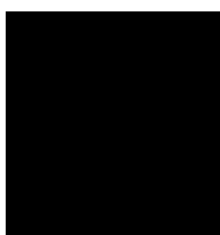
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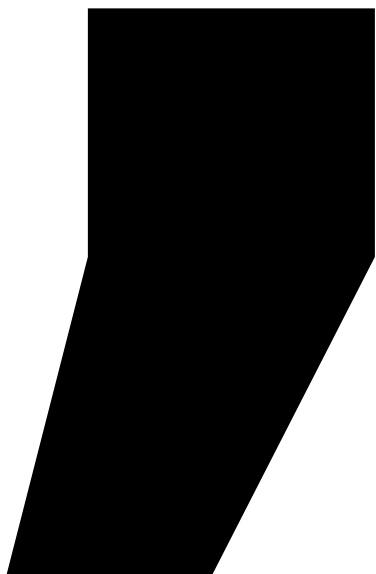


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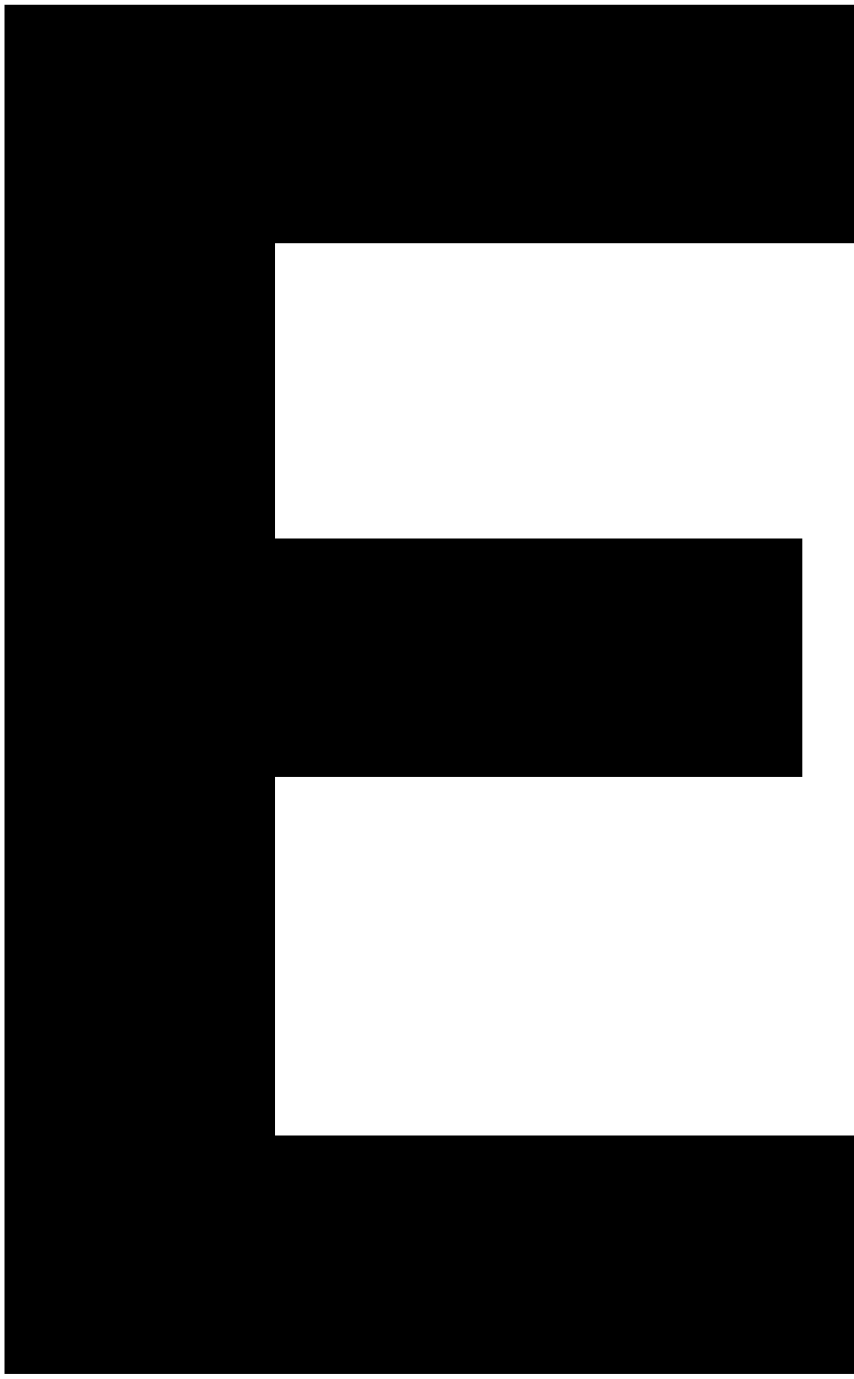
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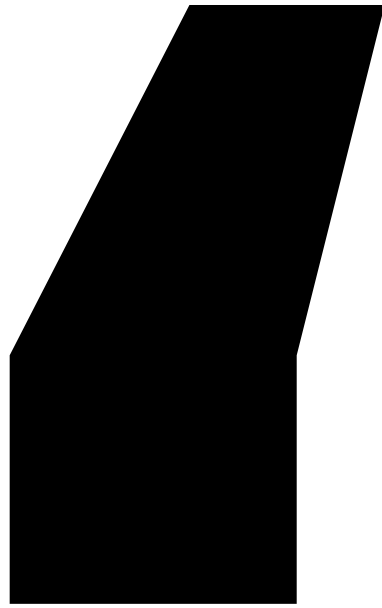
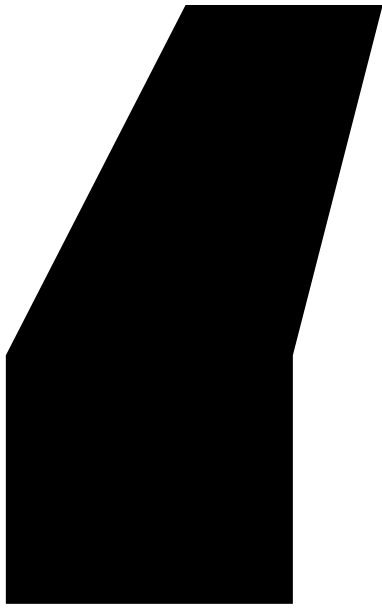






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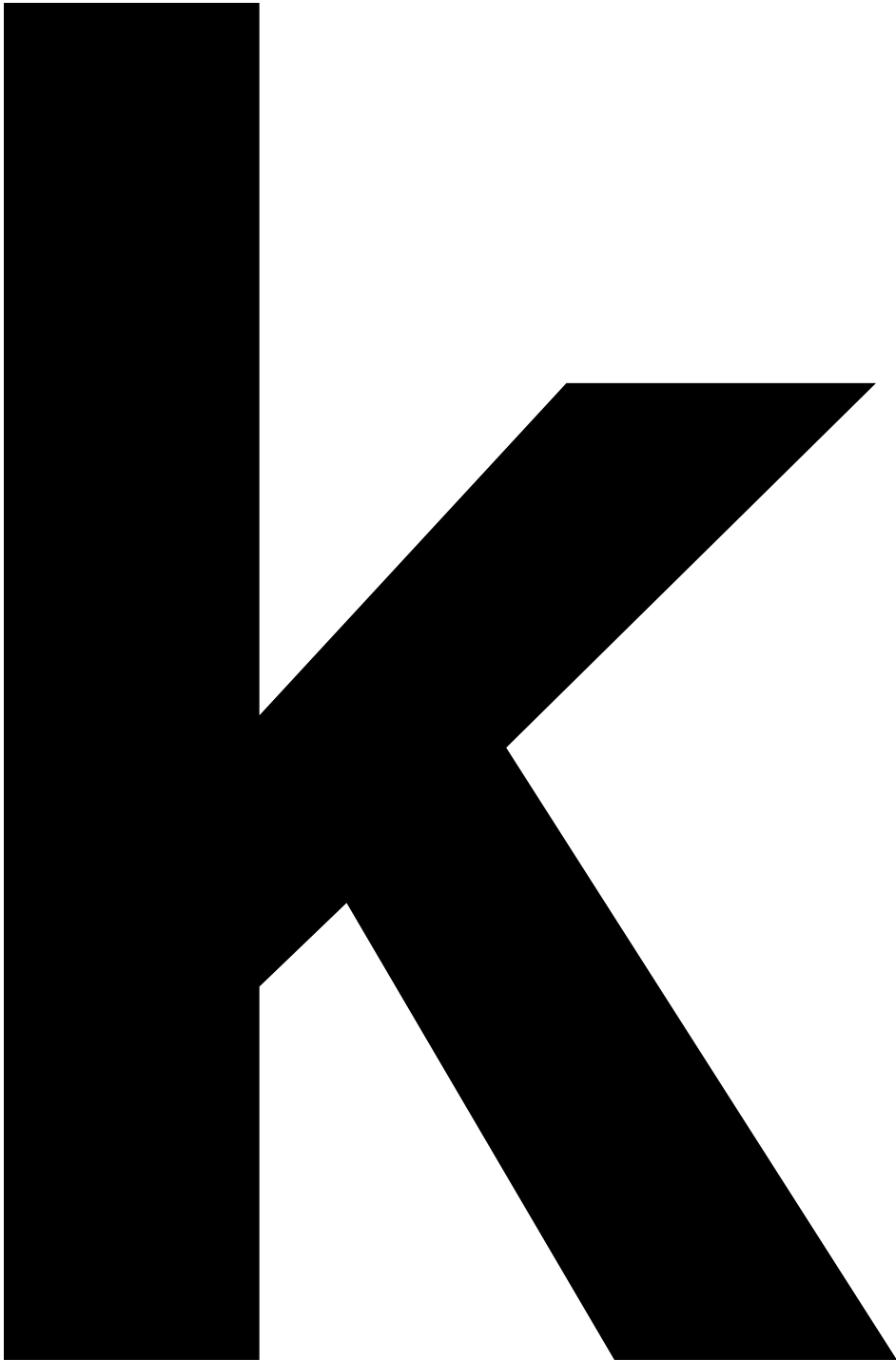
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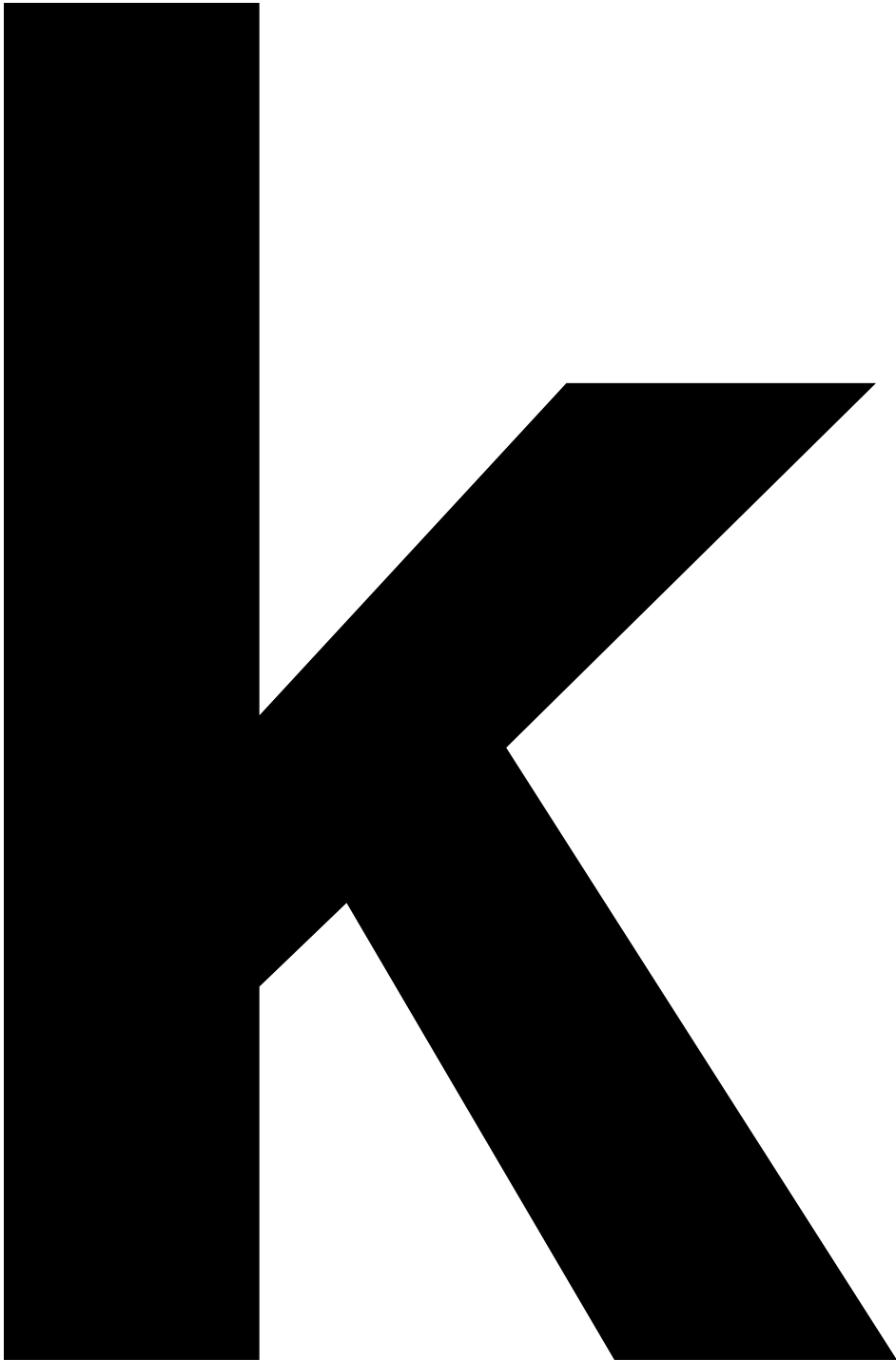






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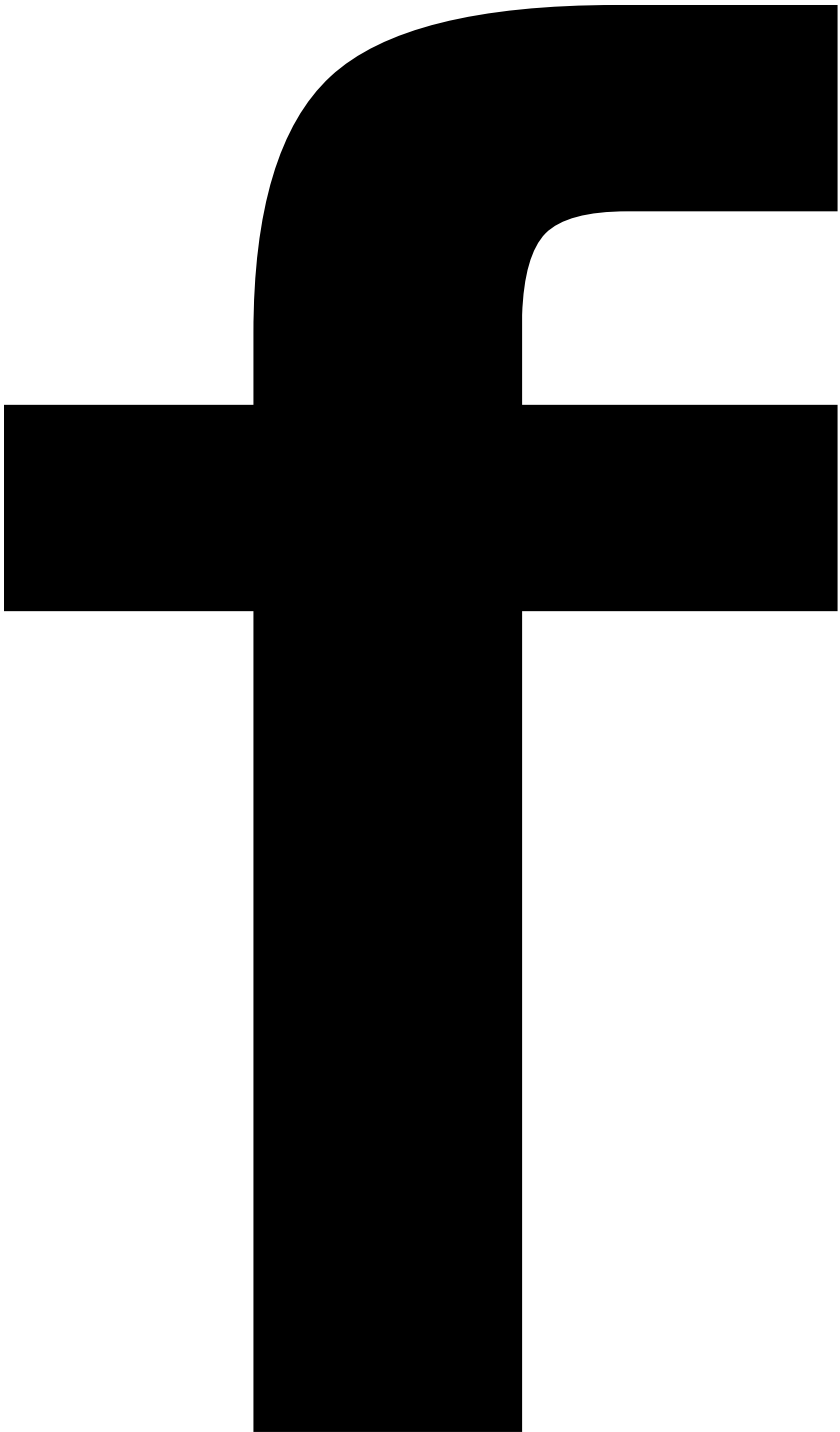




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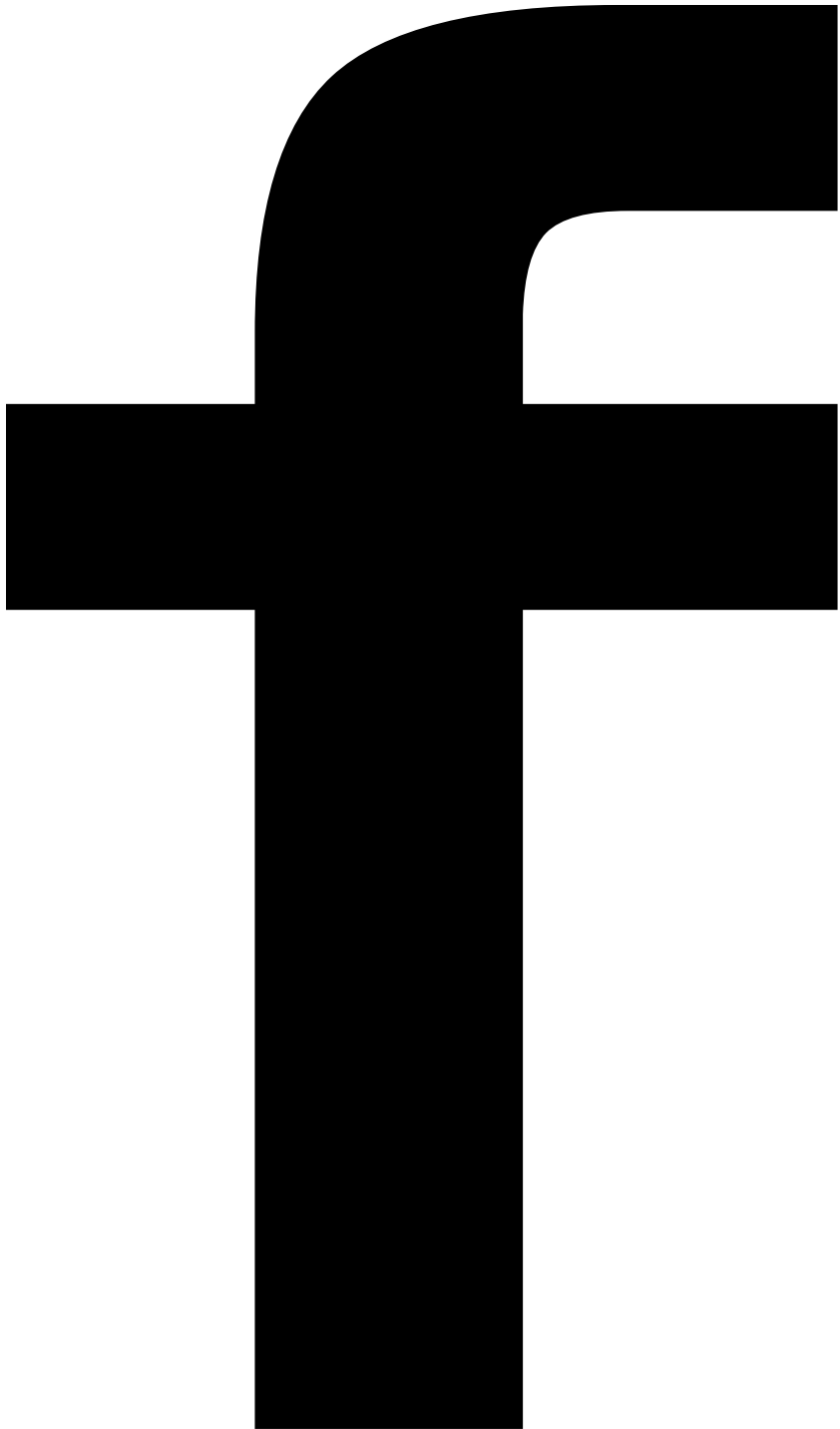




















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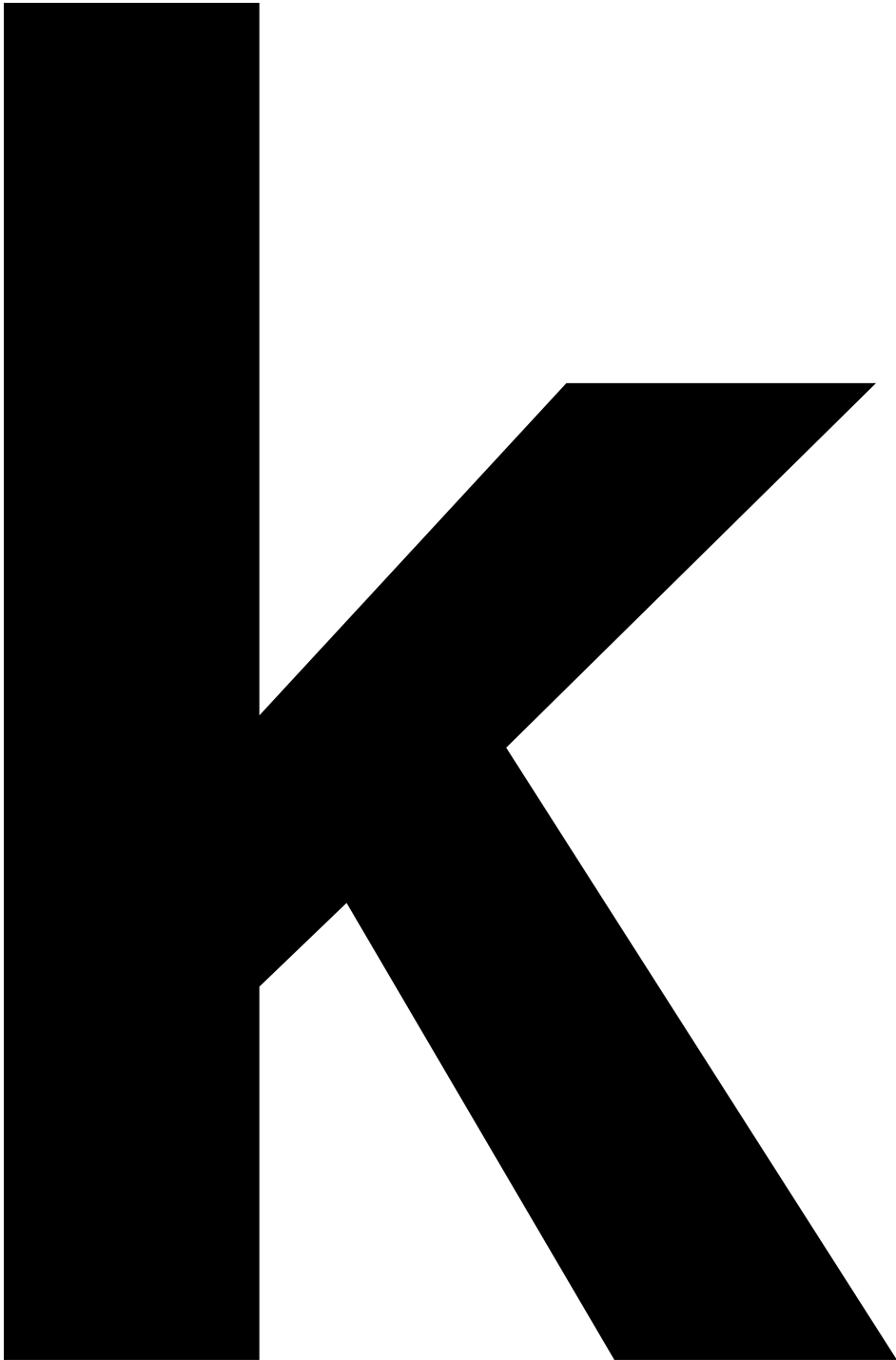


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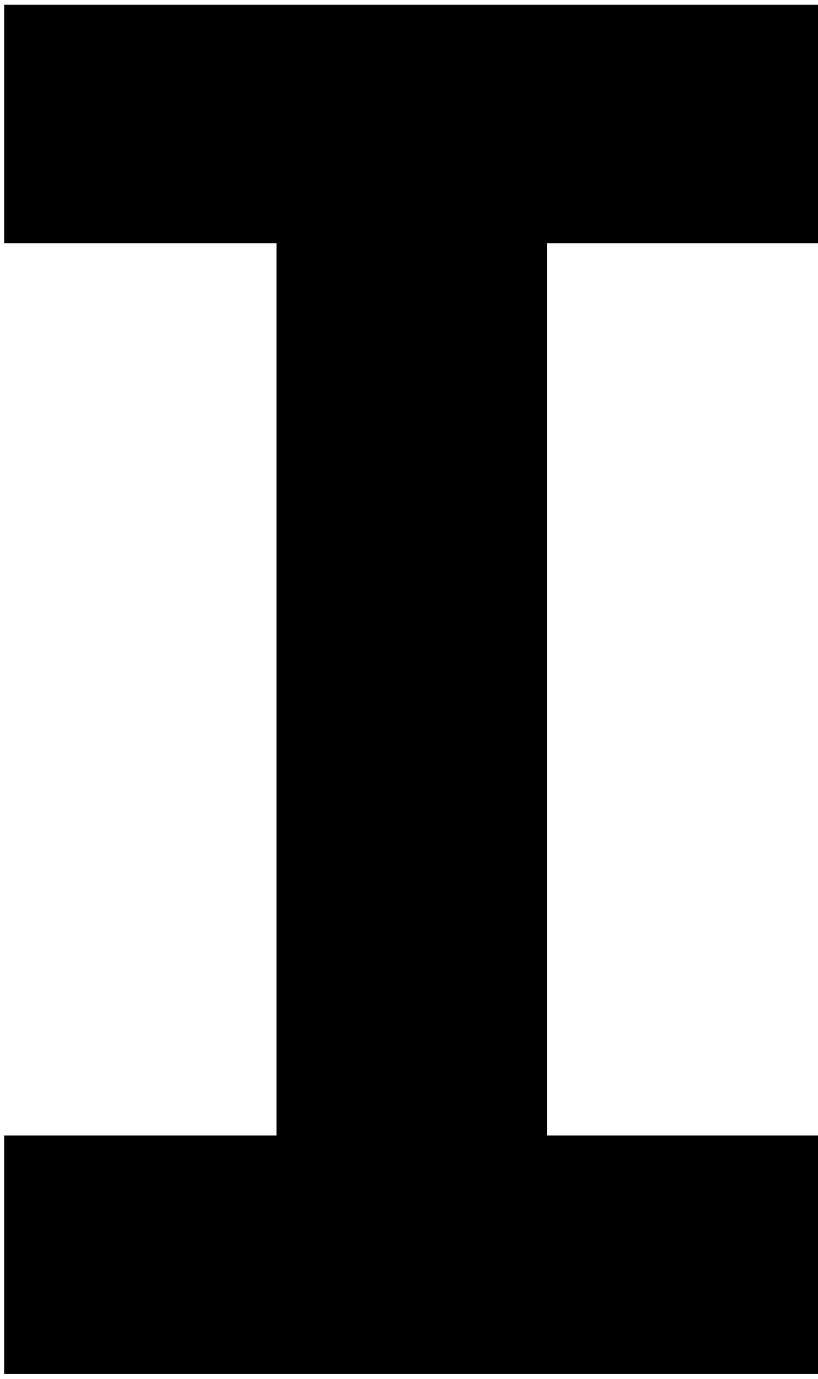






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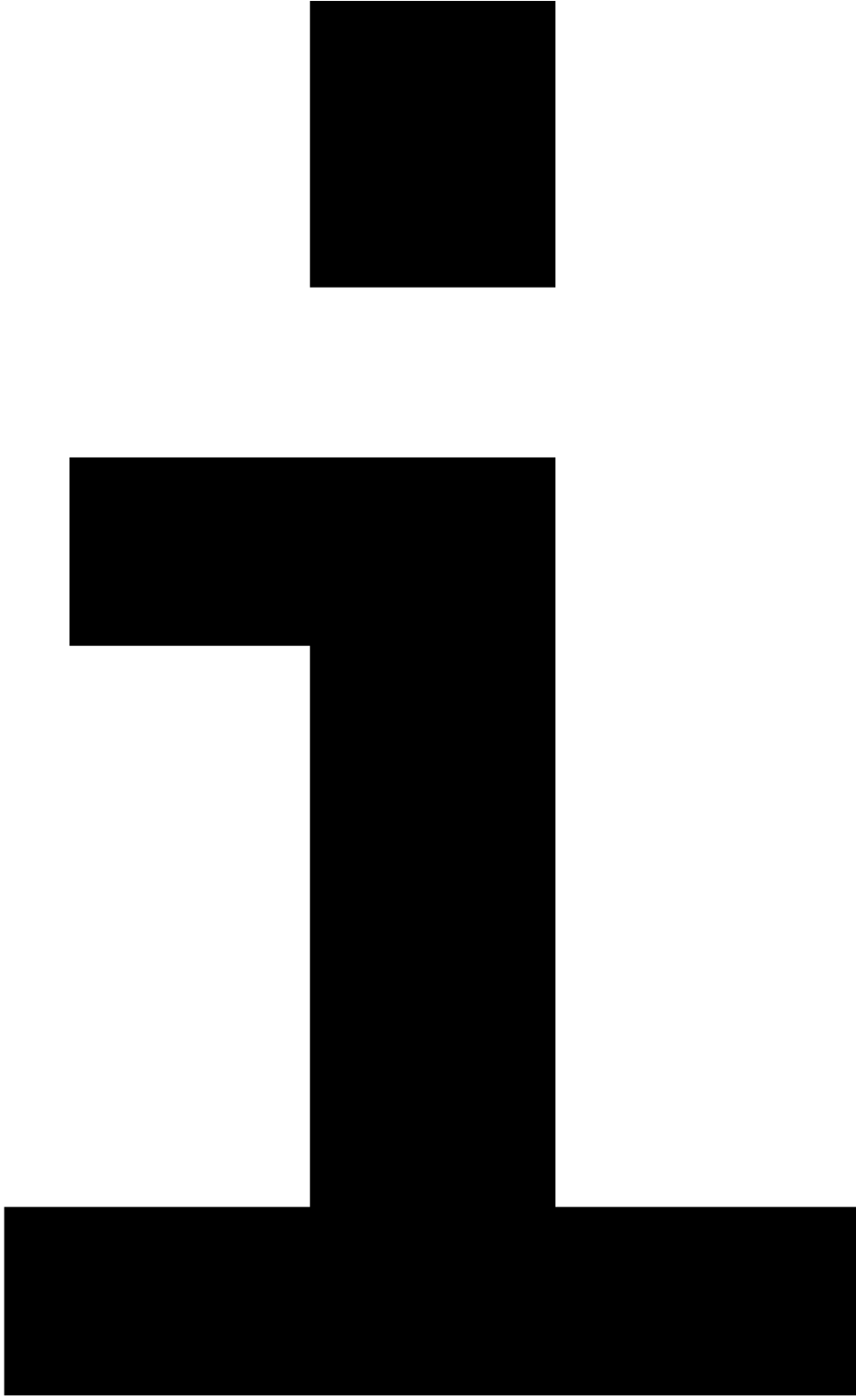
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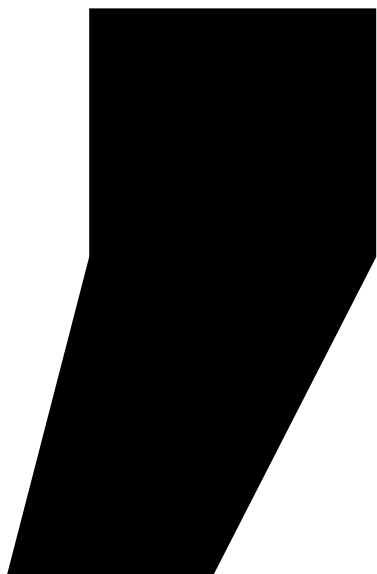


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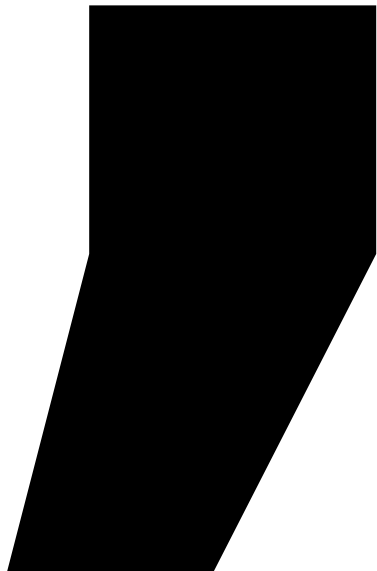


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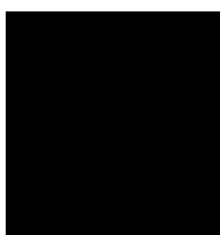
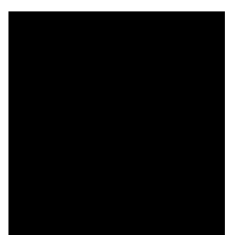


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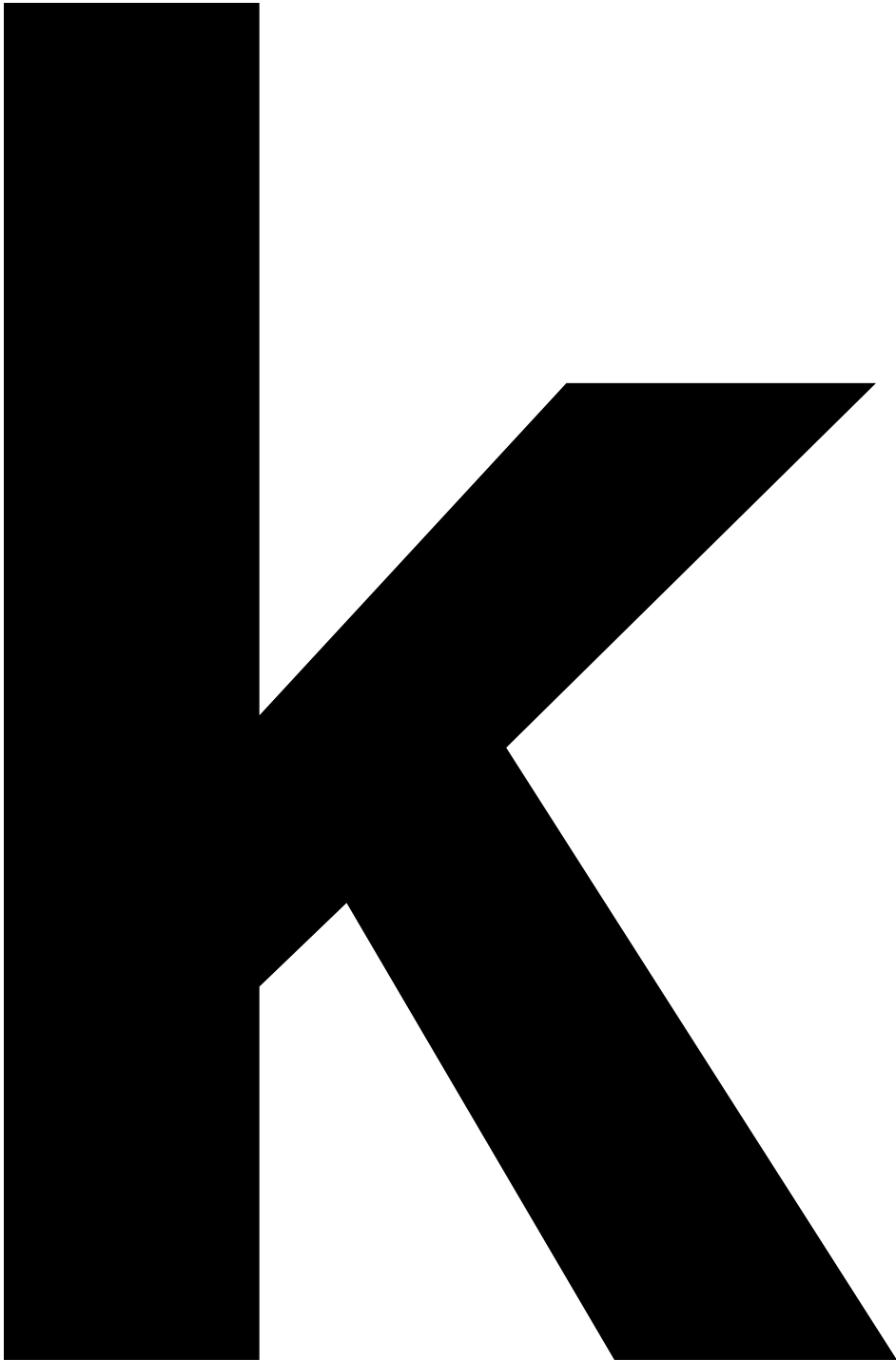
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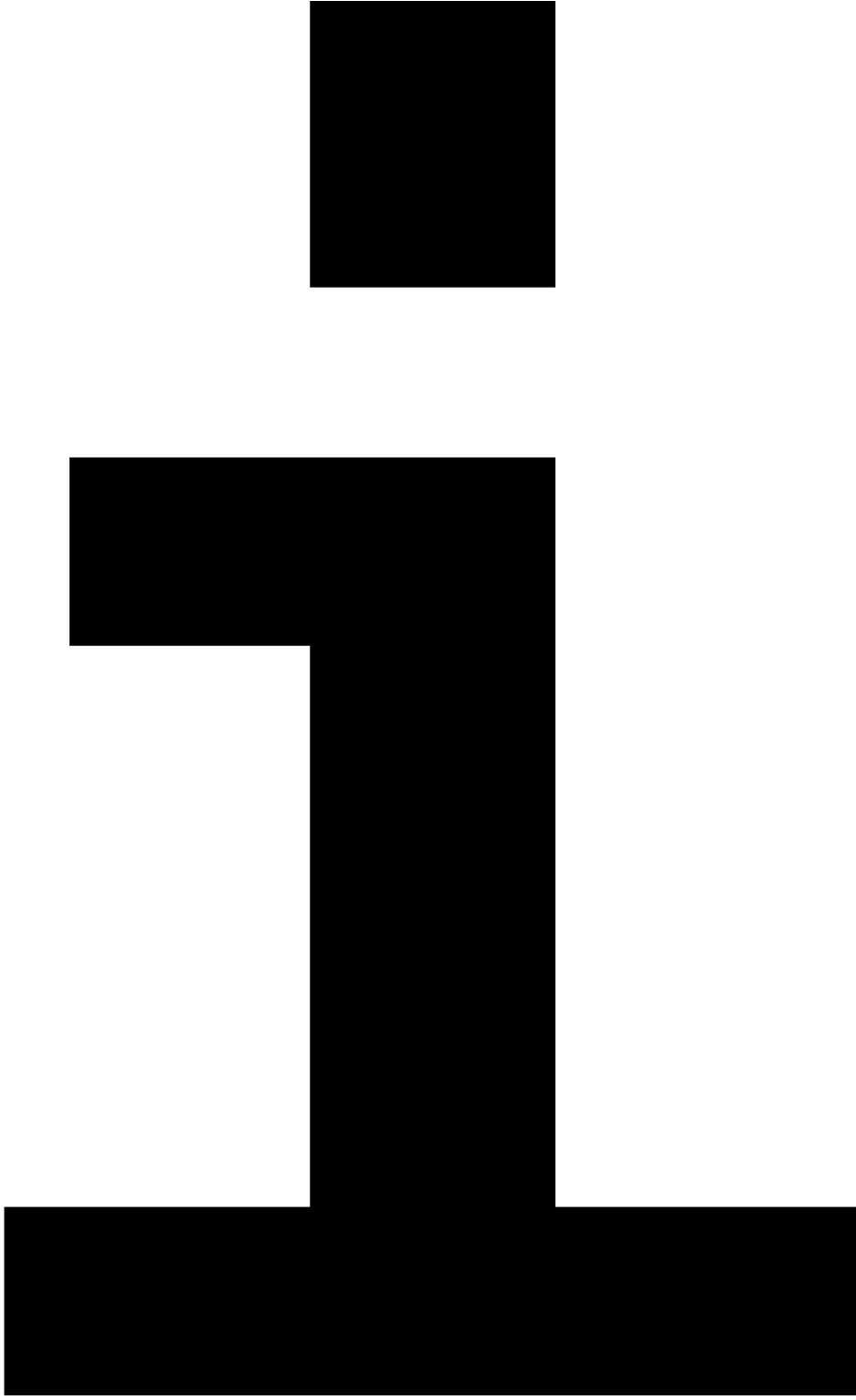




















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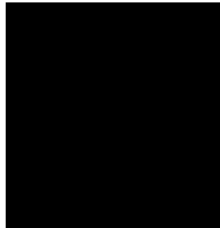
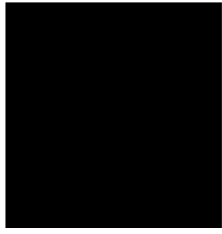
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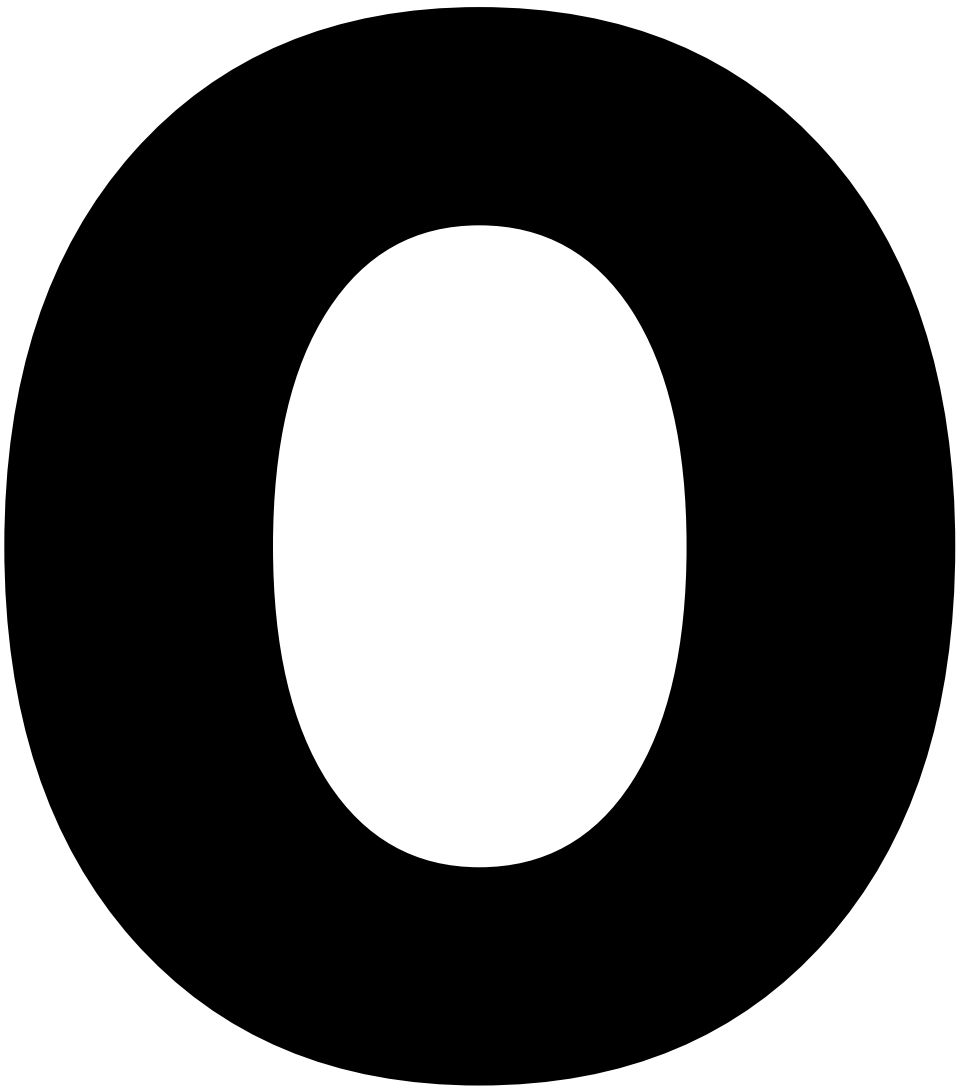
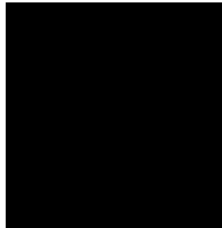
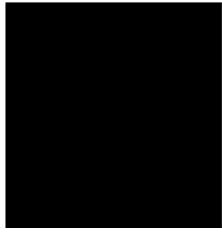
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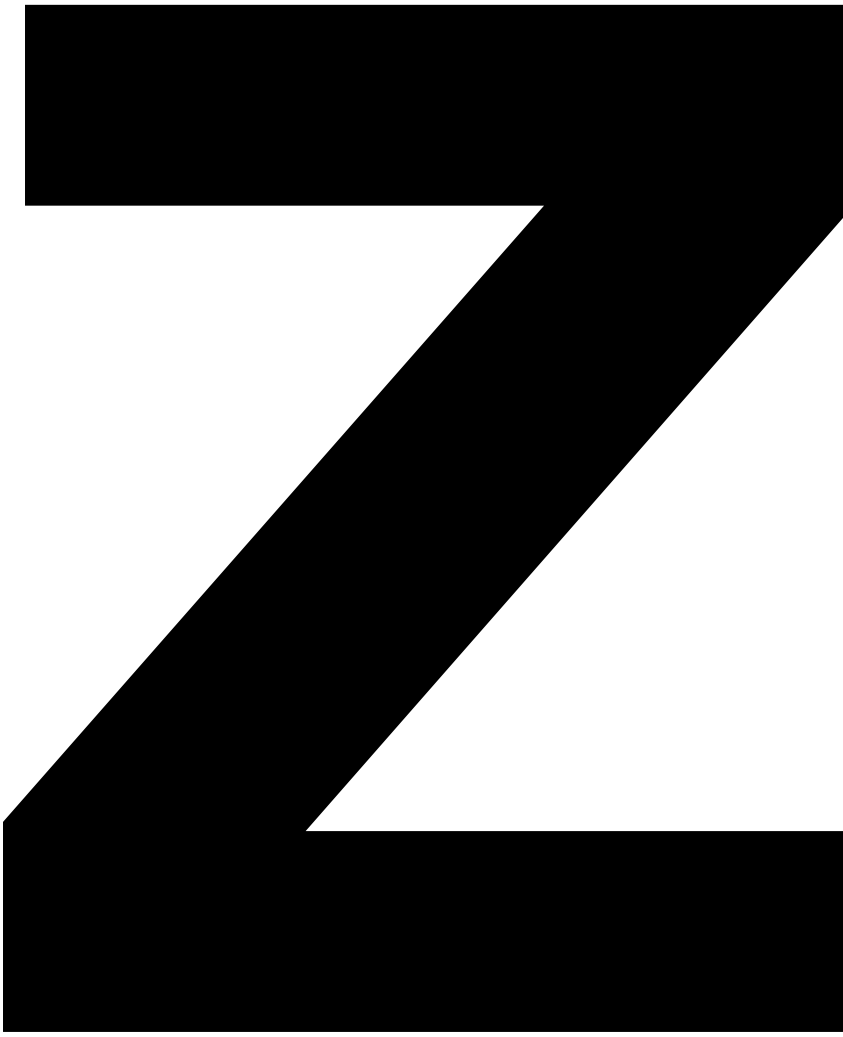


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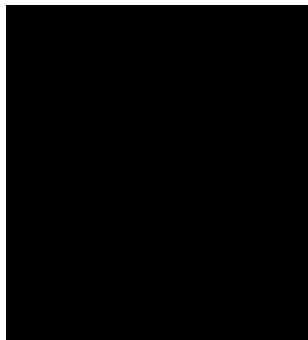






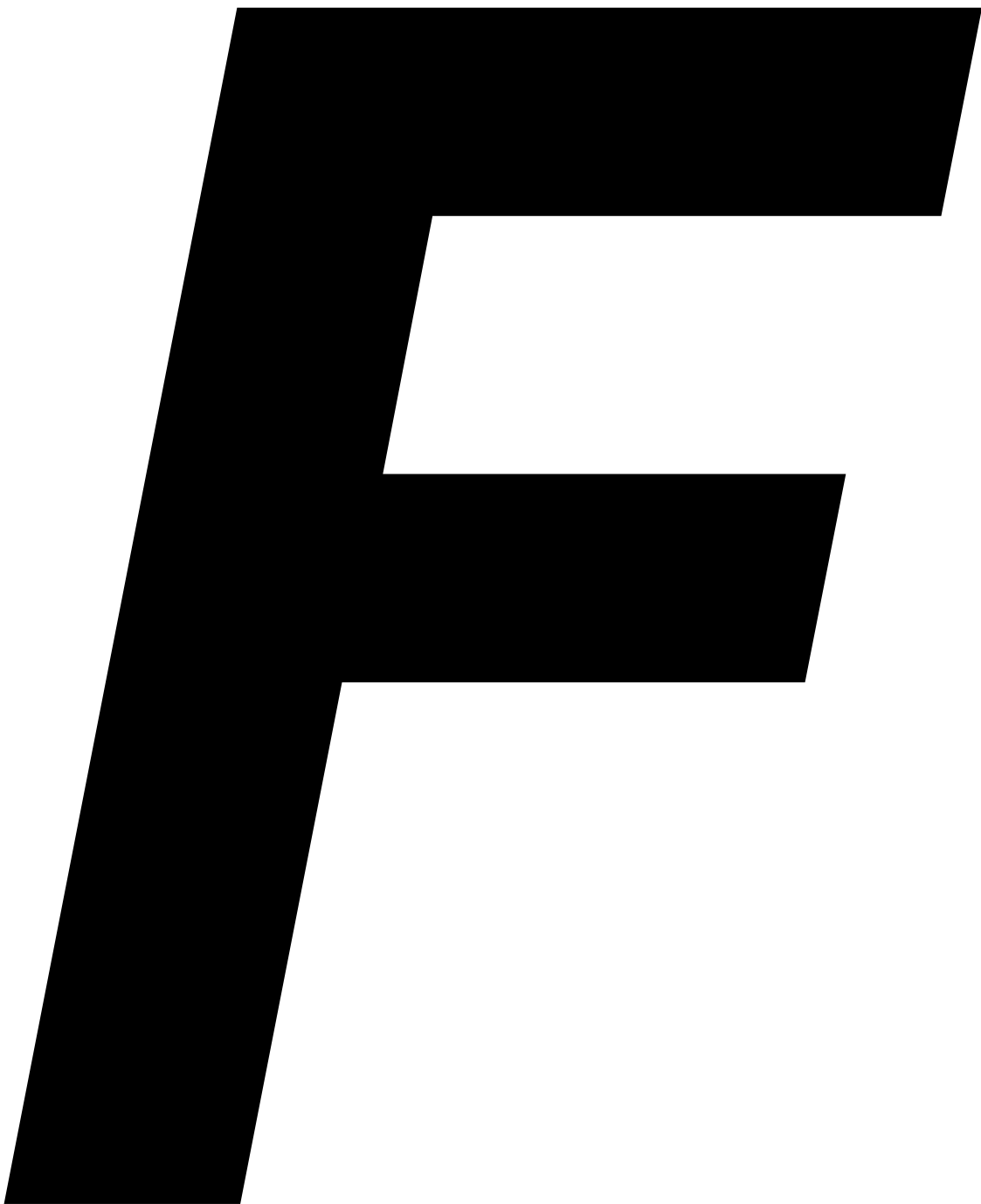














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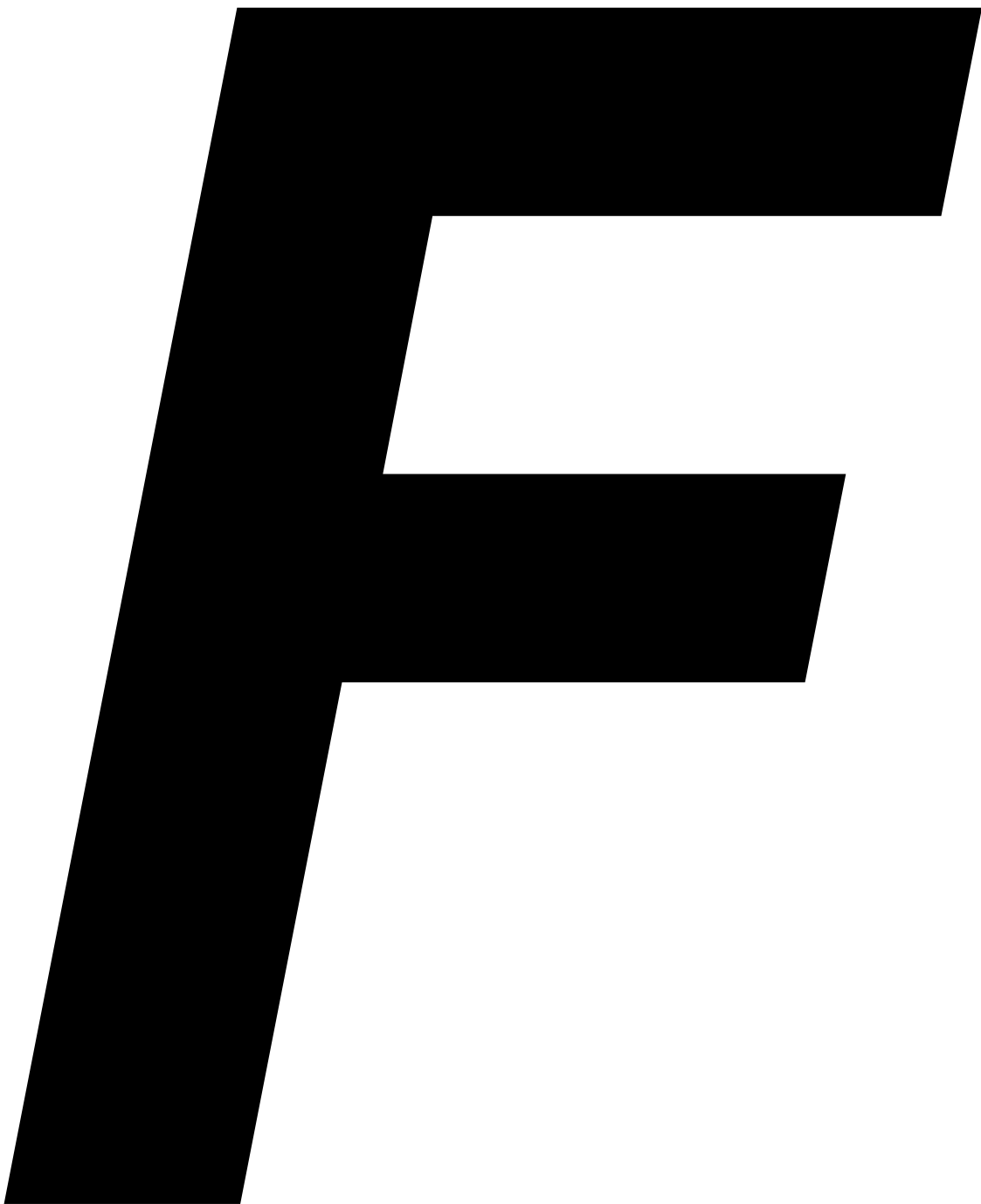
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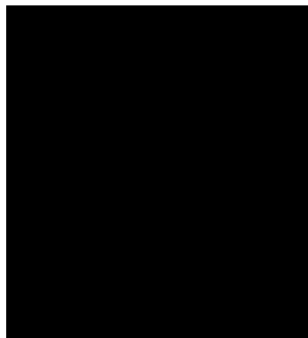
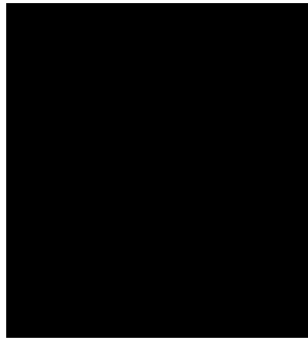


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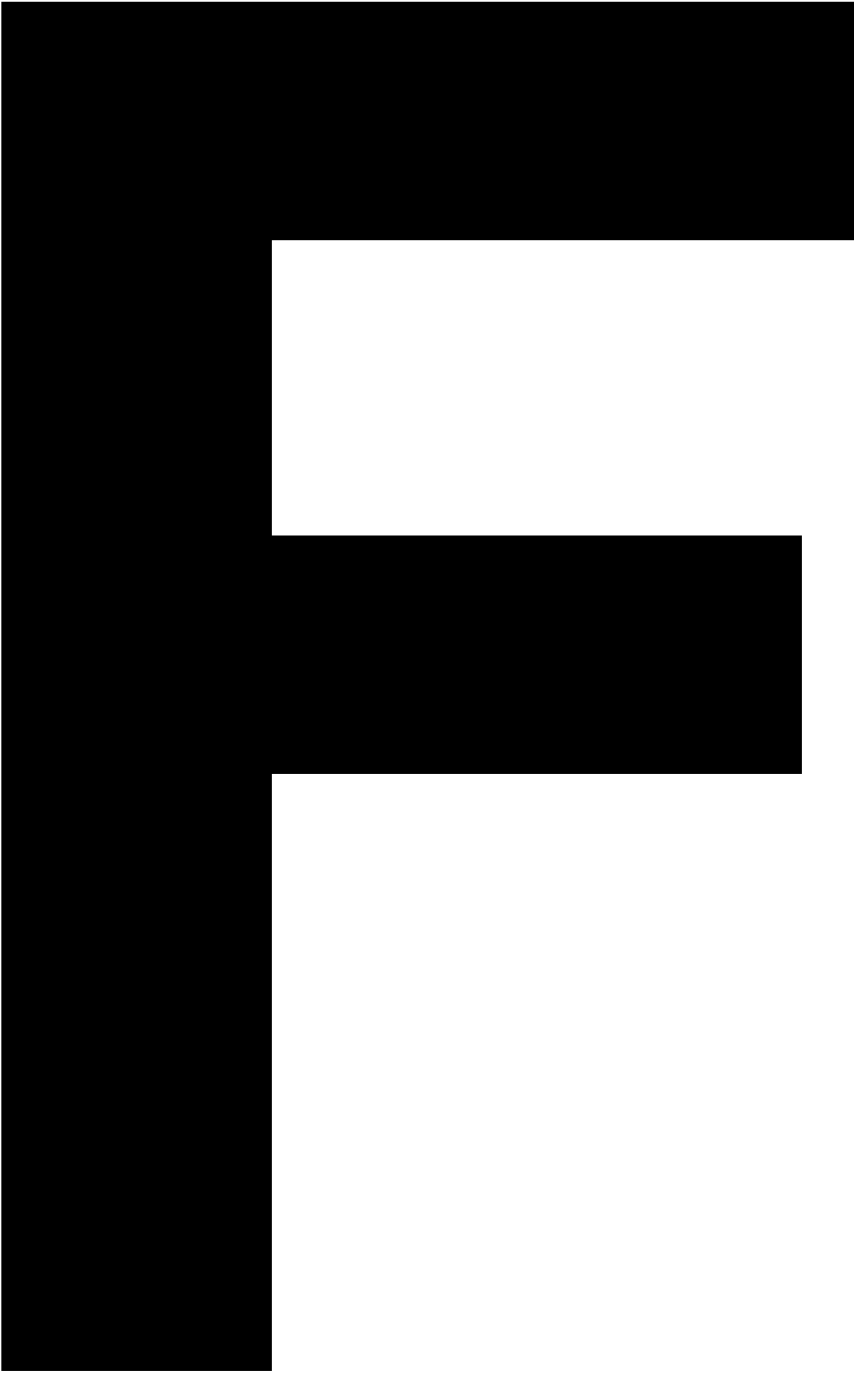


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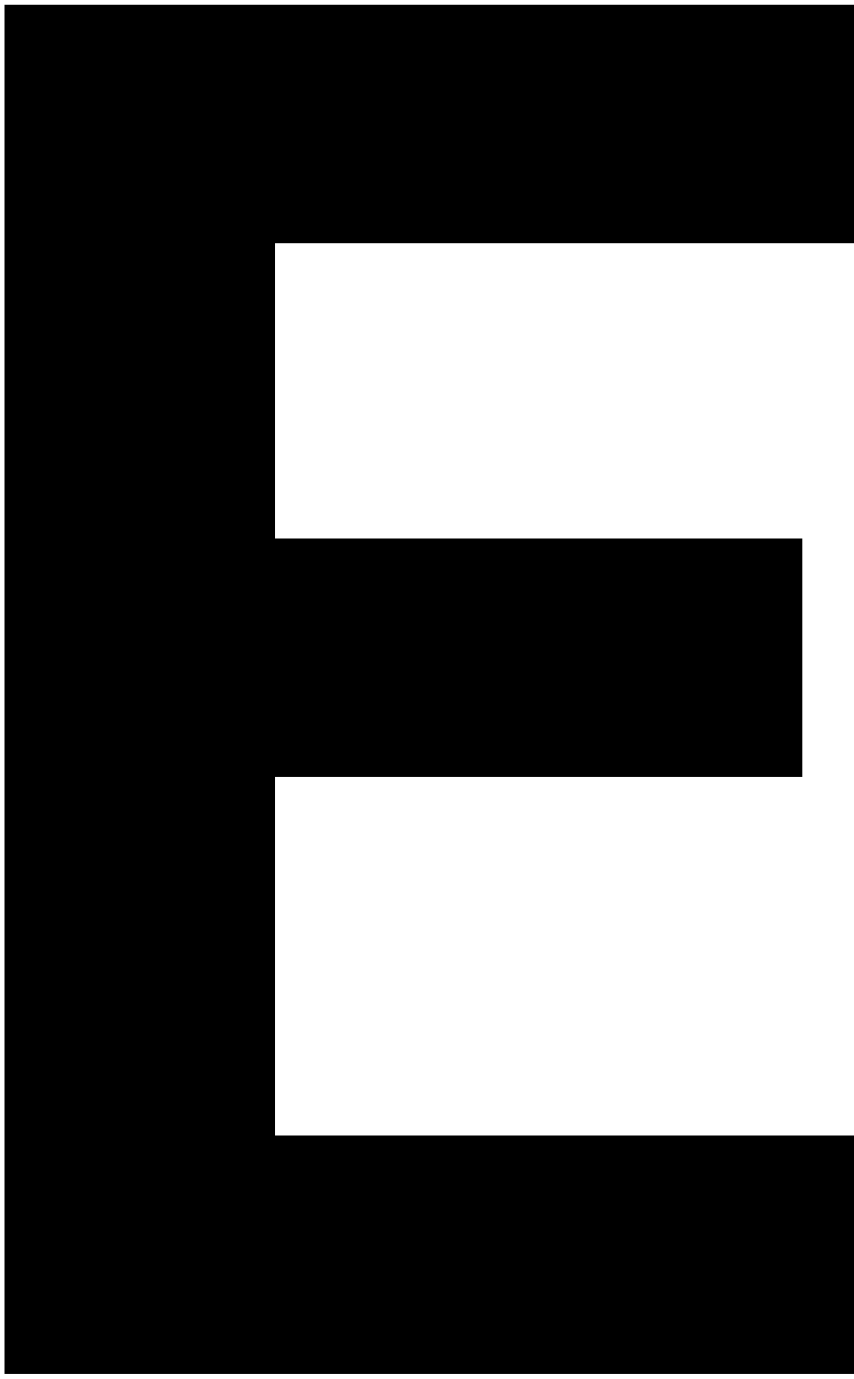


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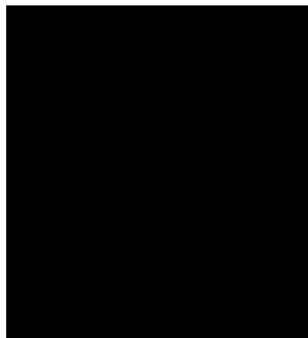
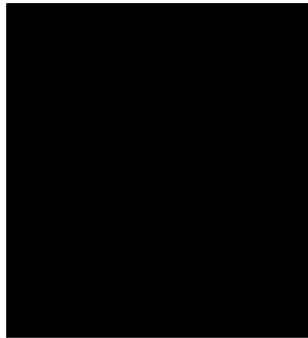




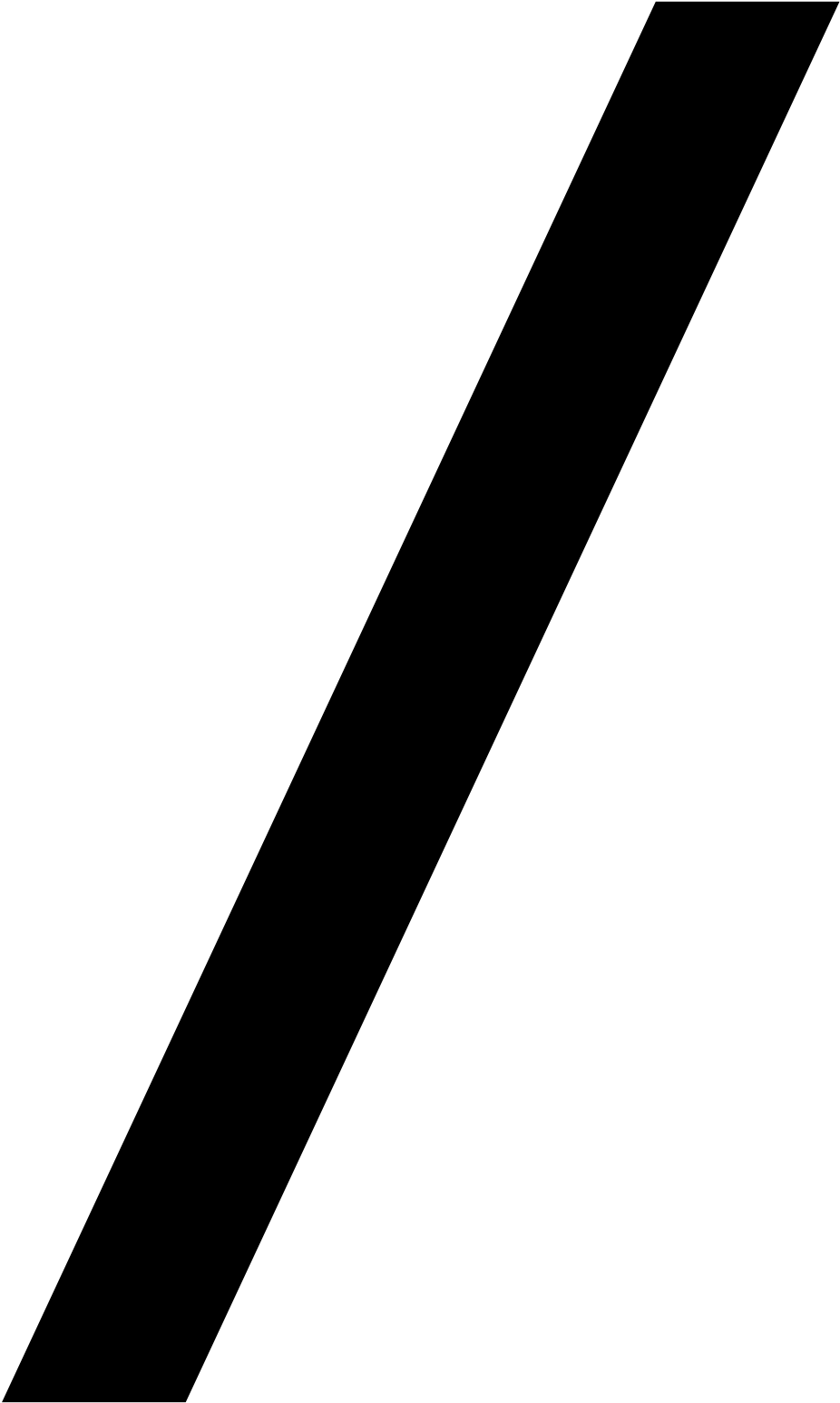


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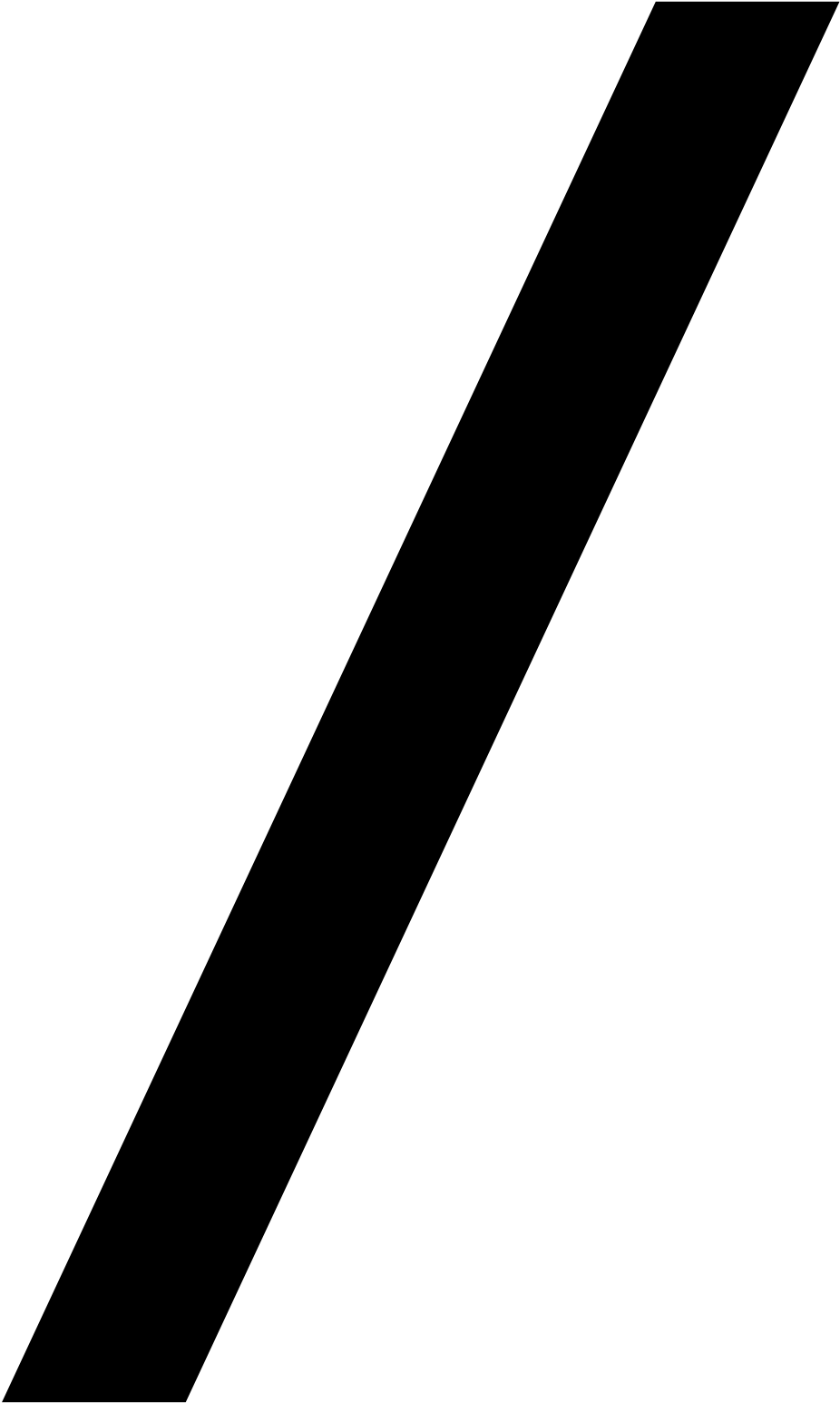
















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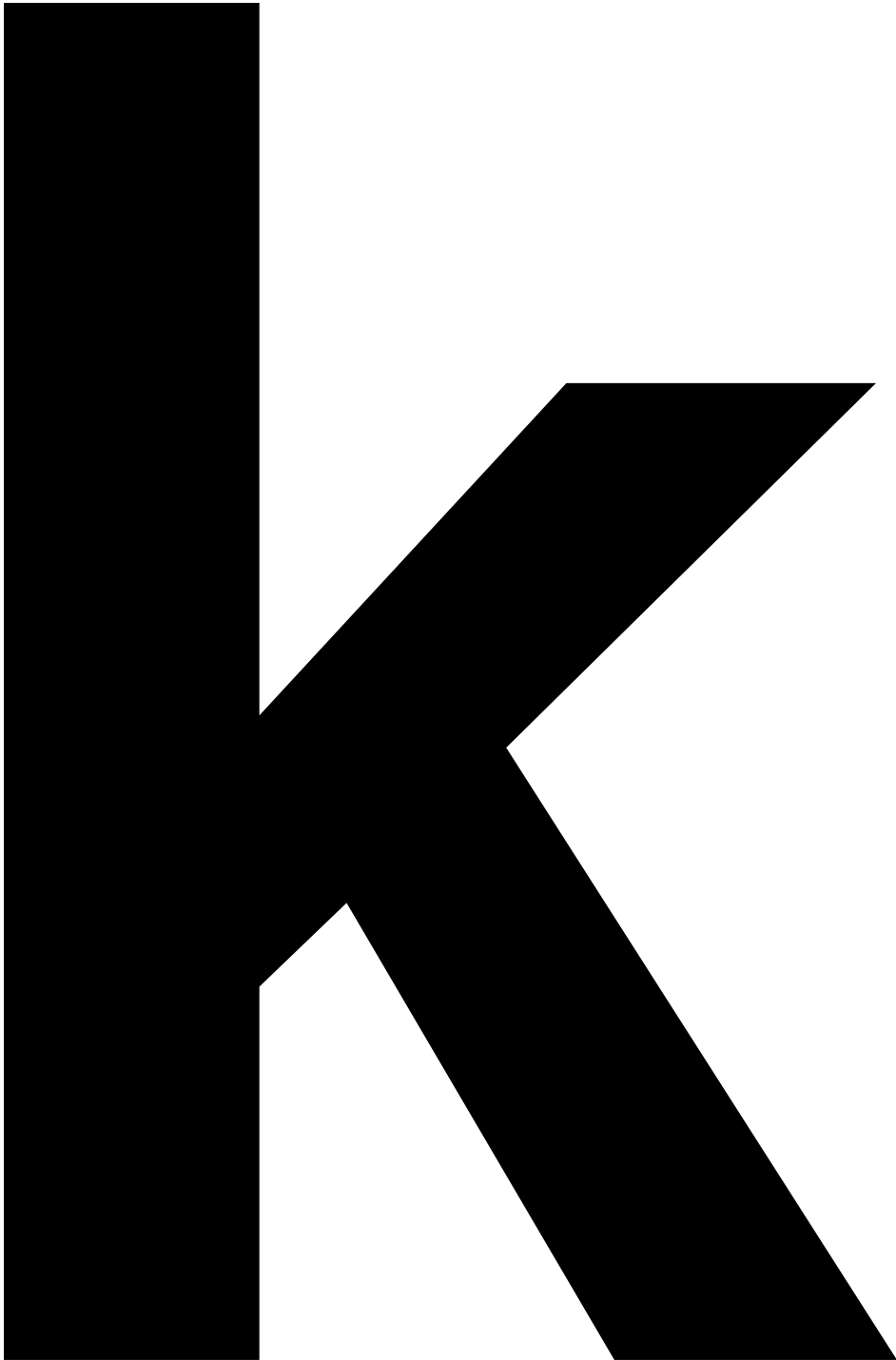


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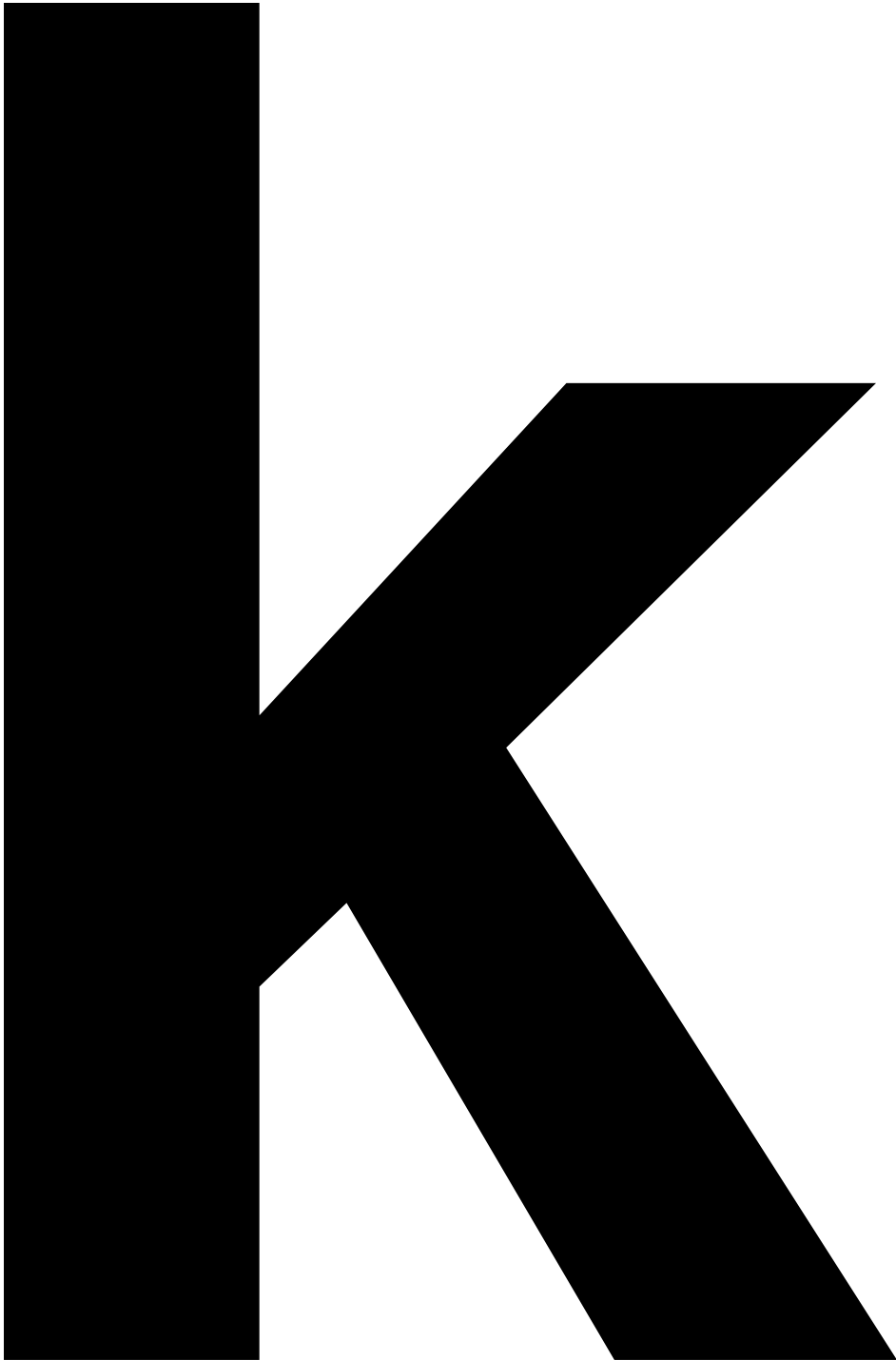
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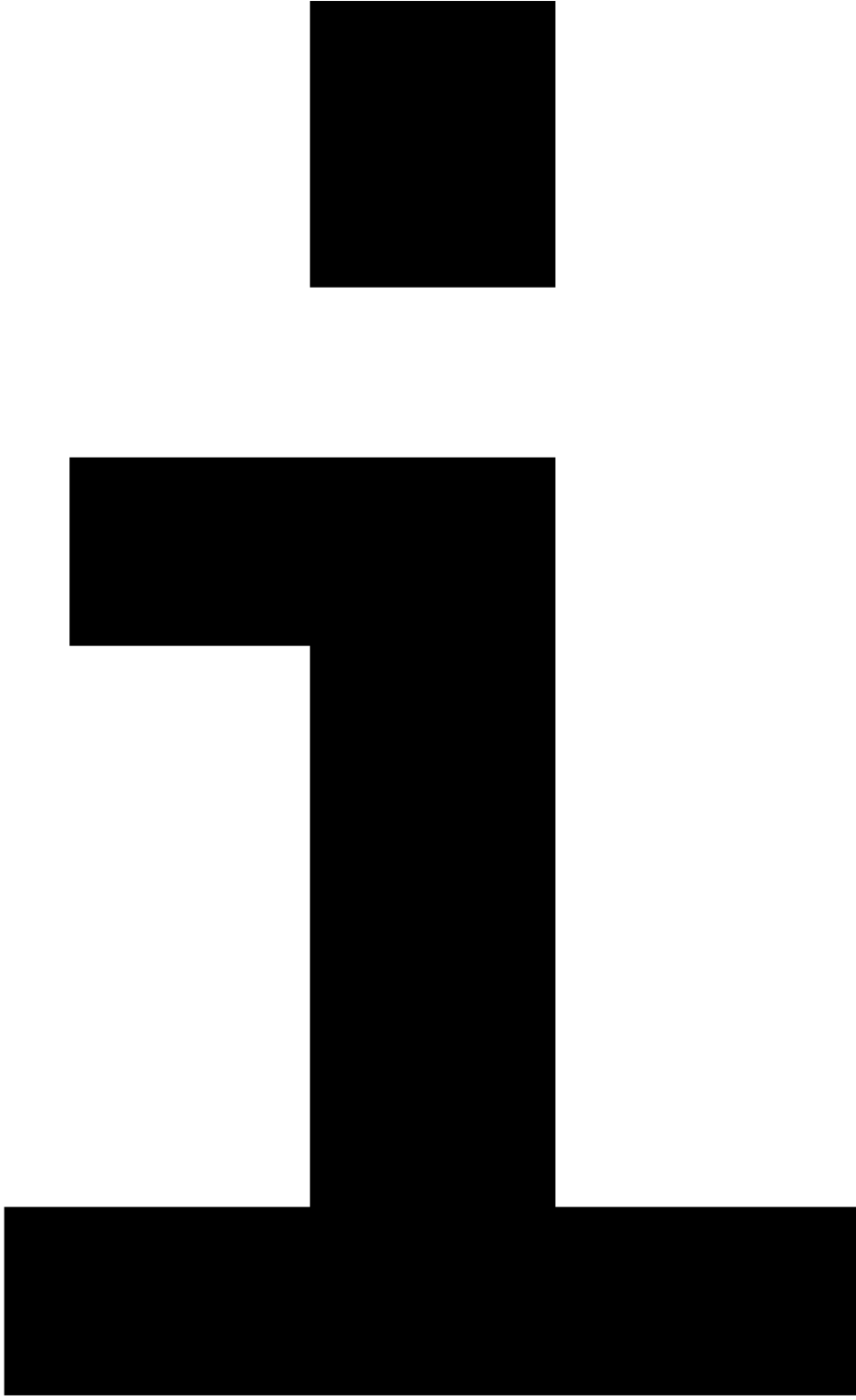




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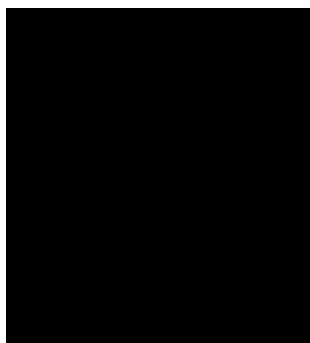






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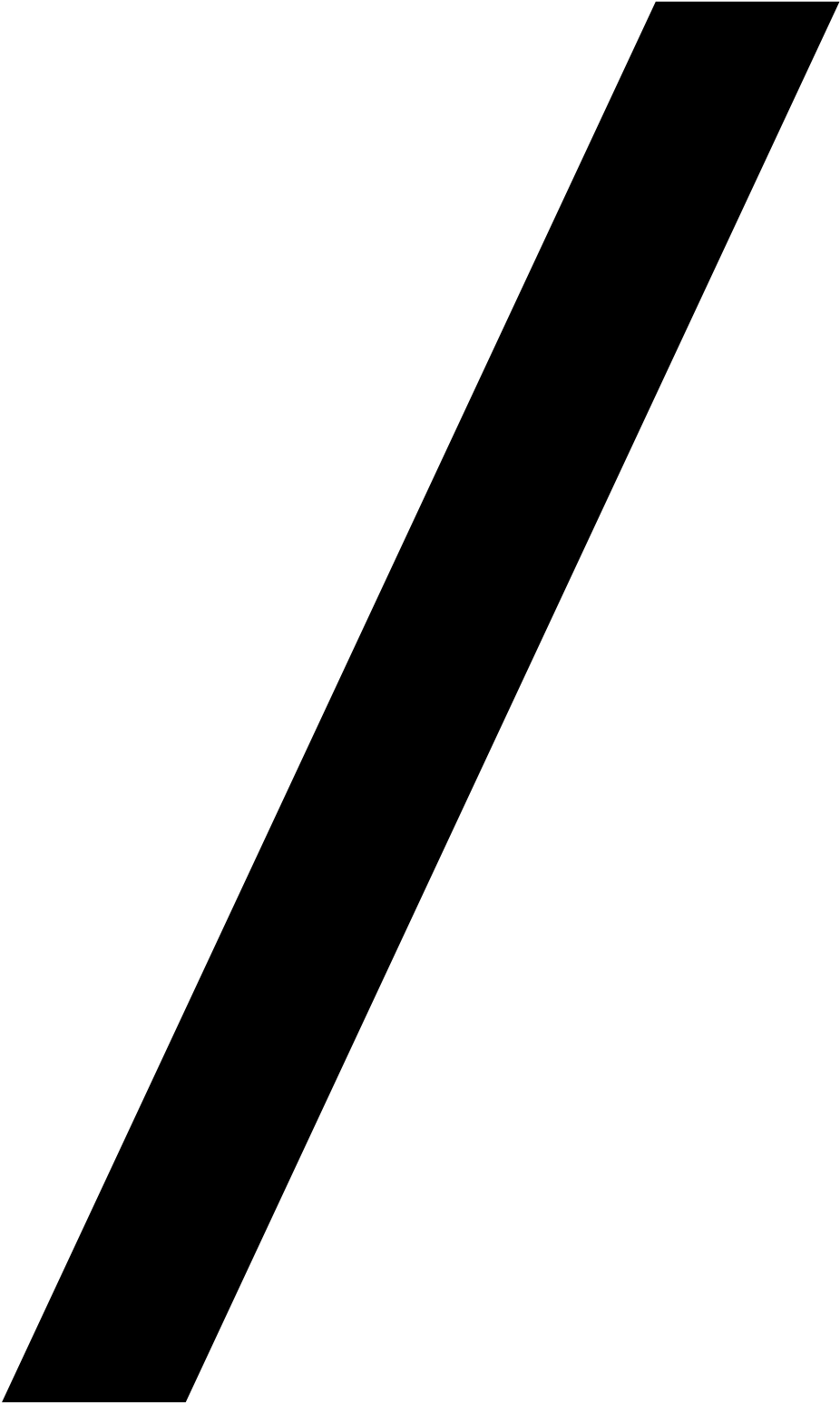
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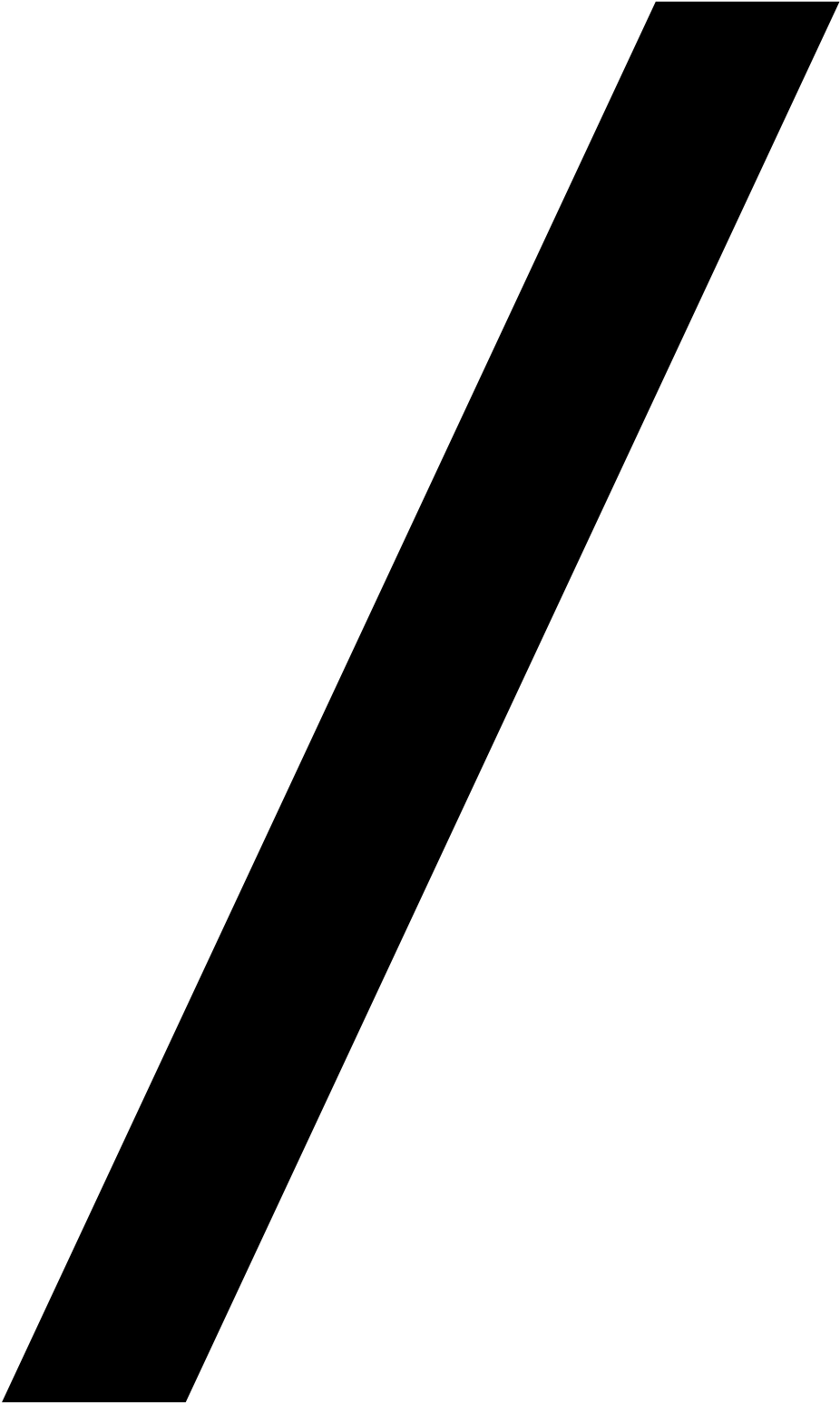
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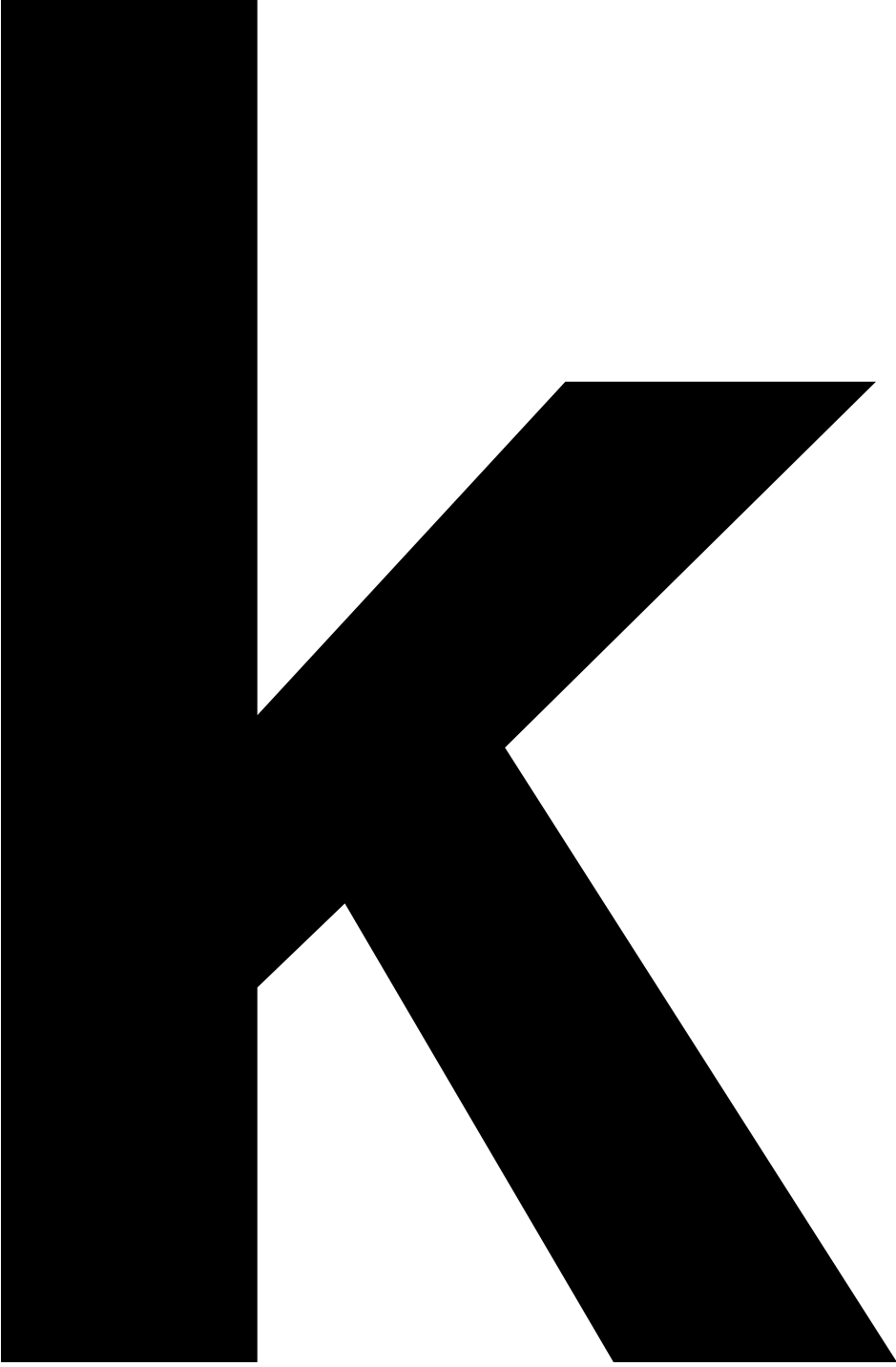




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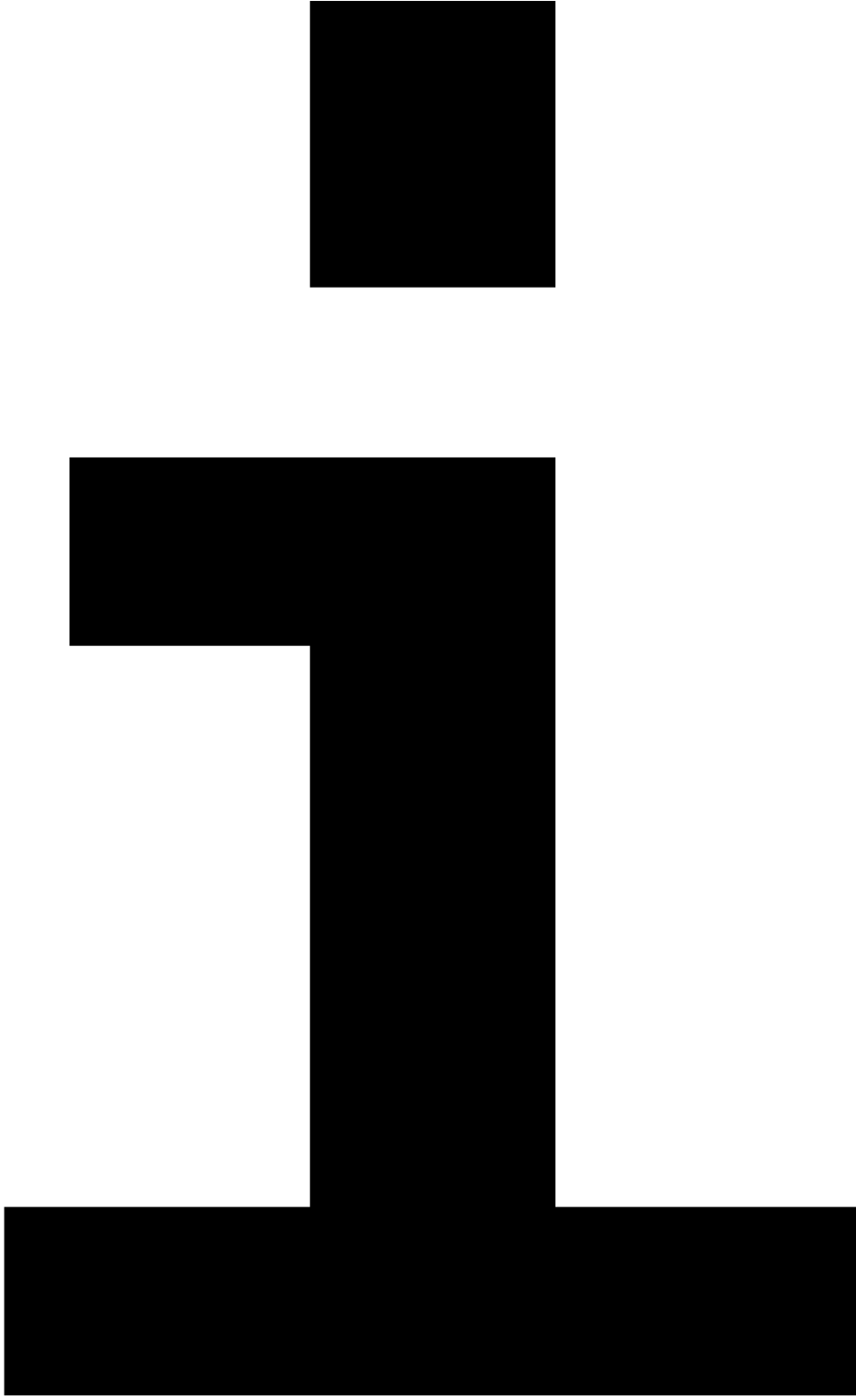














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**sa**



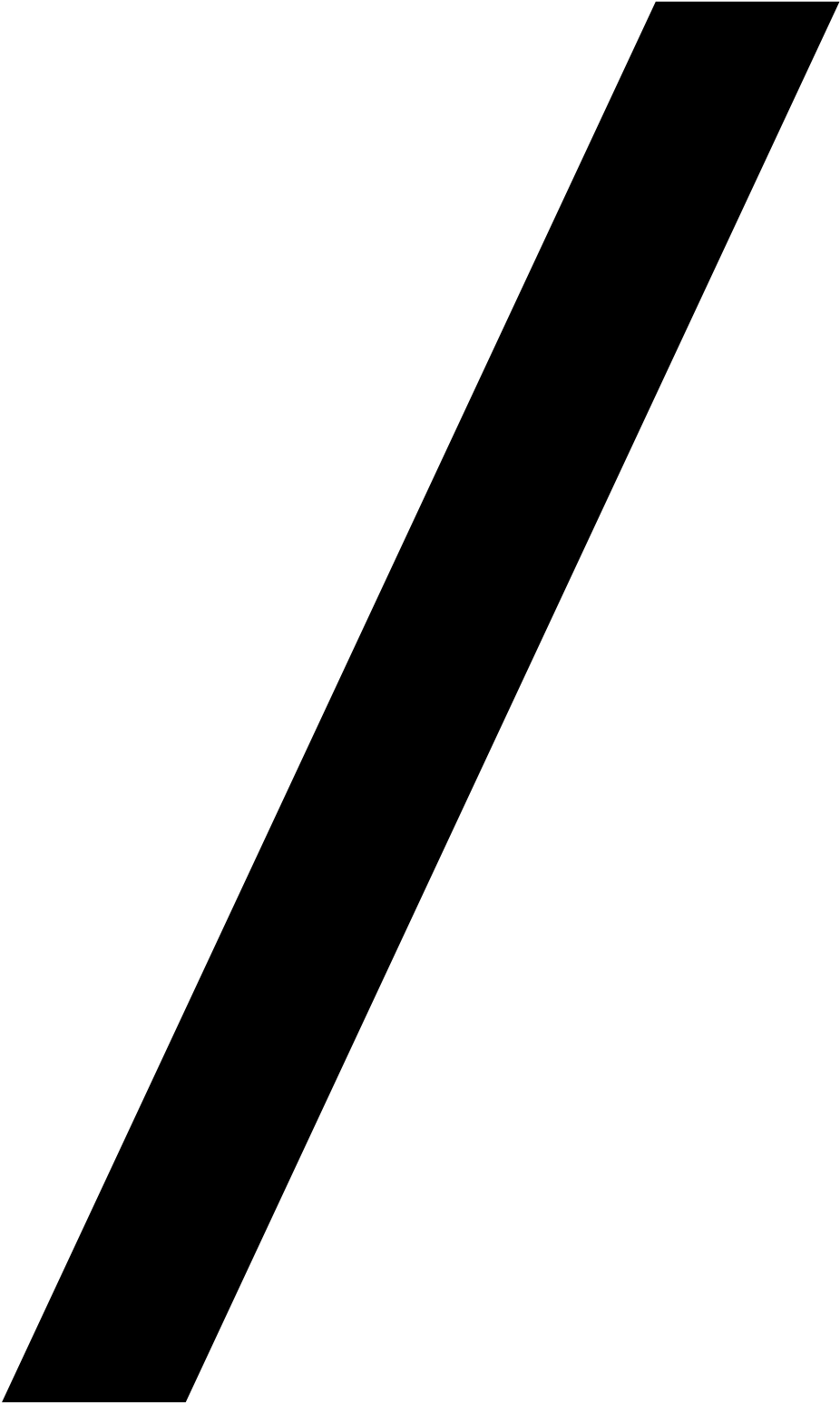
**e**





















**B**

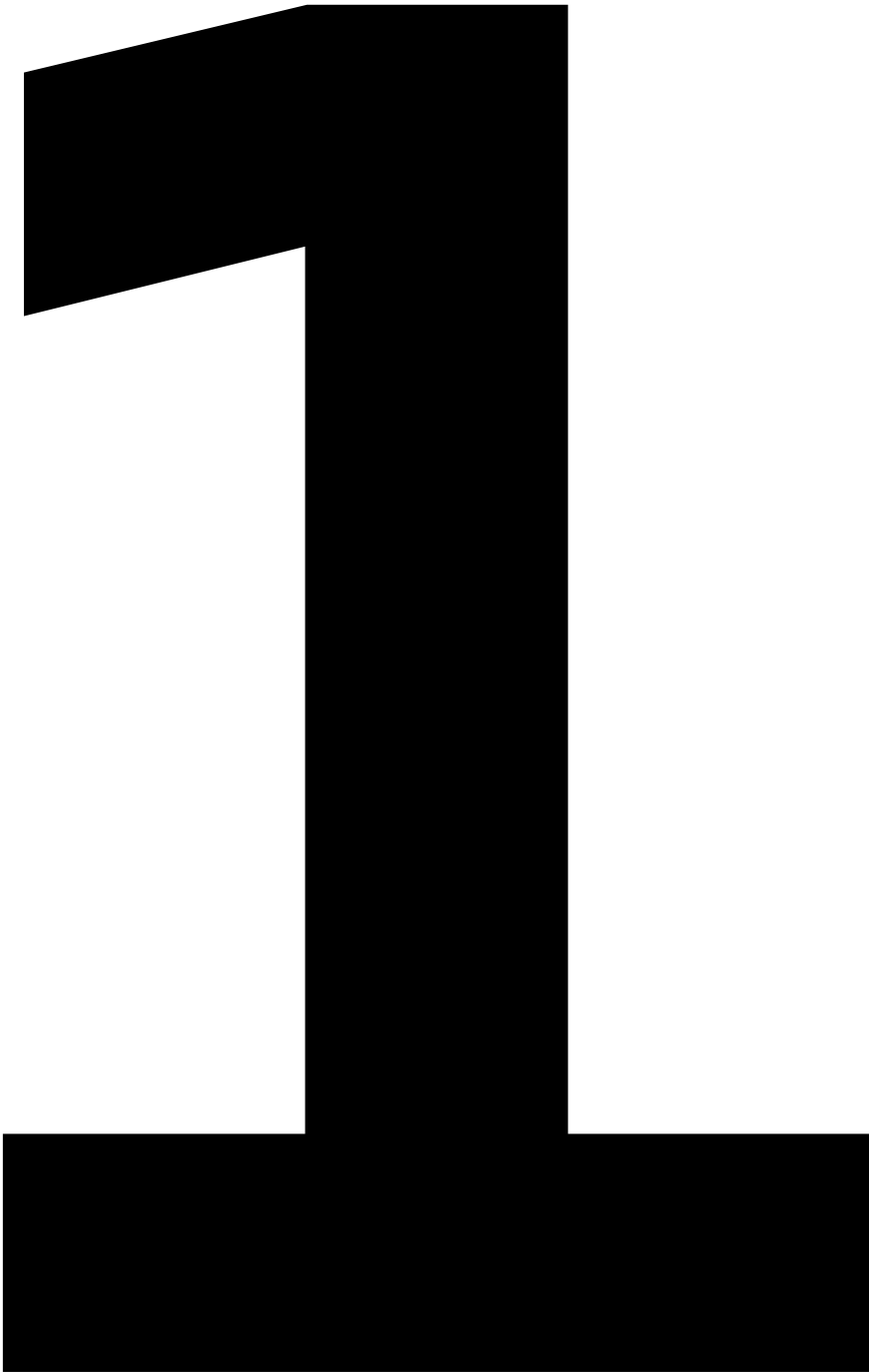


**A**



**B**













**h**







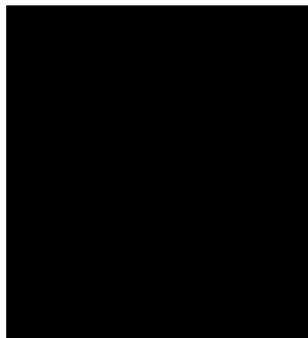
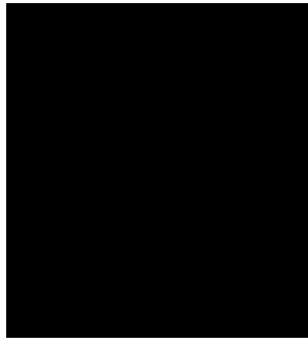




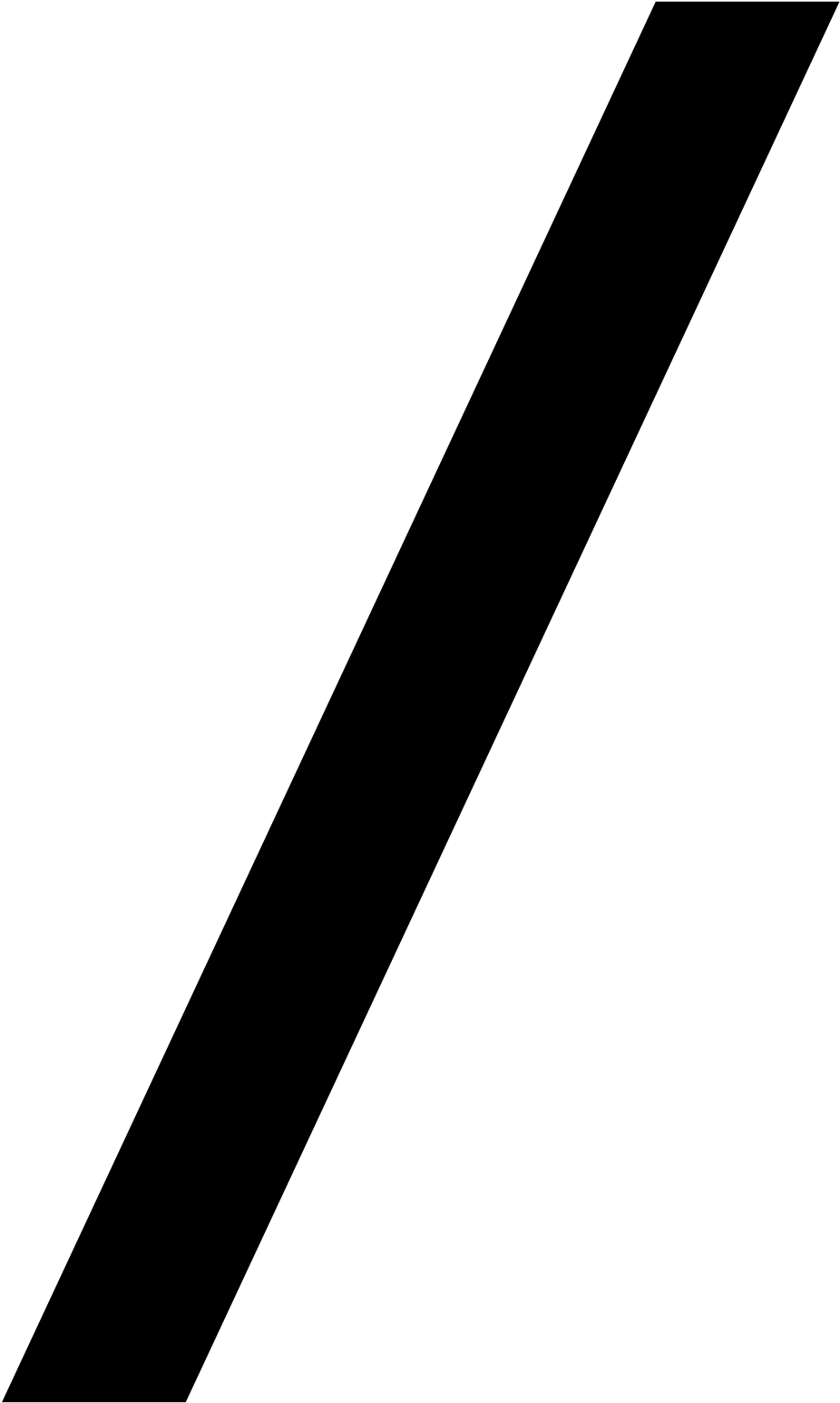


**o**

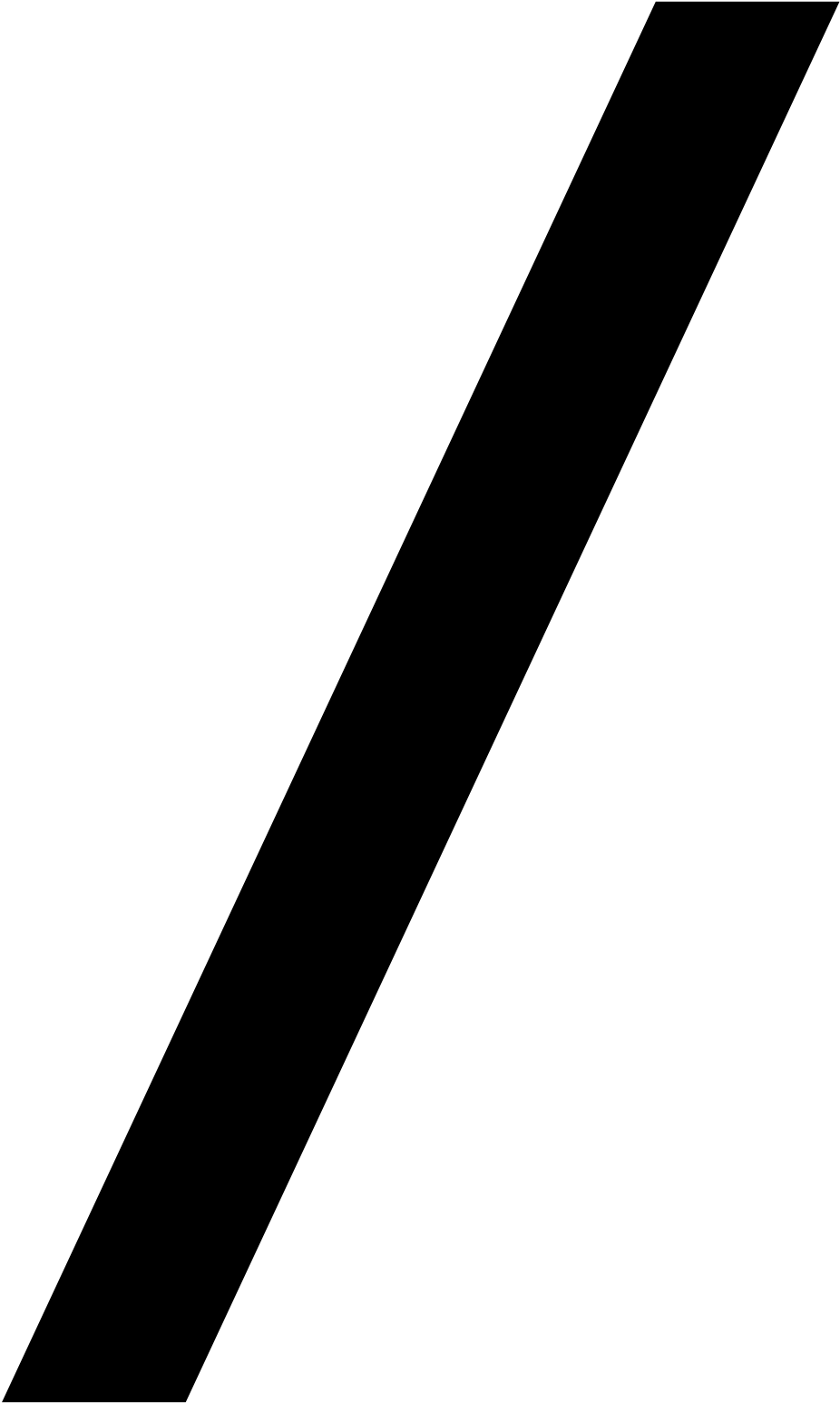
















**m**



**sa**

















**C**



**h**



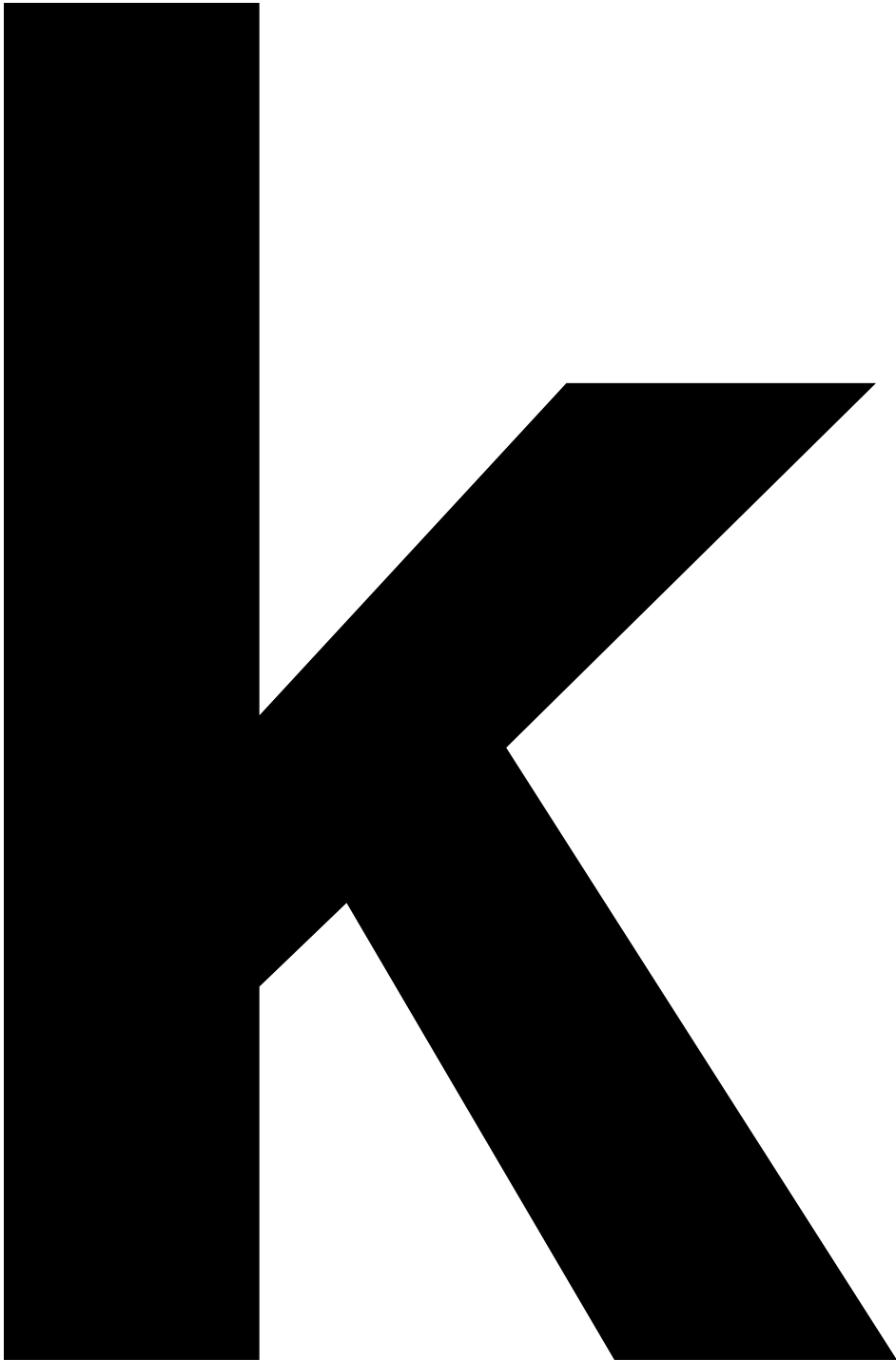
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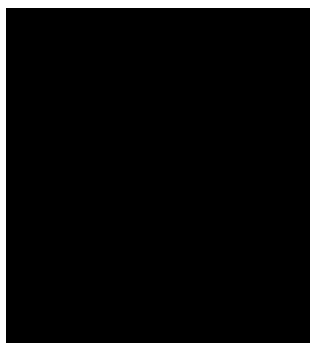


**C**











**Q**









**e**



**e**



**n**





**o**



**e**



**sa**



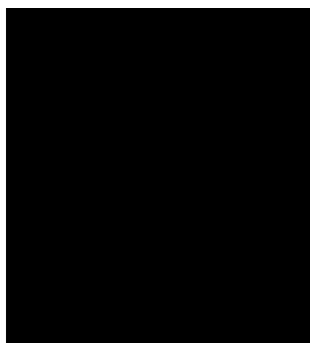
**C**





**e**







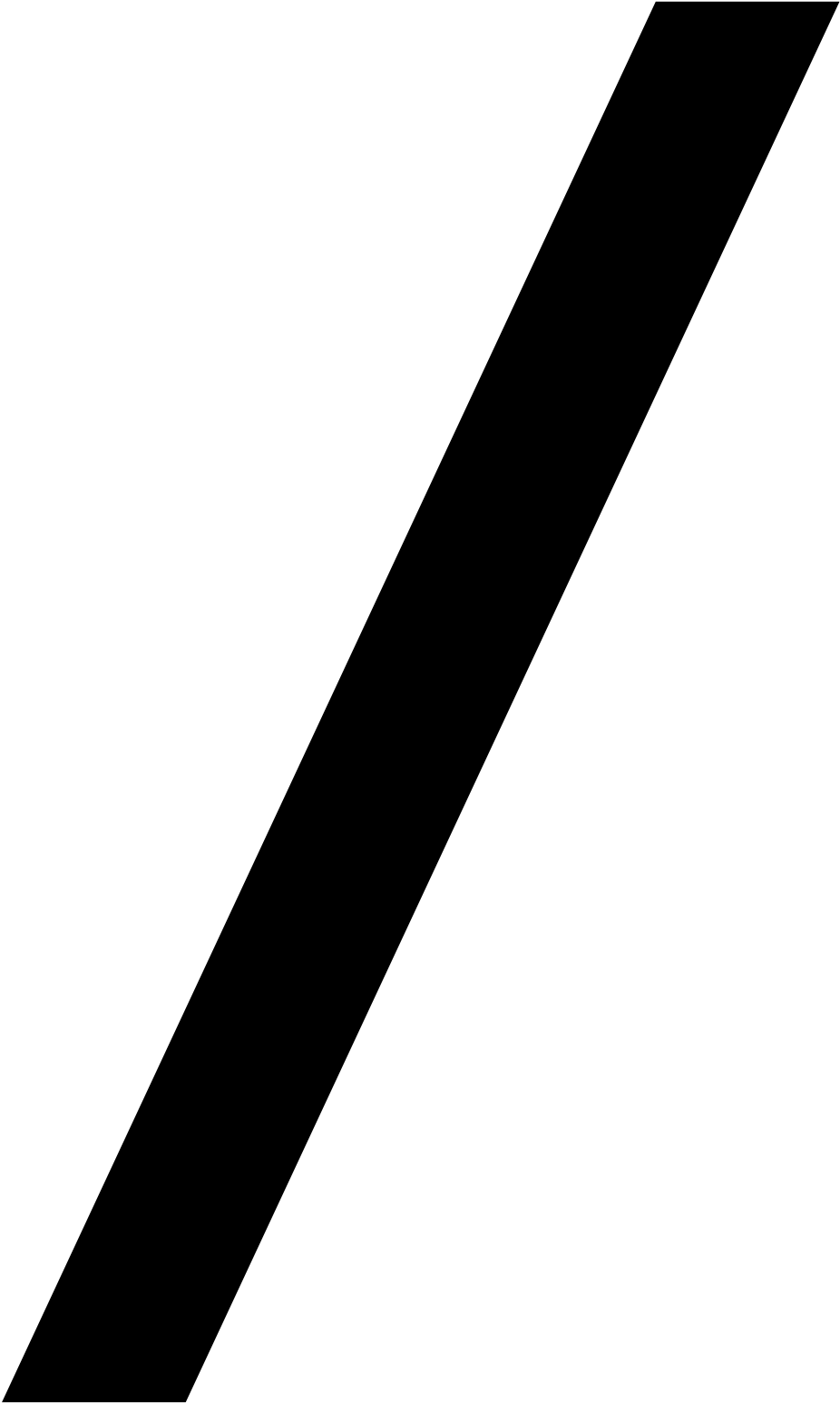
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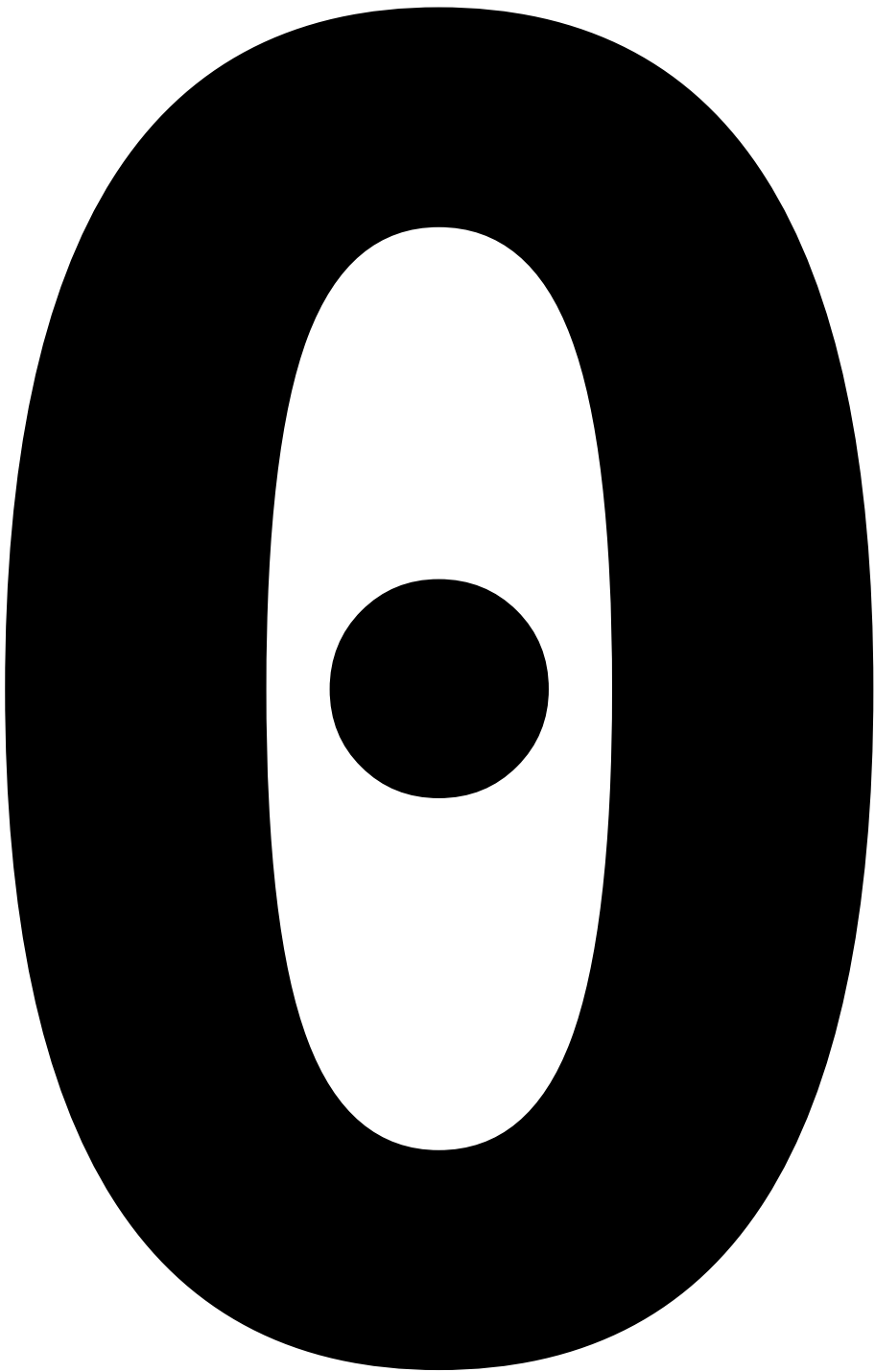


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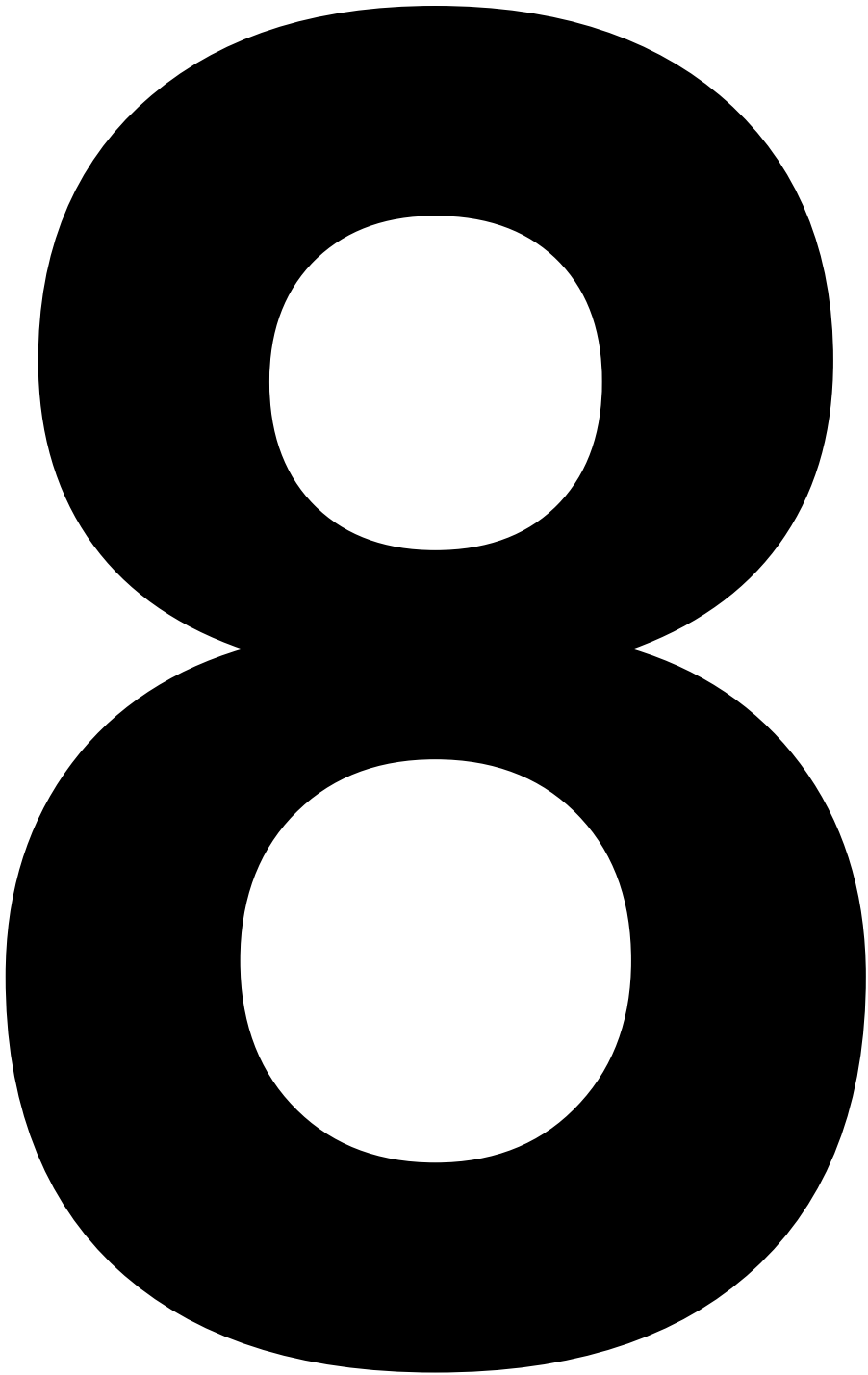


















**h**









**m**



**J**







**sa**





**10**



**Q**



**e**









**u**







**e**



**n**





**sa**

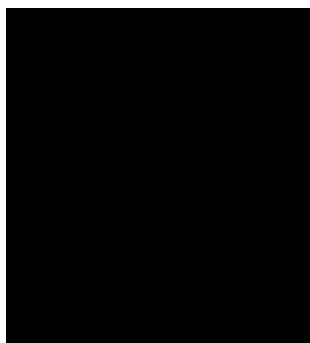


**m**



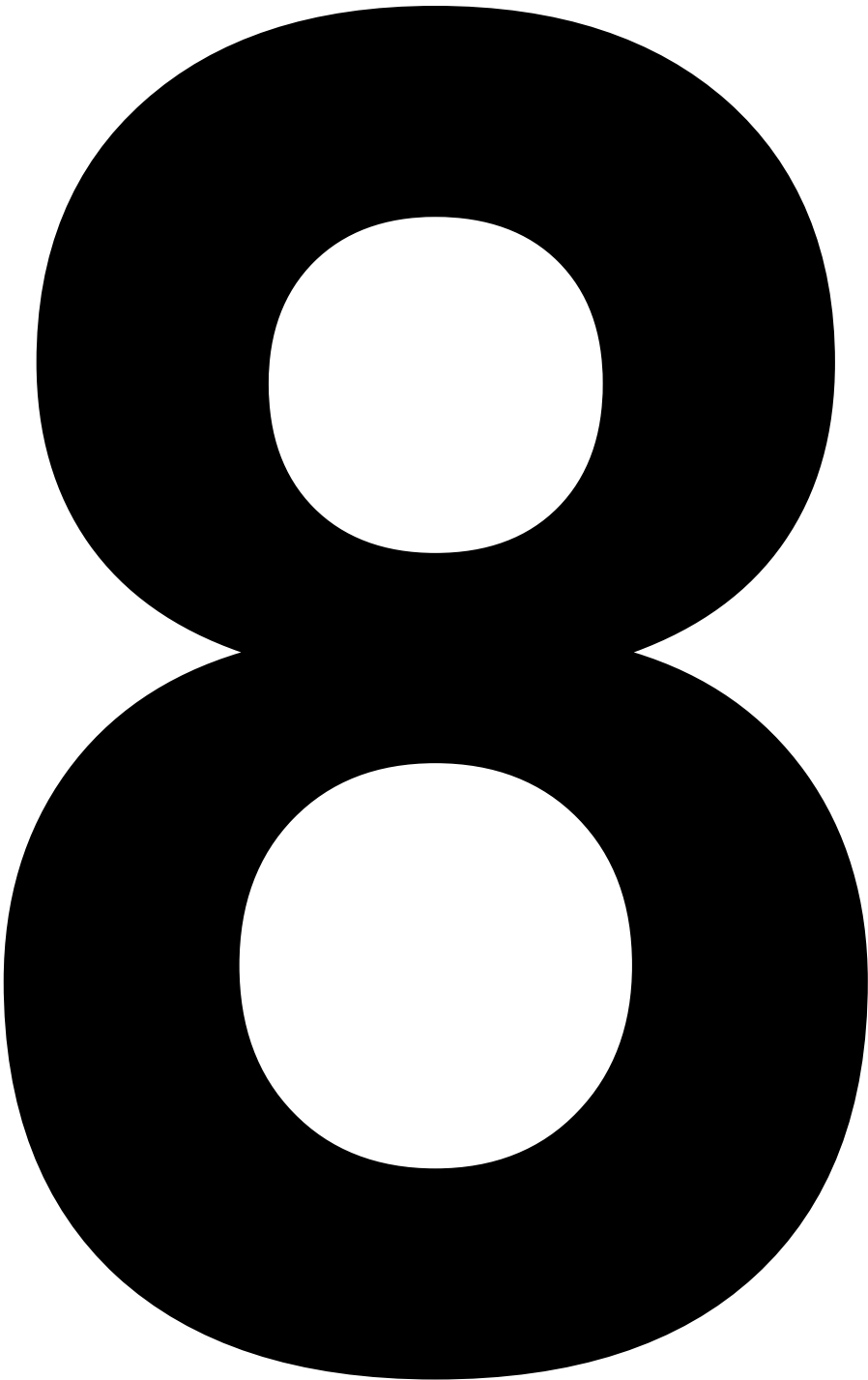
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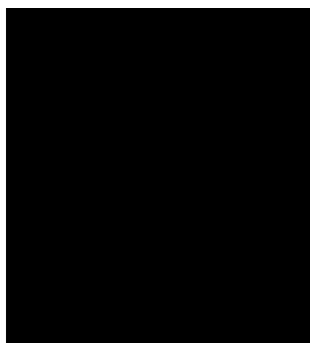








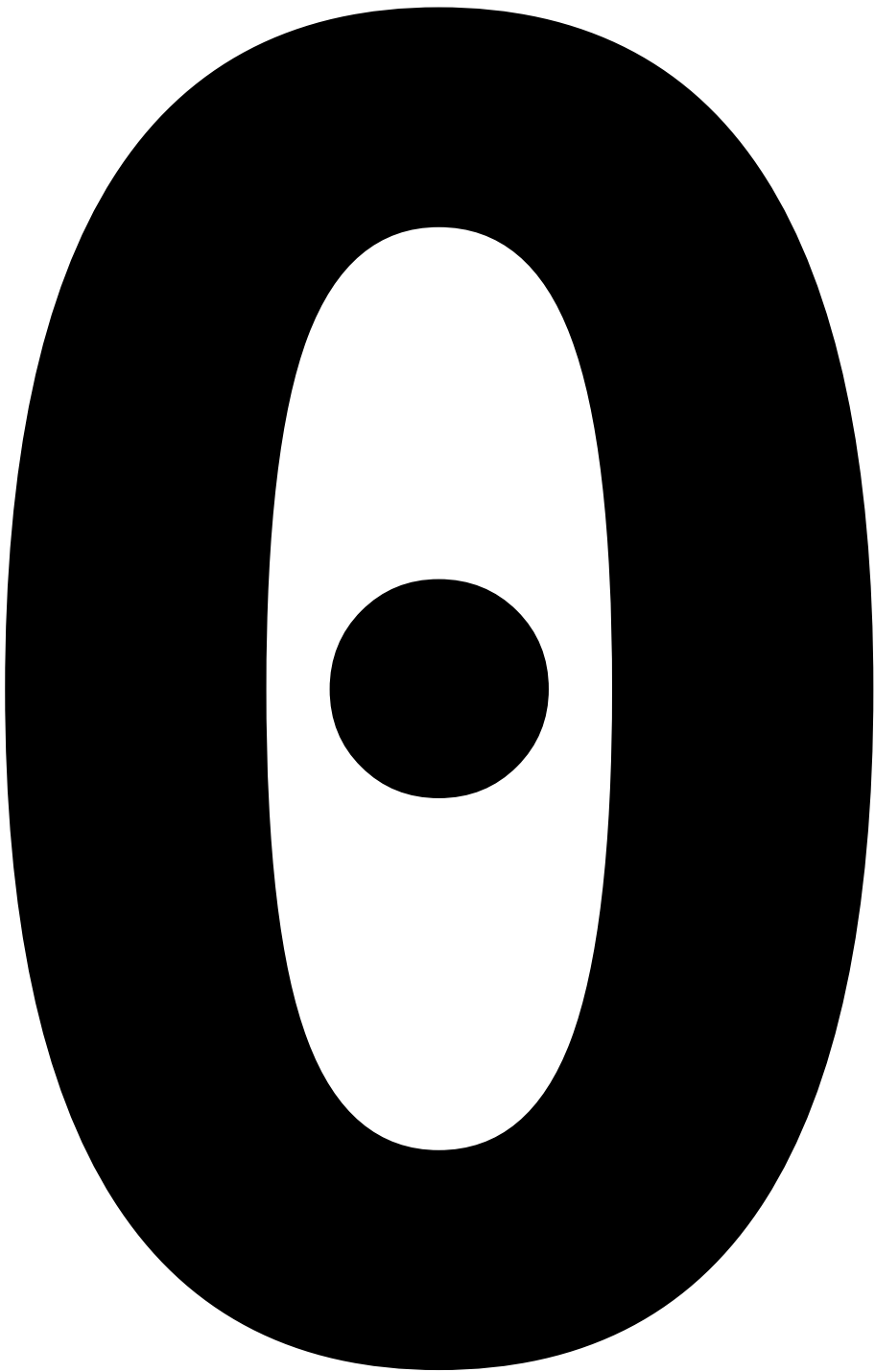






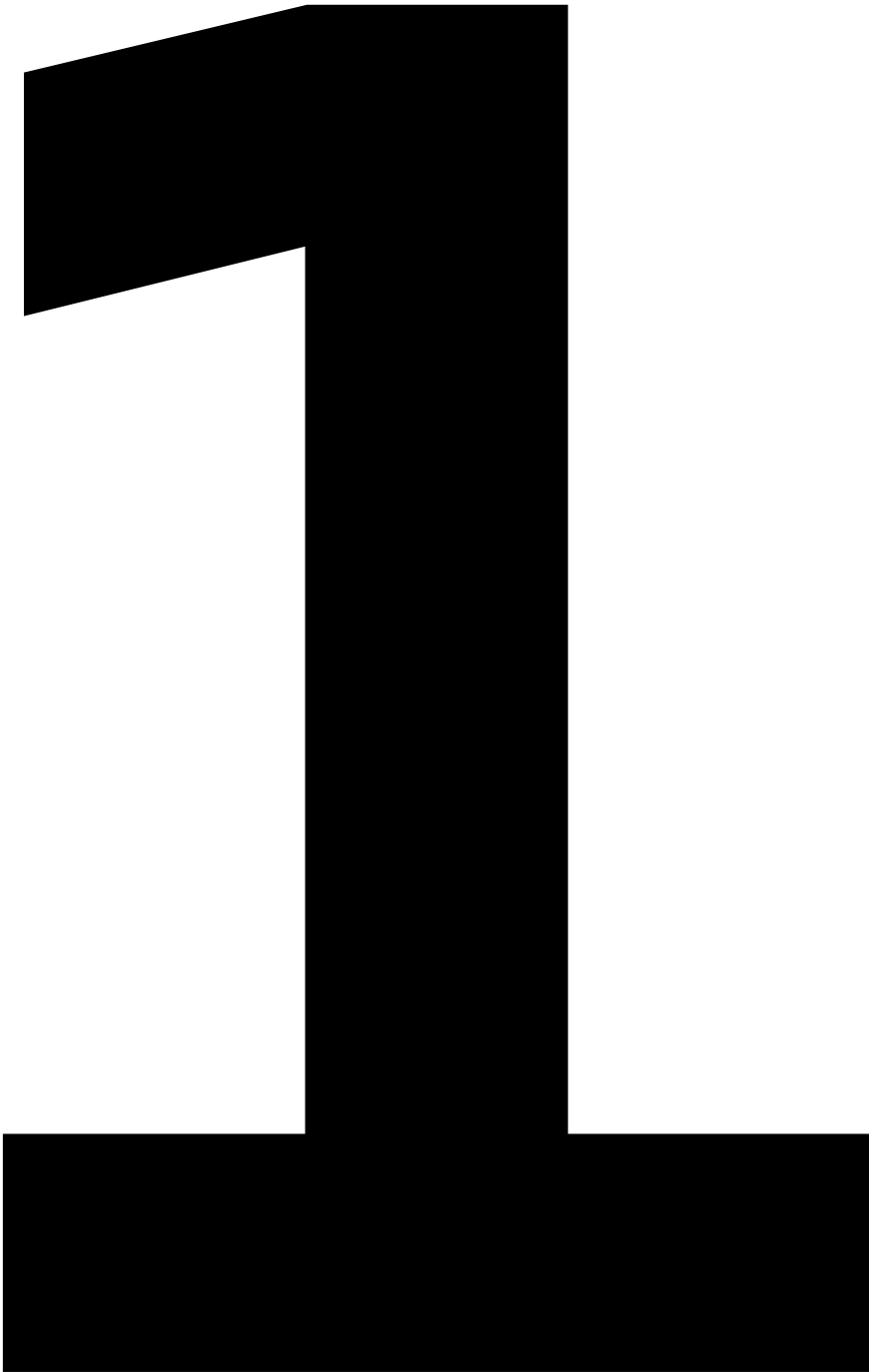
2













**3**









**B**





**A**



**B**



2









**h**







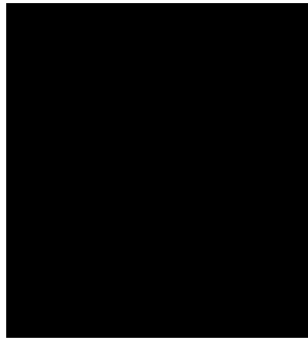




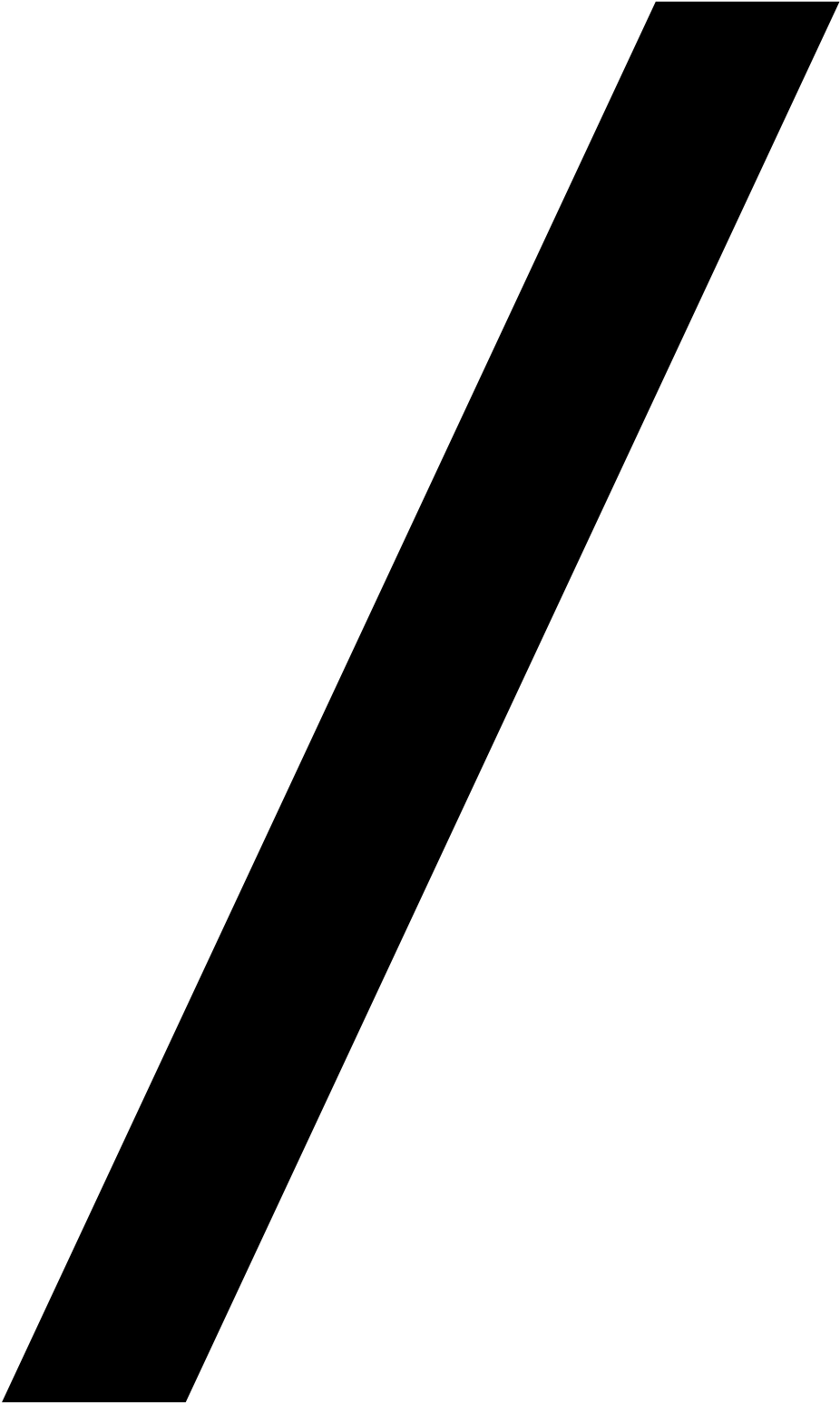
**o**



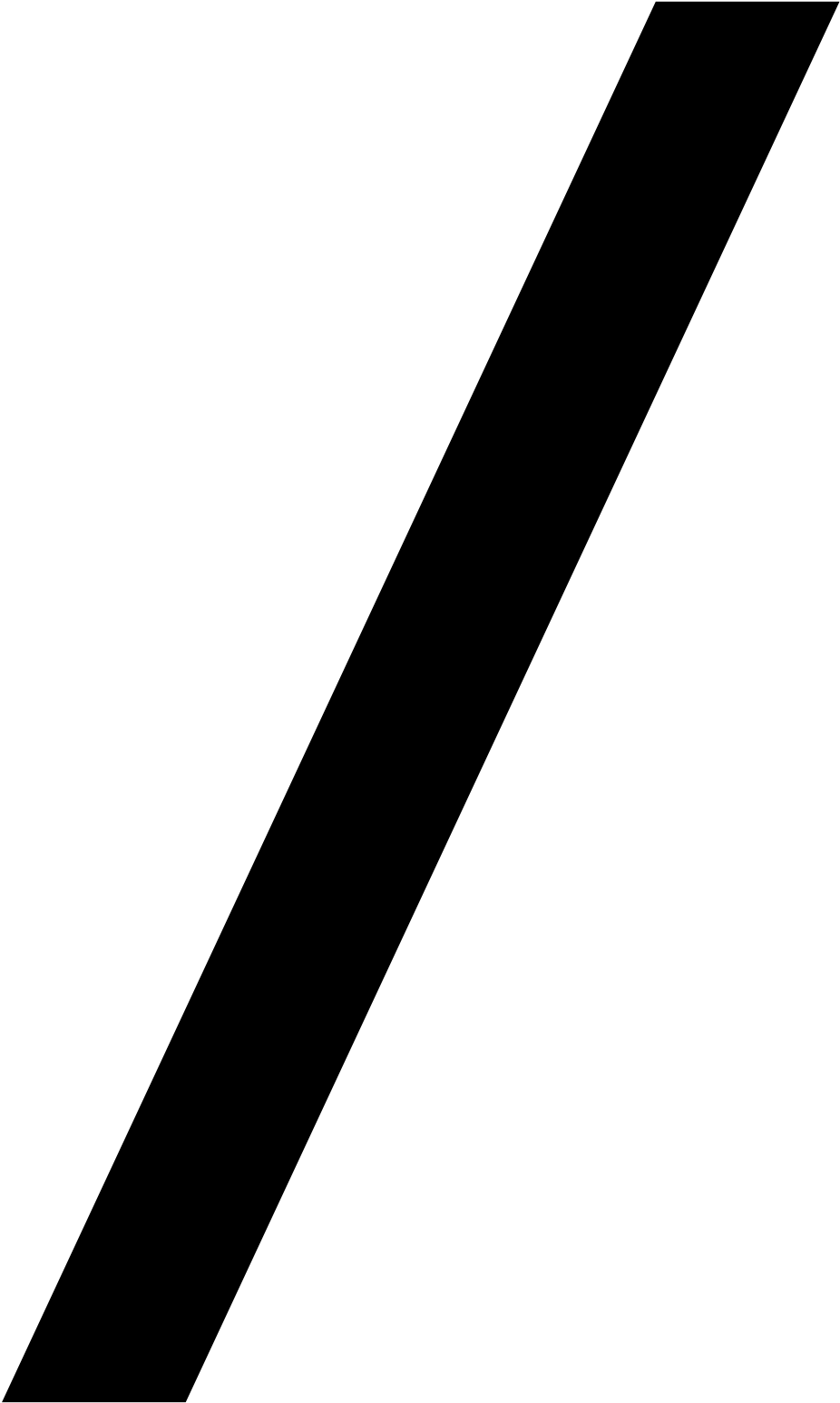














**w**



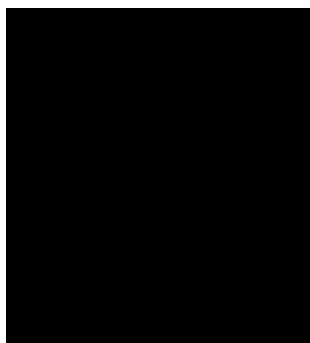


**w**



**w**







**S**





**u**



**e**



**Q**



**Q**





**e**



**u**







**S**





**C**



**h**



**e**







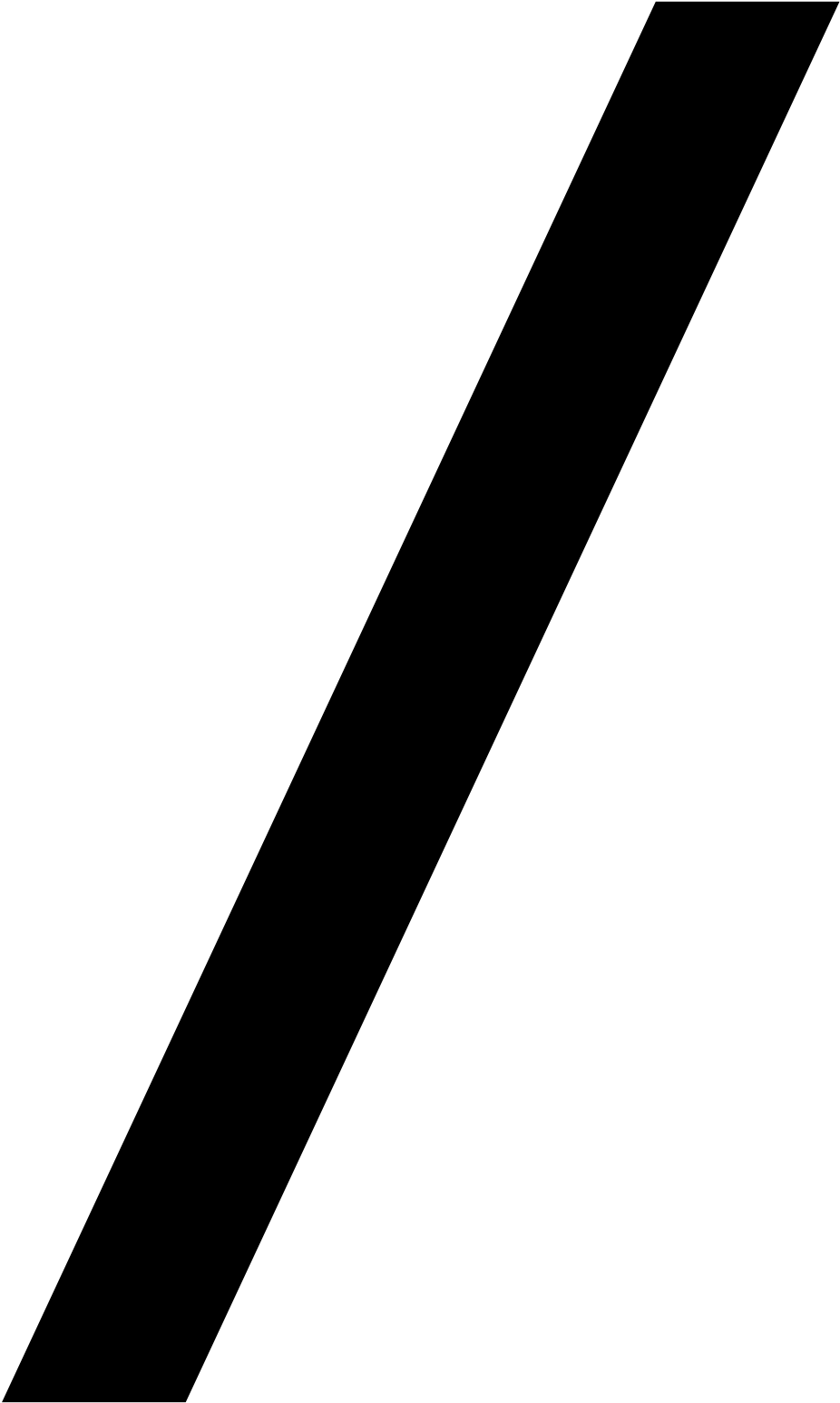


**Q**



**e**







**w**









**S**



**S**



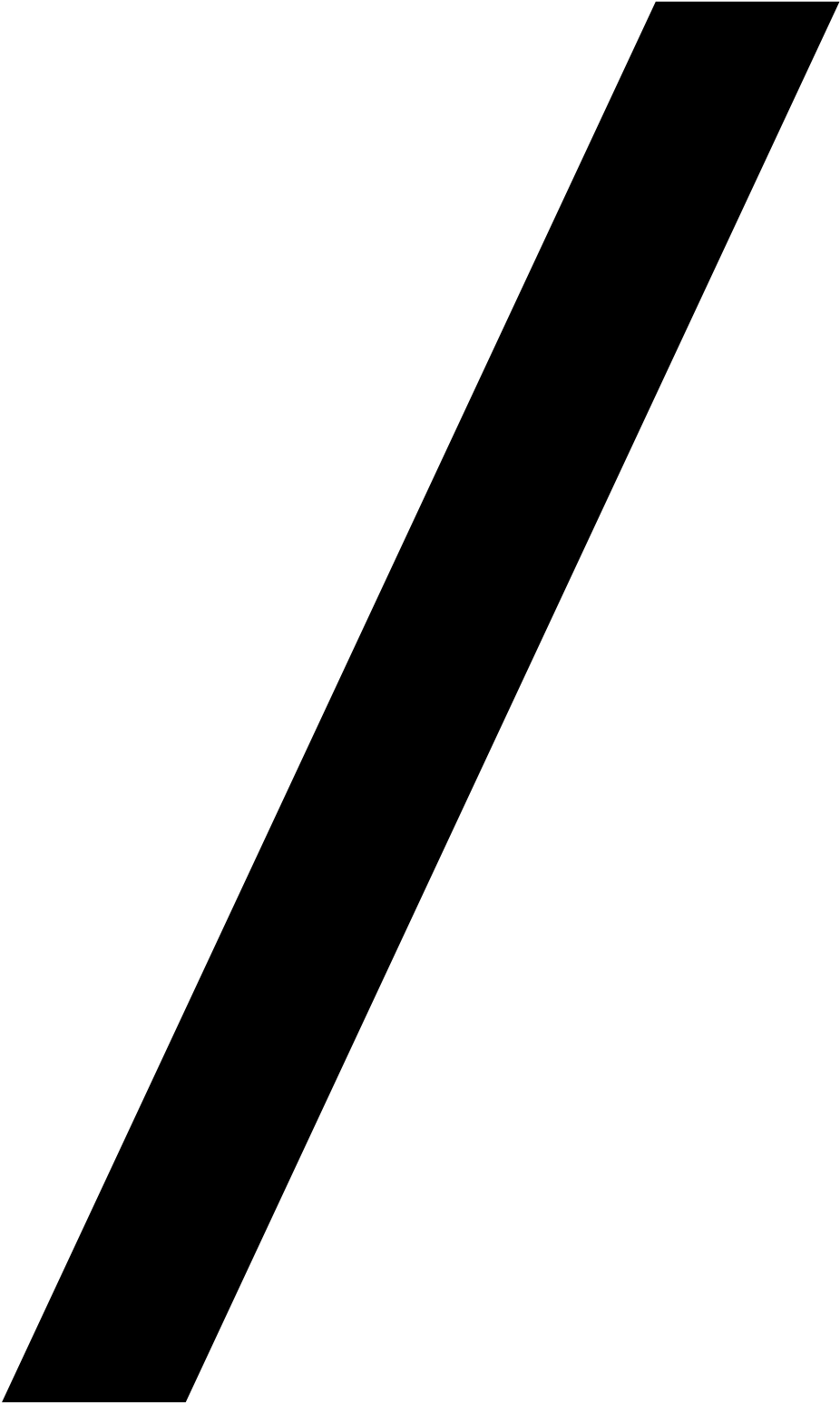
**e**





**n**







**10**



**sa**





**Y**



**e**













**S**



**C**



**h**



**e**









**10**



**e**



**h**









**e**







**Q**





**e**







**10**



**e**





**S**







**sa**



**e**













**Q**













**m**







**n**





**e**







**sa**



**J**





**w**



**sa**



**S**



**S**





**e**

















**sa**



**Q**







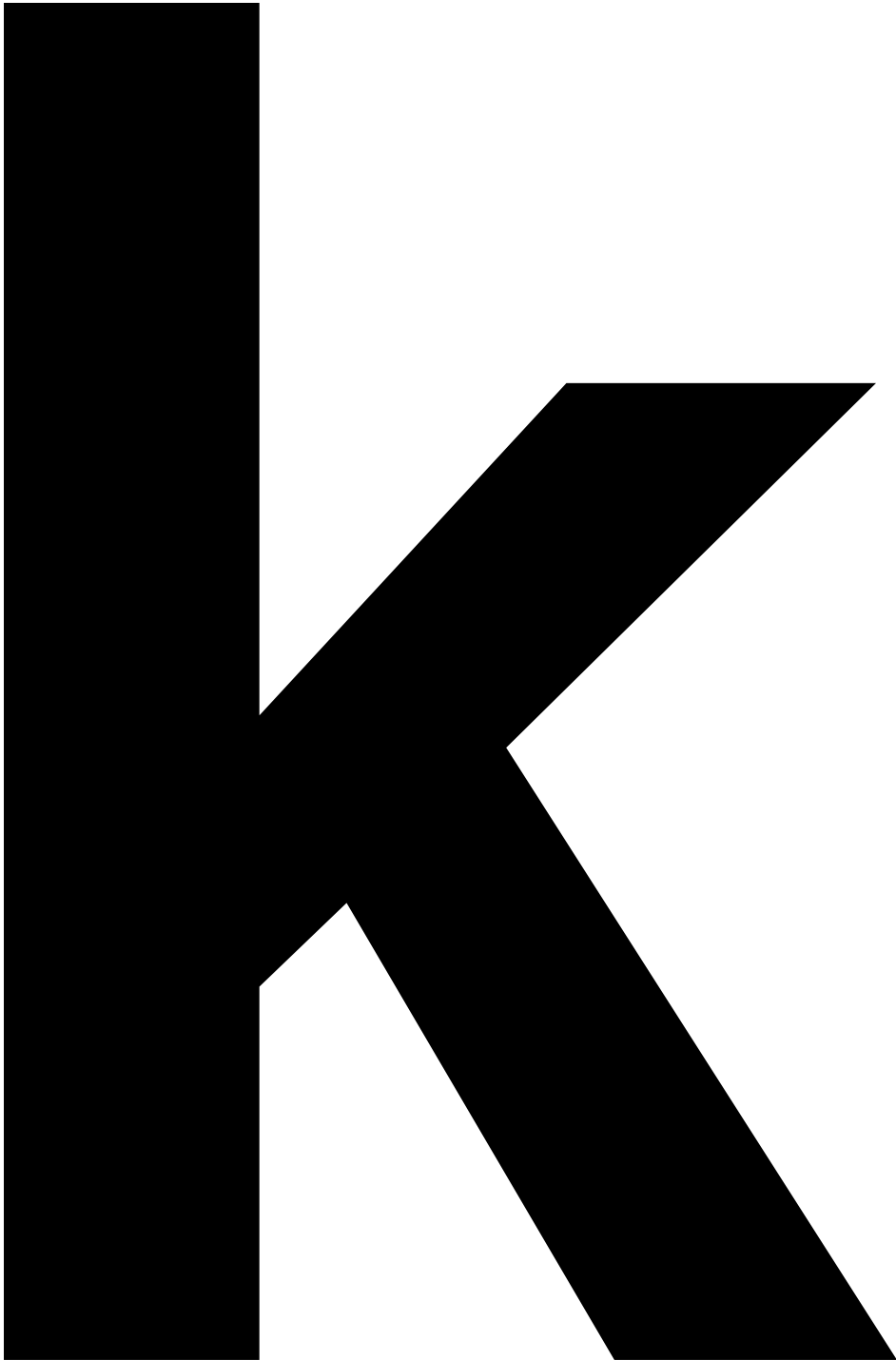






**sa**

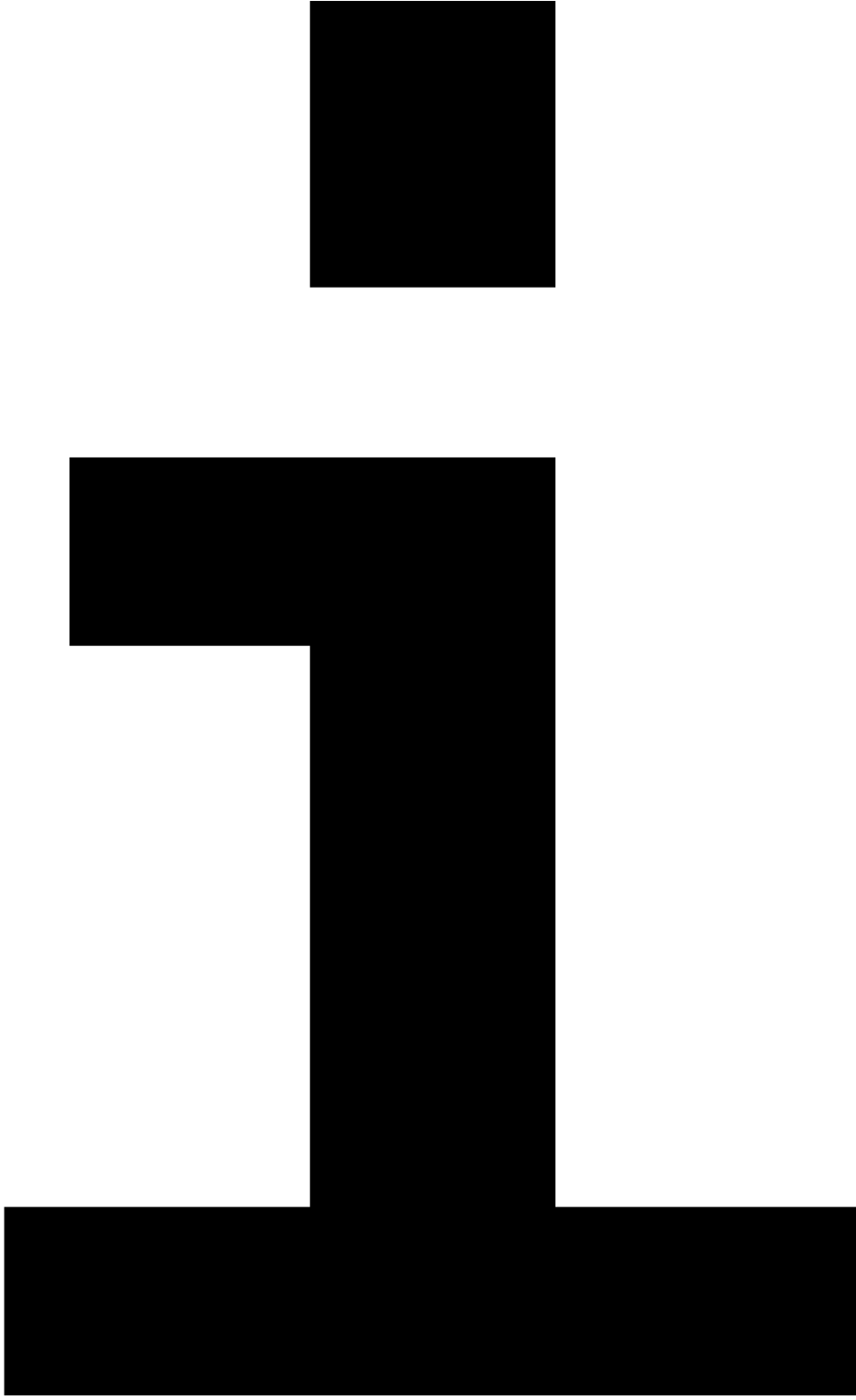
















**V**







**10**



**e**





**J**



**sa**



**S**









**e**

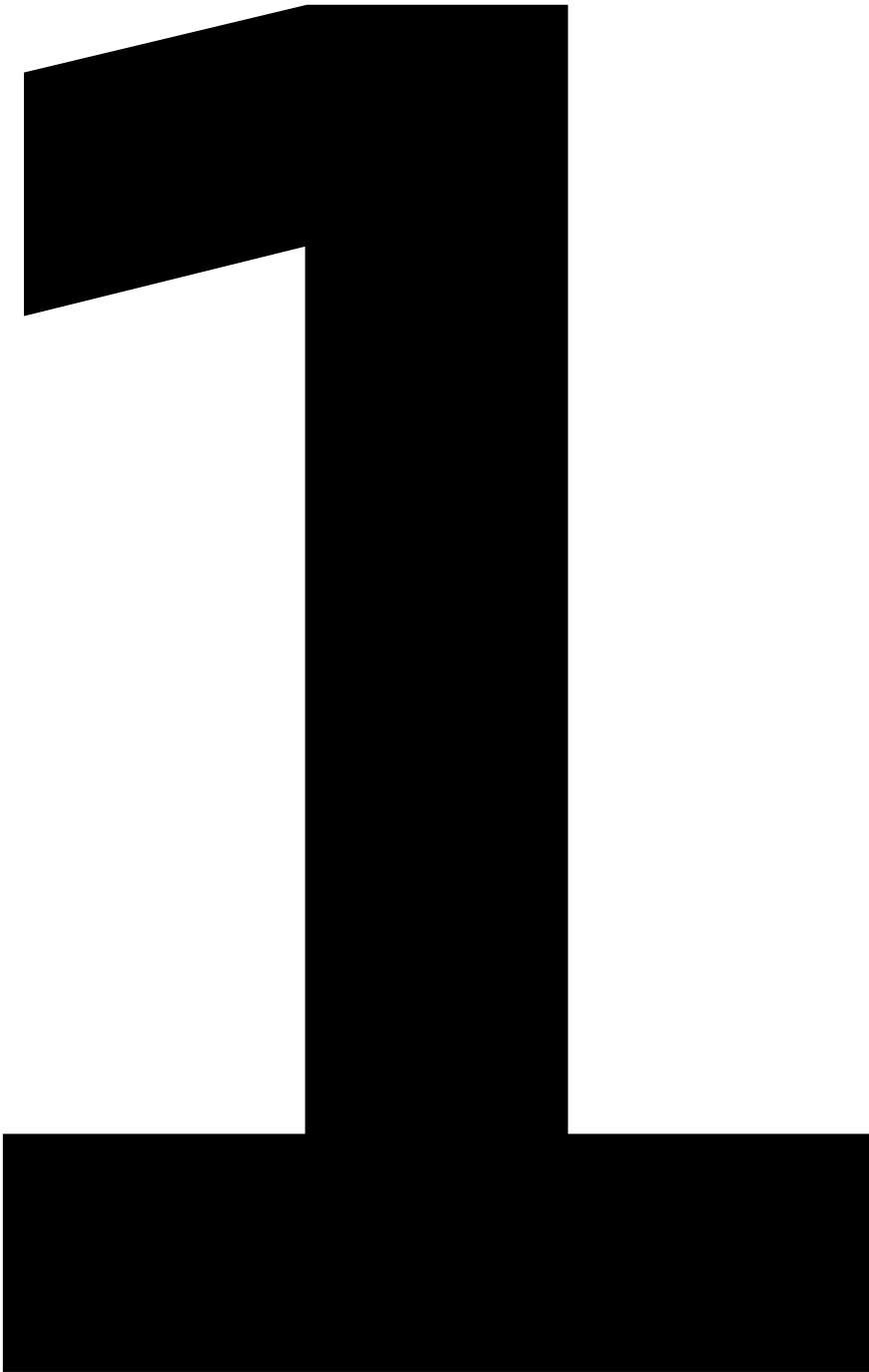






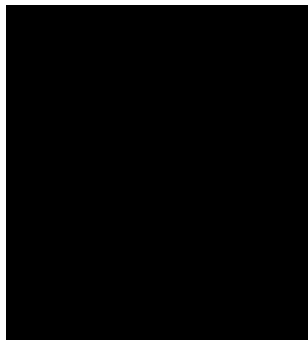








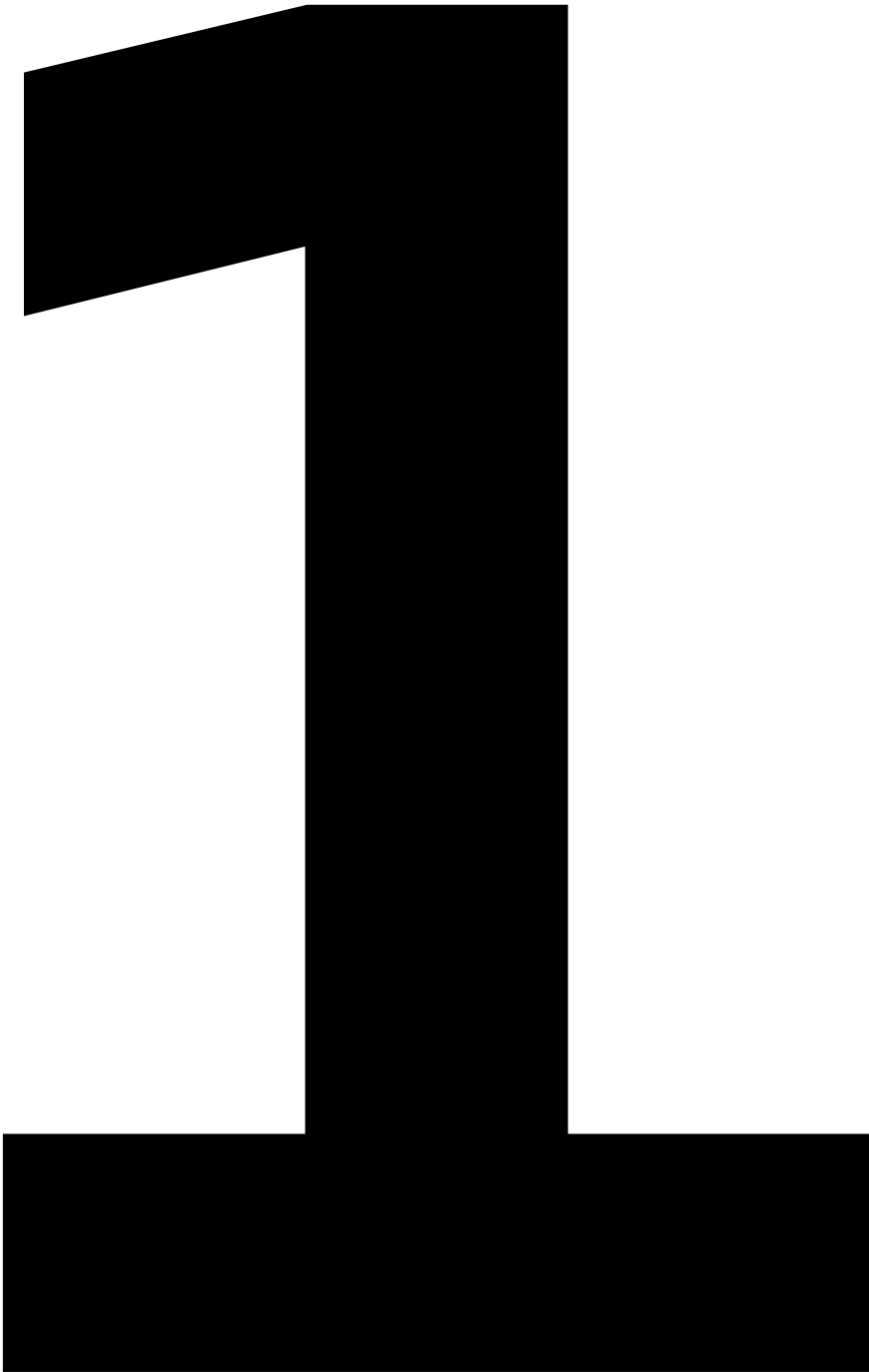






9







2





**5**



6



6









**sa**



**10**



**Q**



**e**









**u**







**e**





**n**



**sa**



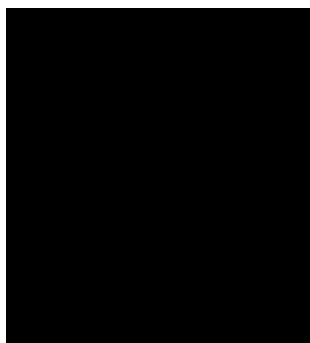
**m**



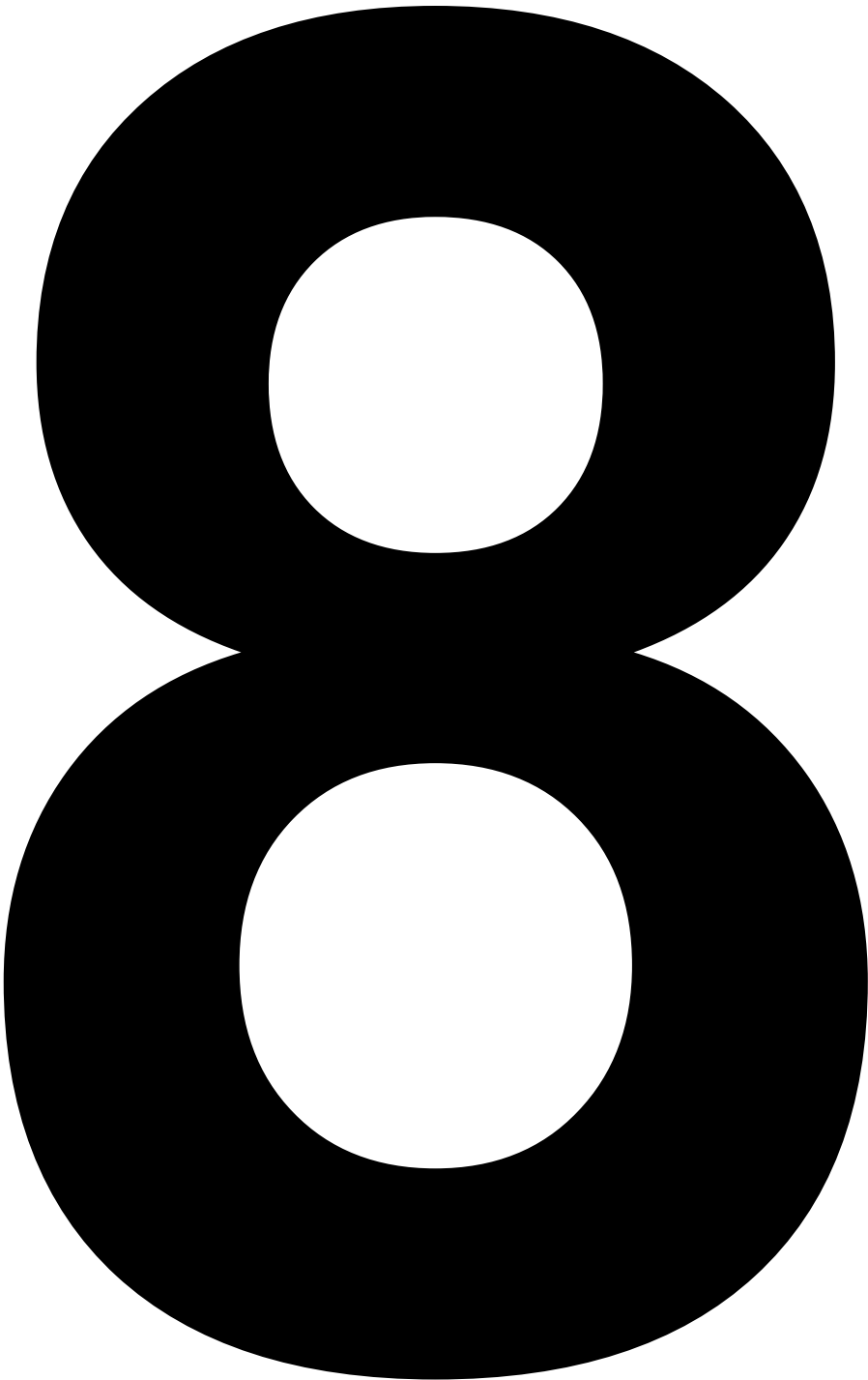
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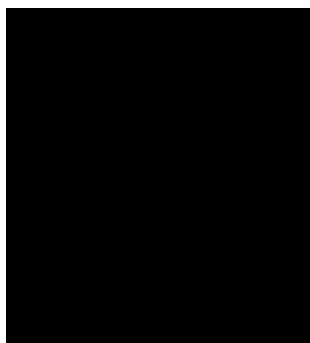










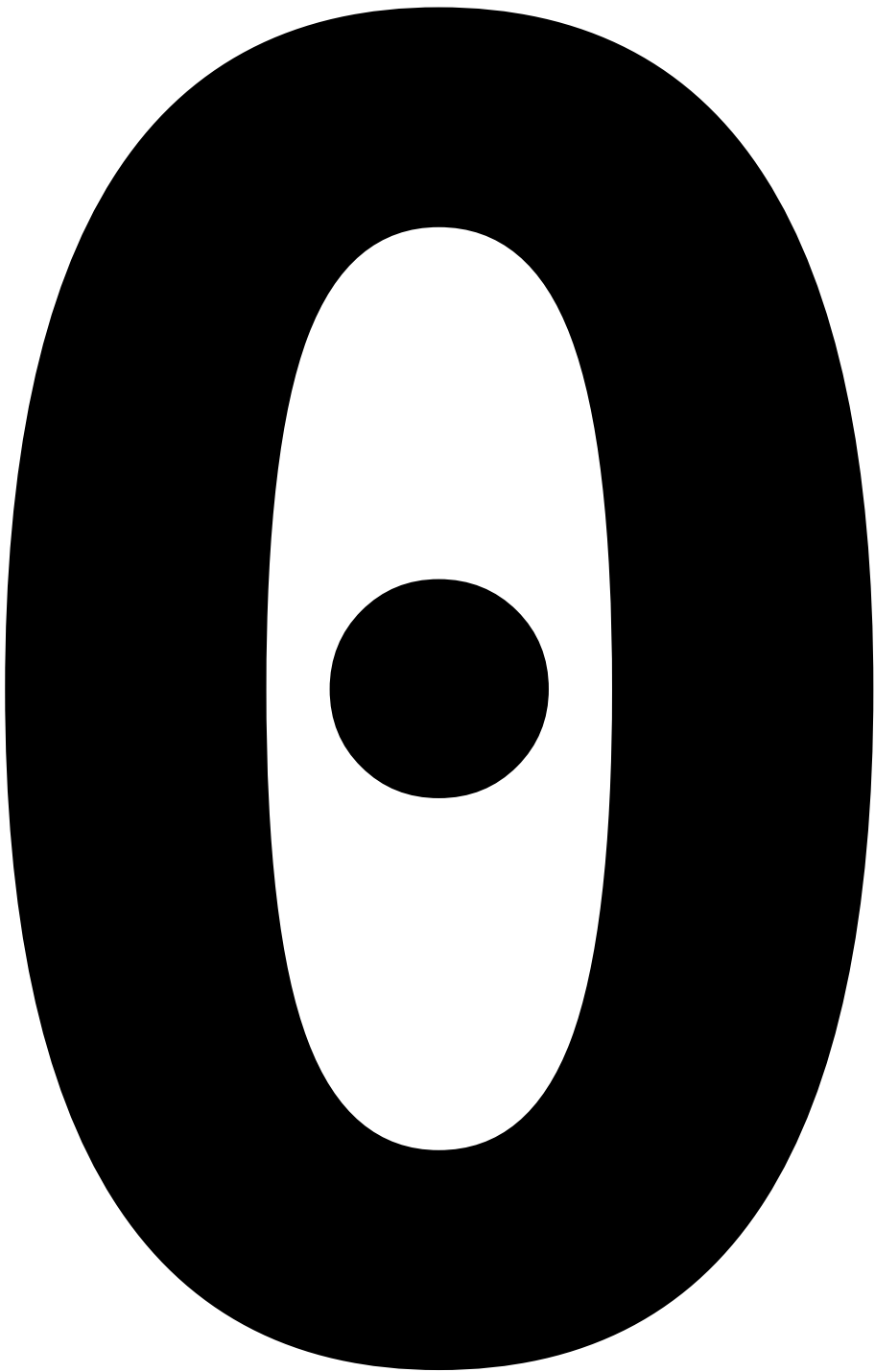




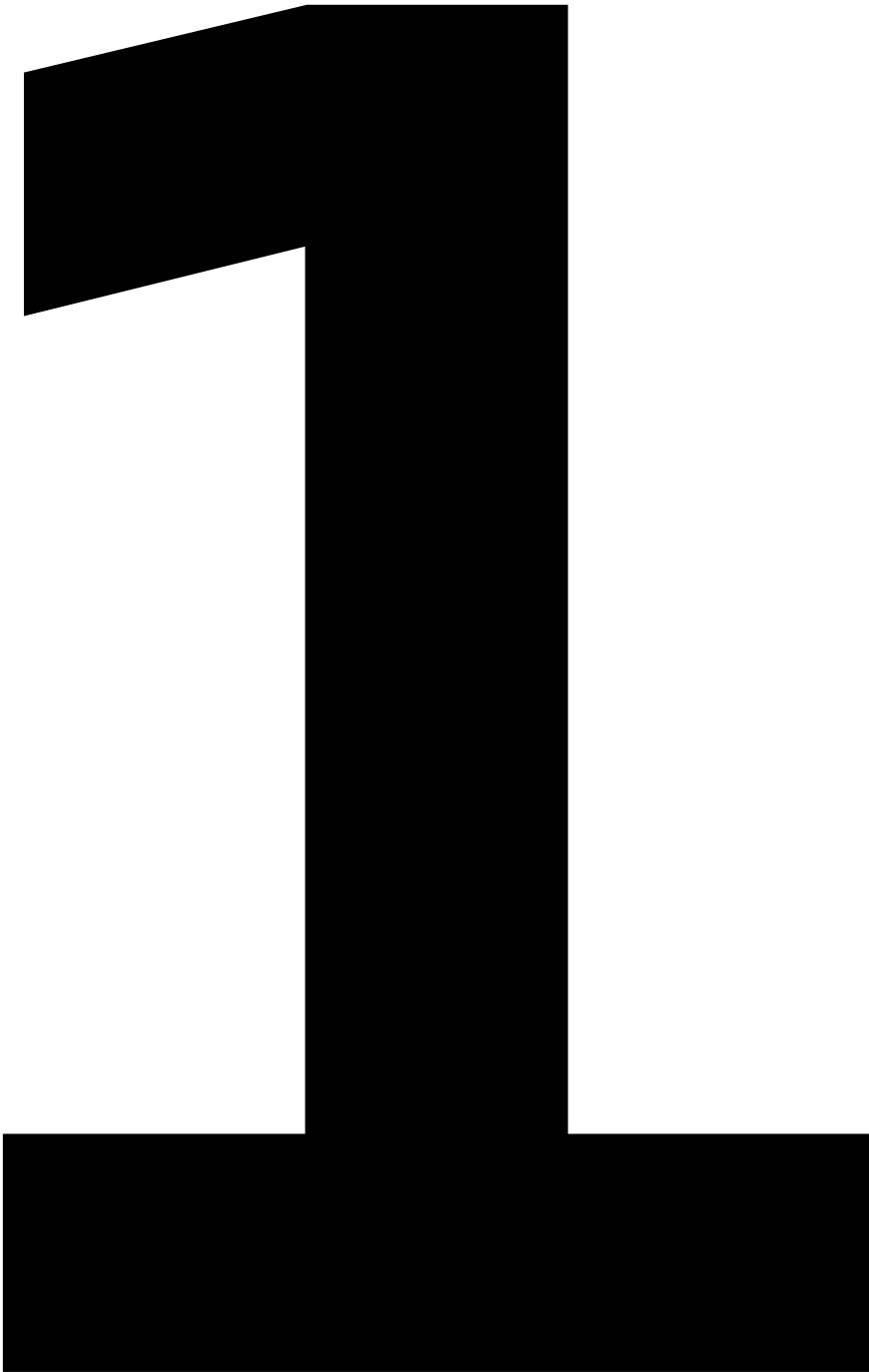
2













**3**





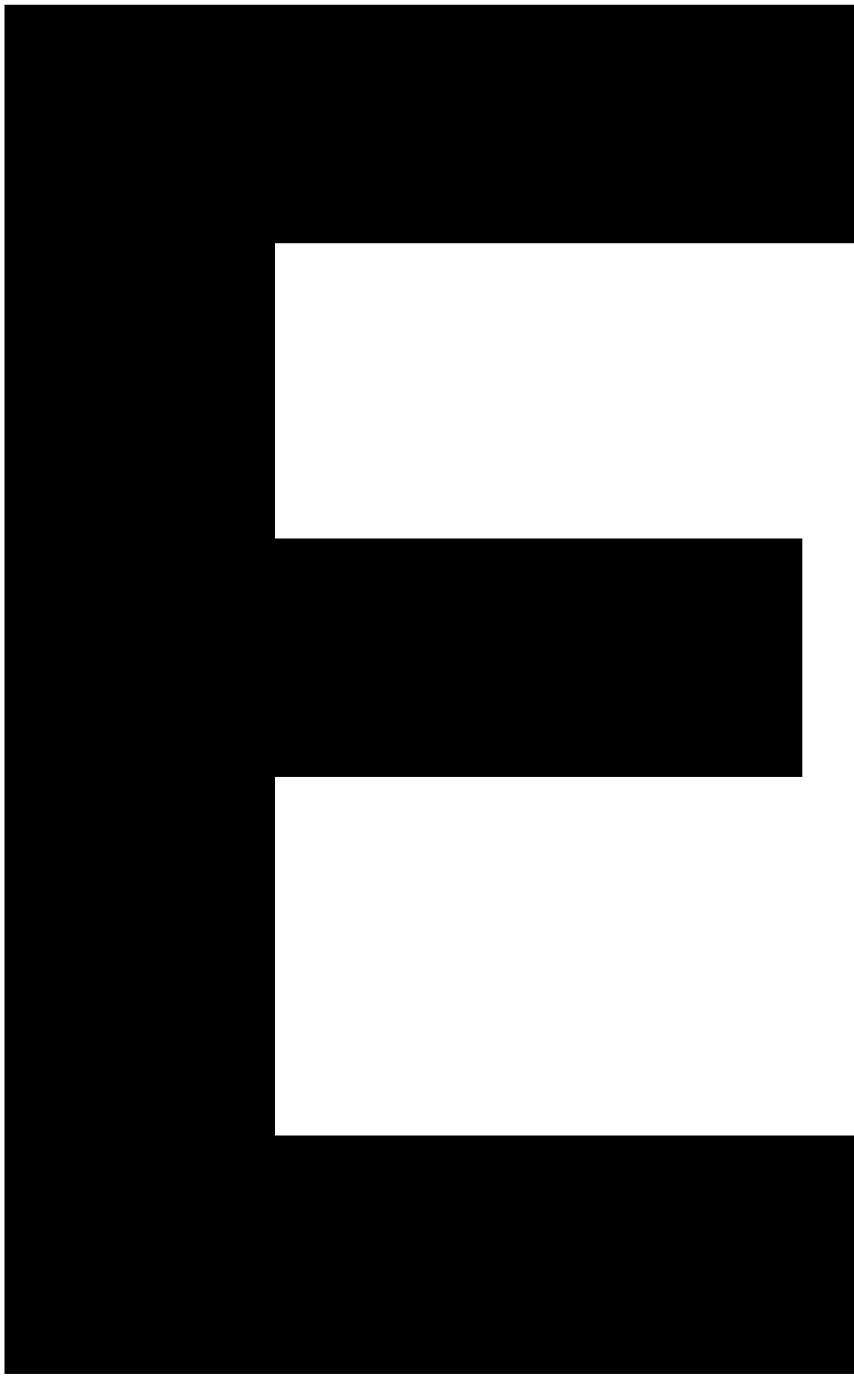






**B**







**C**





**Q**







**h**







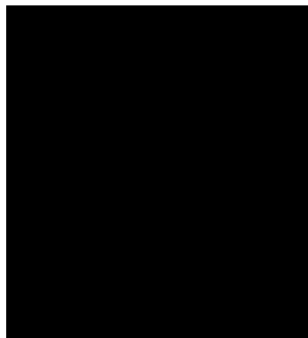
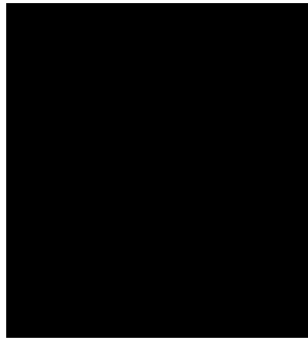




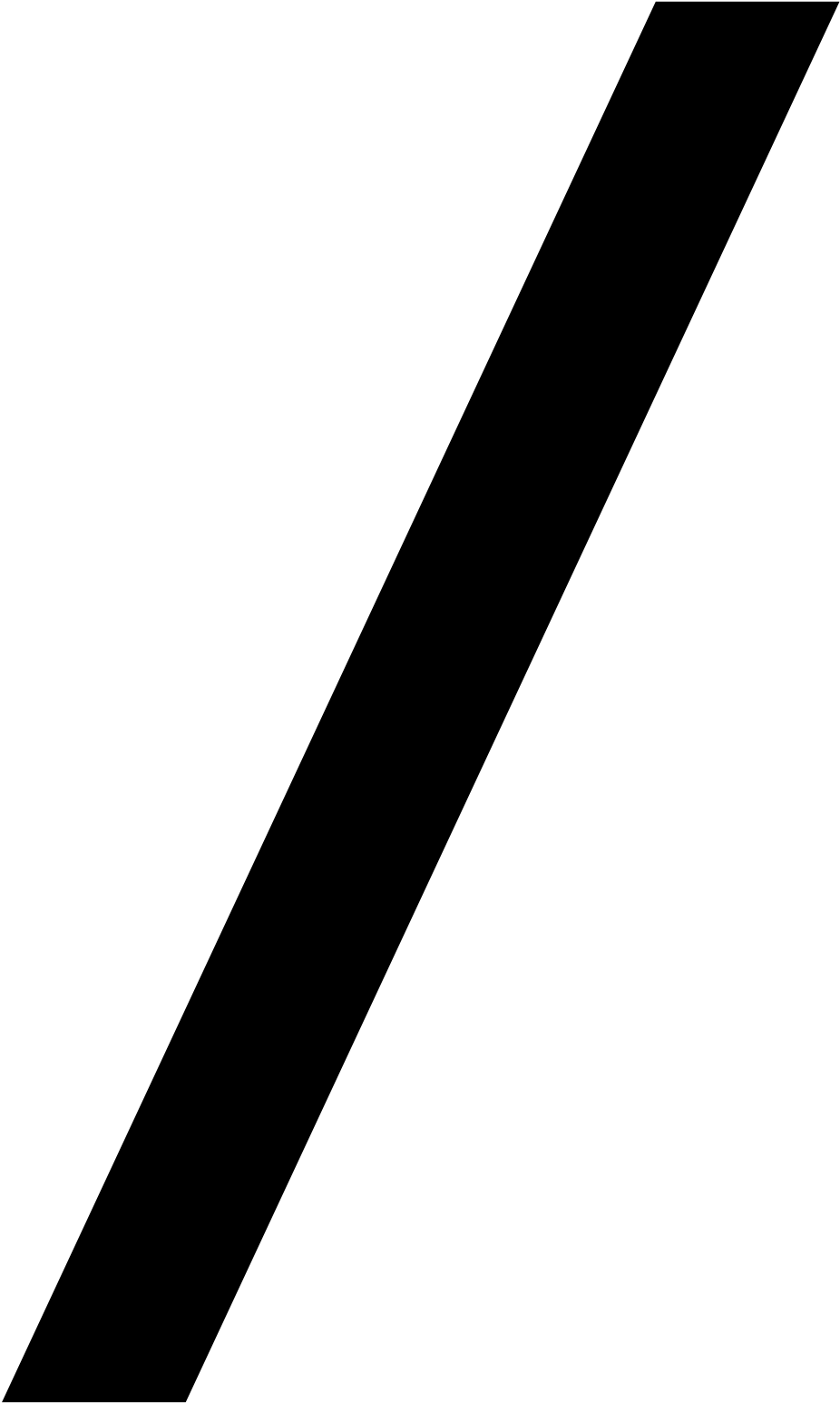


**o**



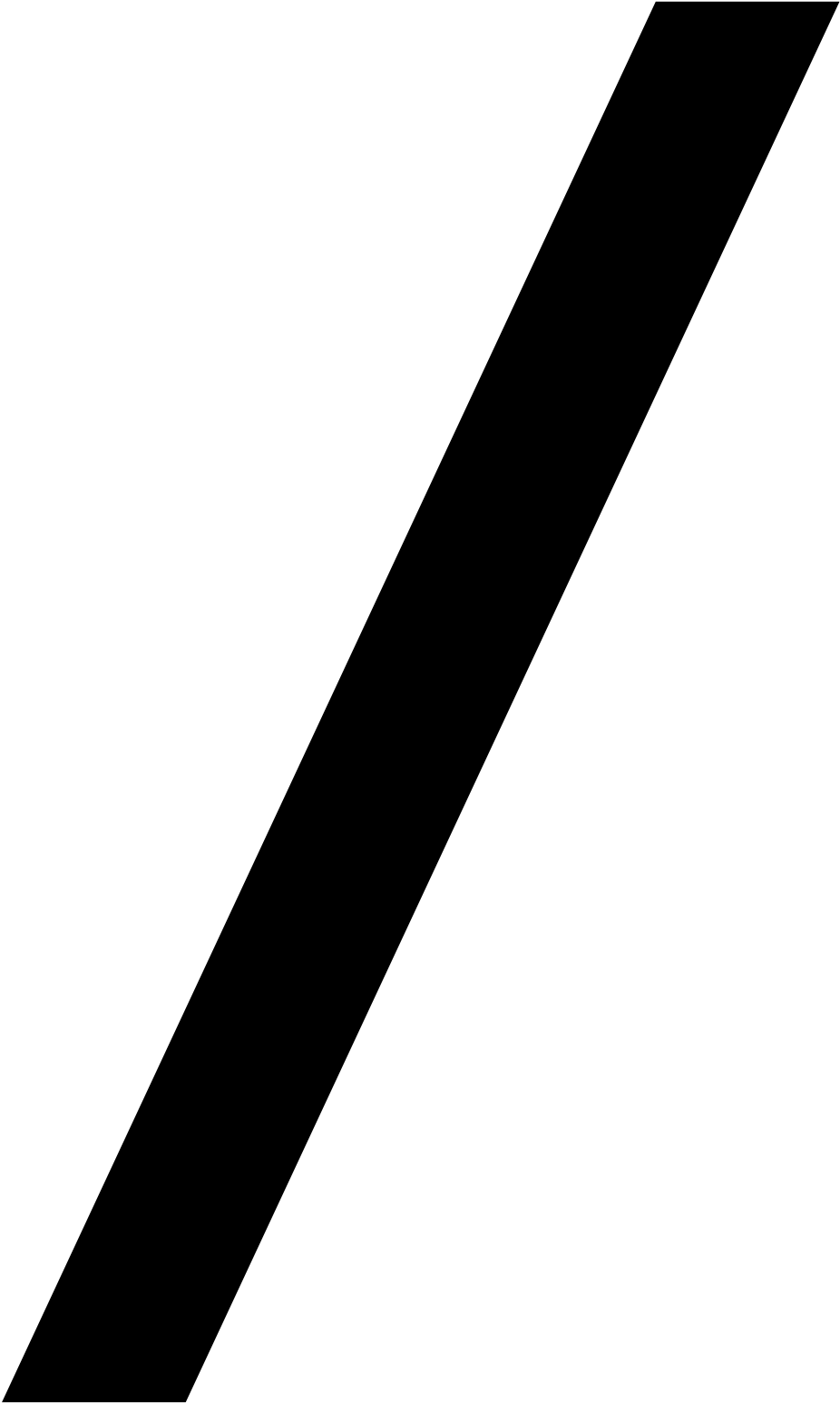














**w**



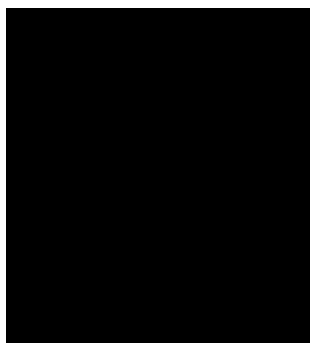
**w**



**w**









**w**



**sa**



**S**





**S**



**e**













**w**







**S**



**S**



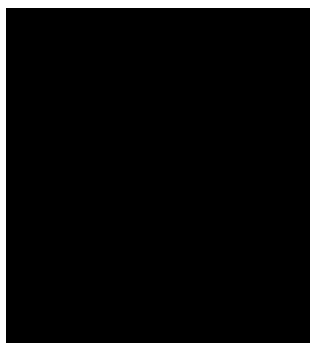


**e**



**n**







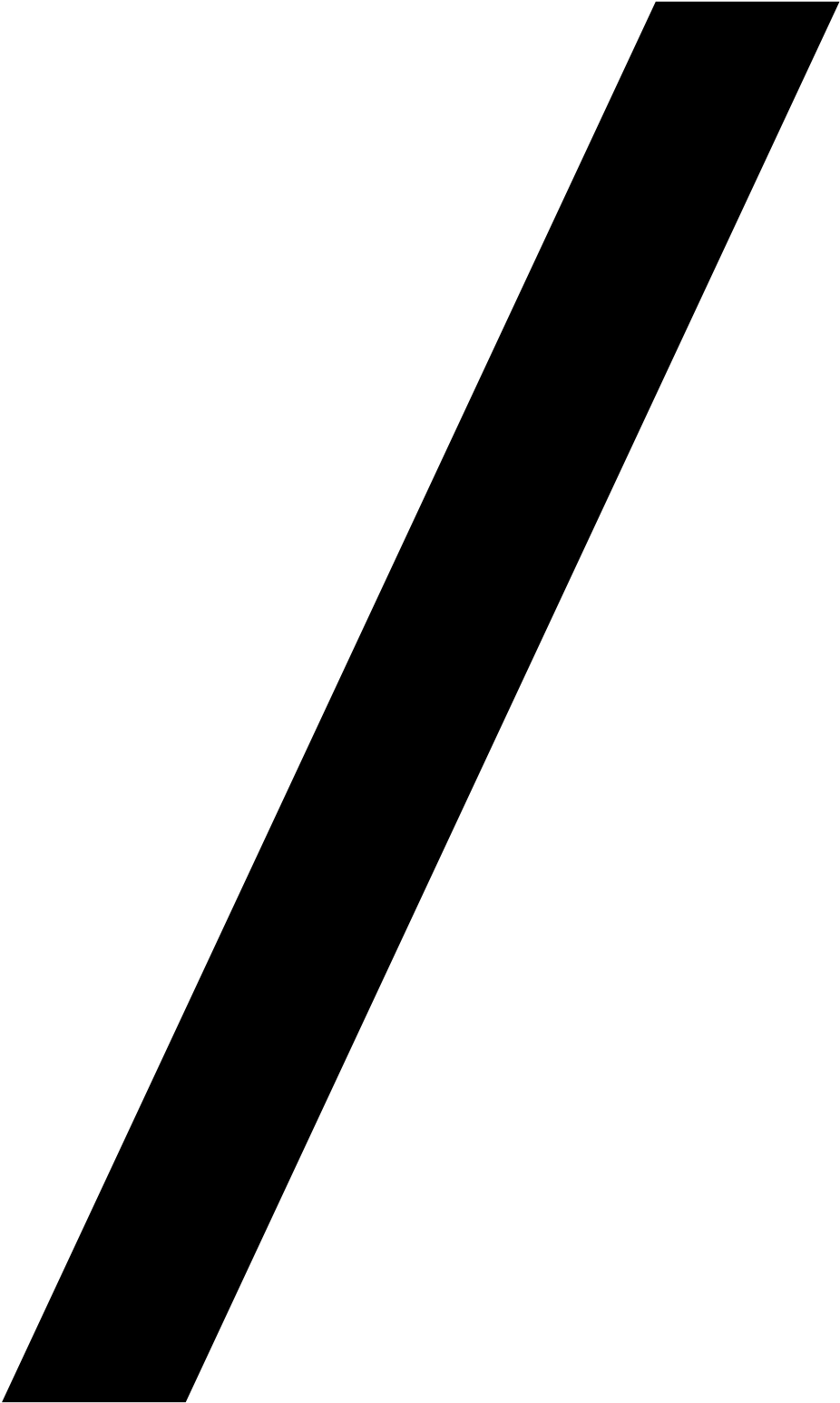
**Q**





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**10**





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**sa**



**S**



**S**





**e**







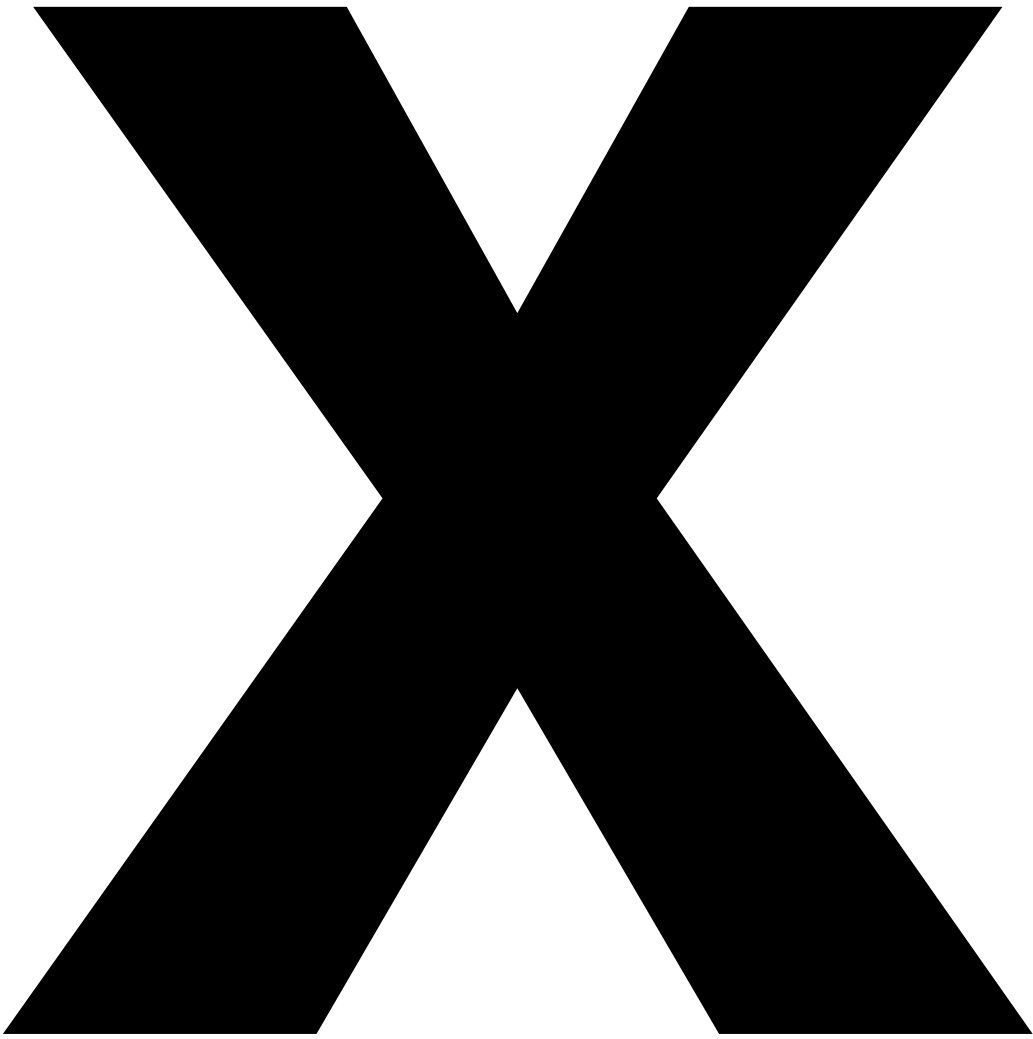
**J**



**e**



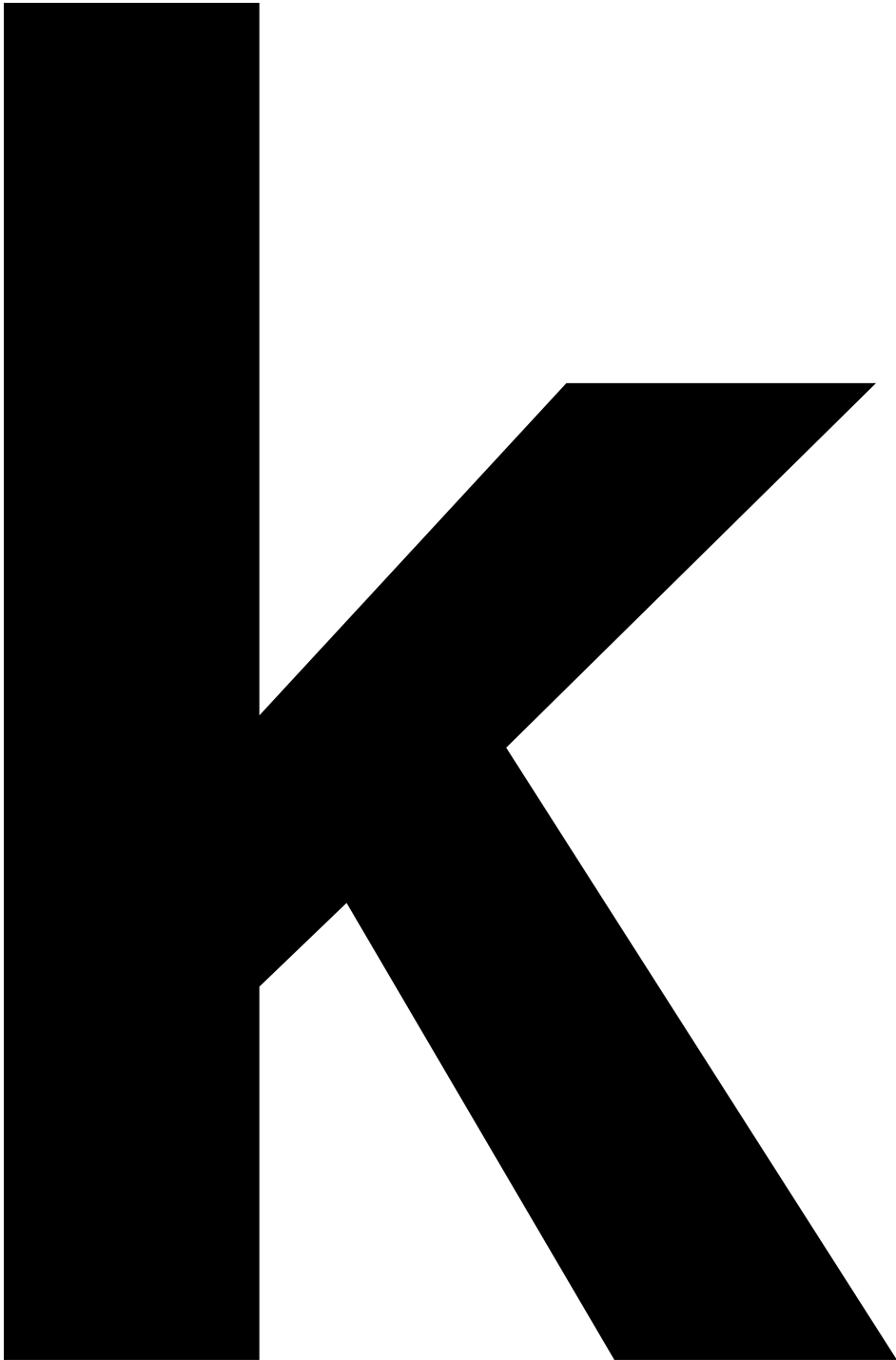














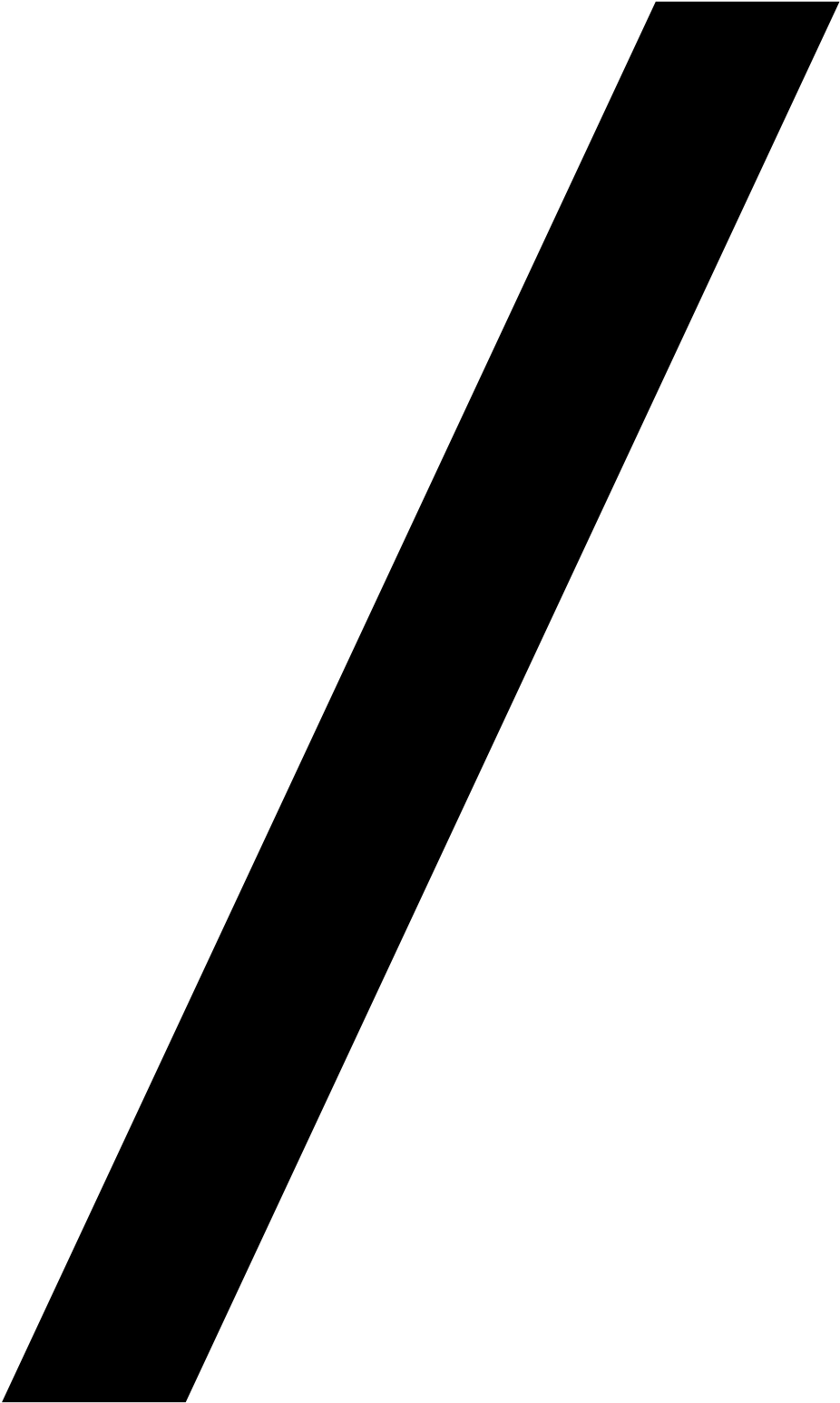






**n**

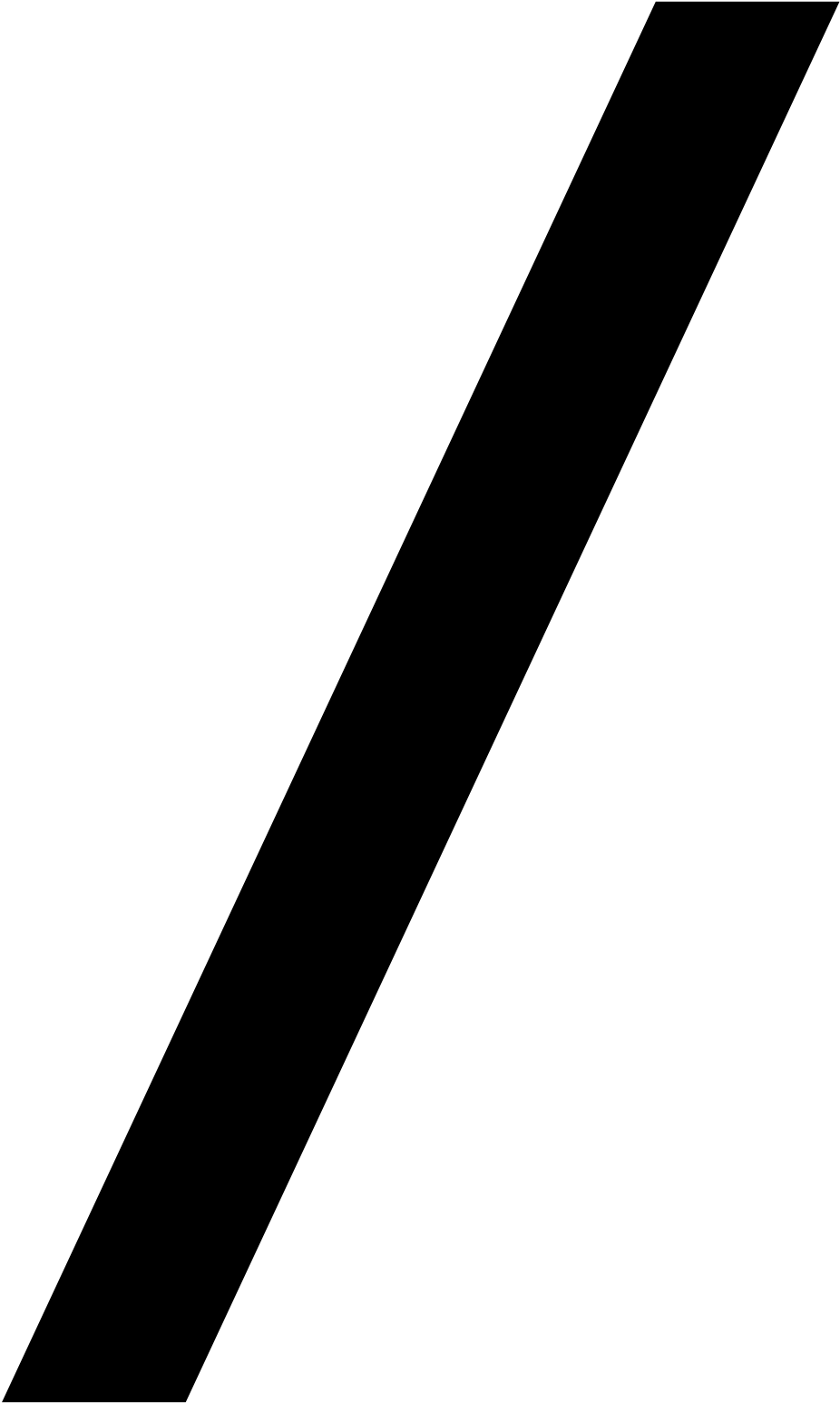






**10**









**10**



**e**



**C**



**Q**





**u**



**e**







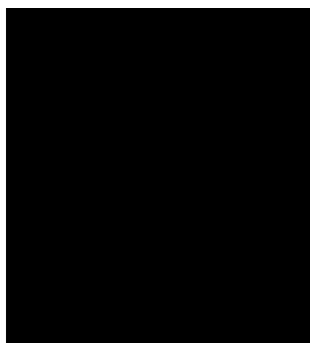
**e**





**J**







**h**









**m**







**sa**



**10**





**Q**



**e**



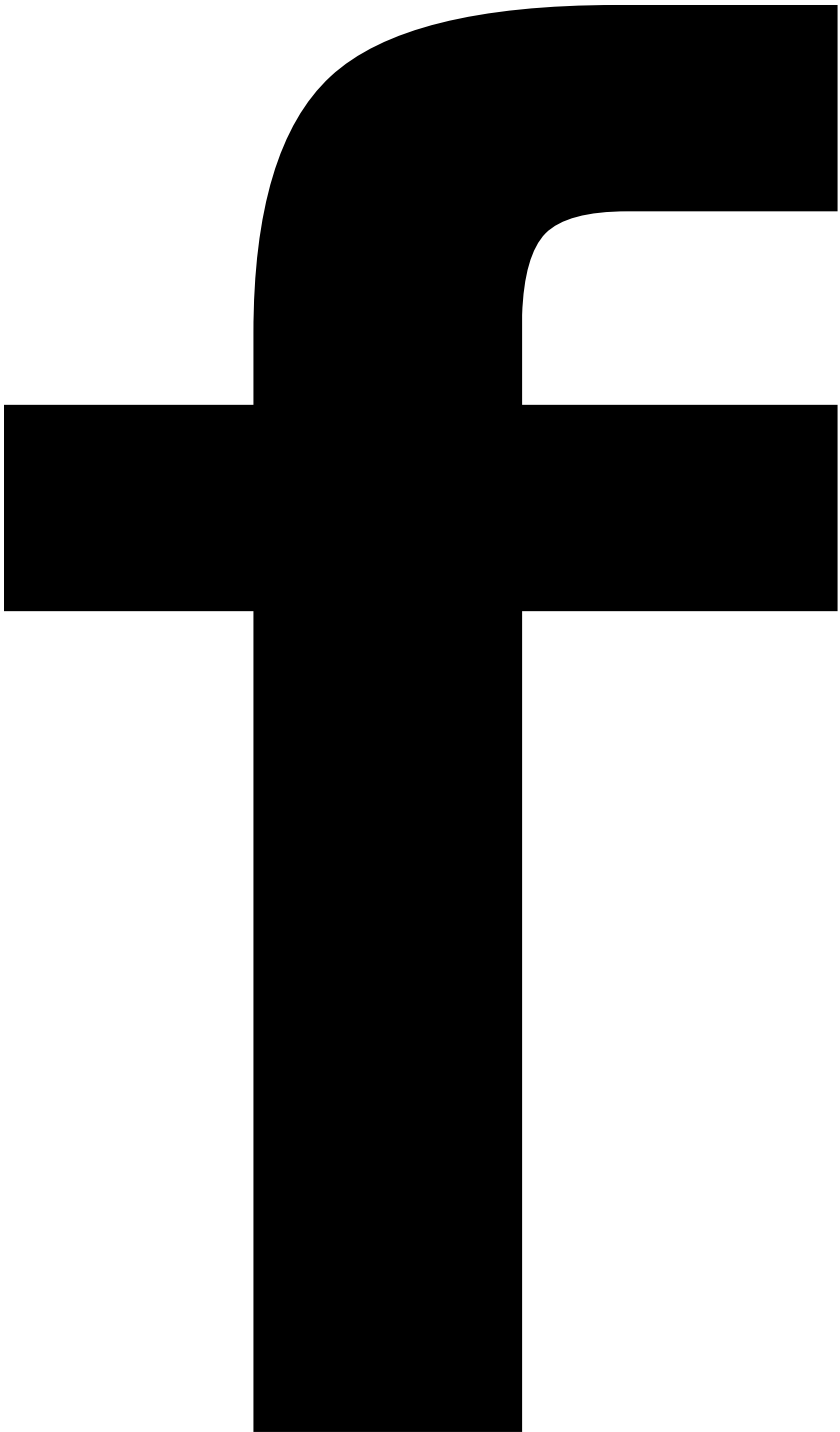




**u**









**e**



**n**



**sa**



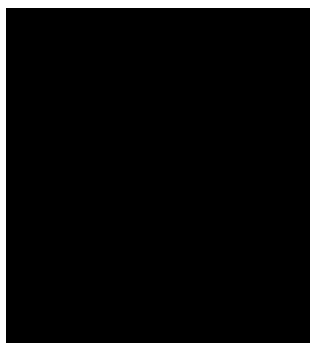


**m**

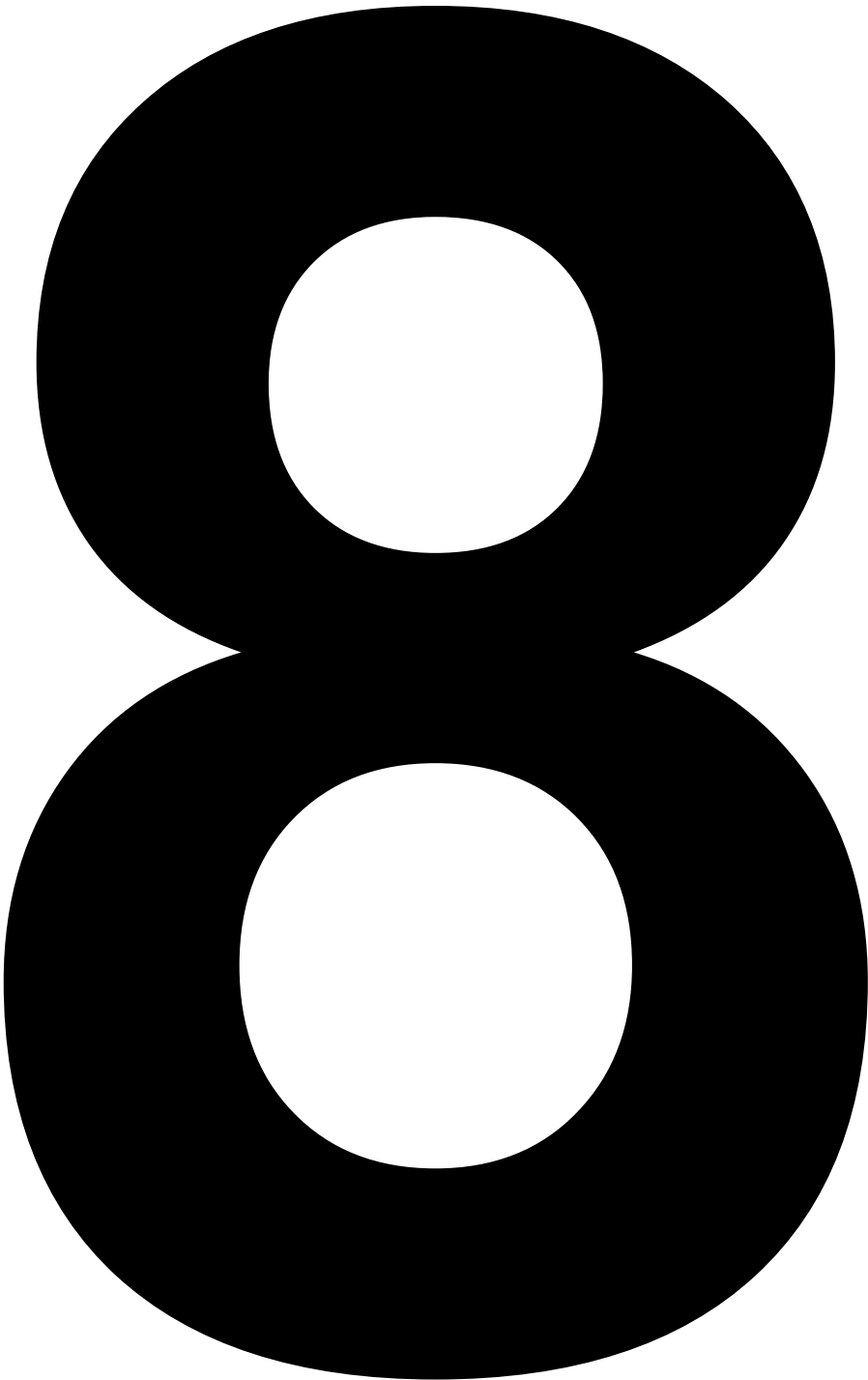


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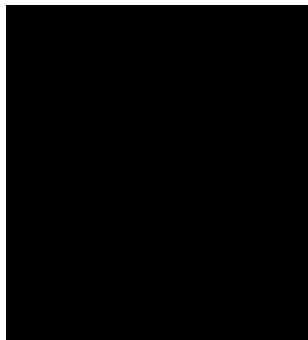












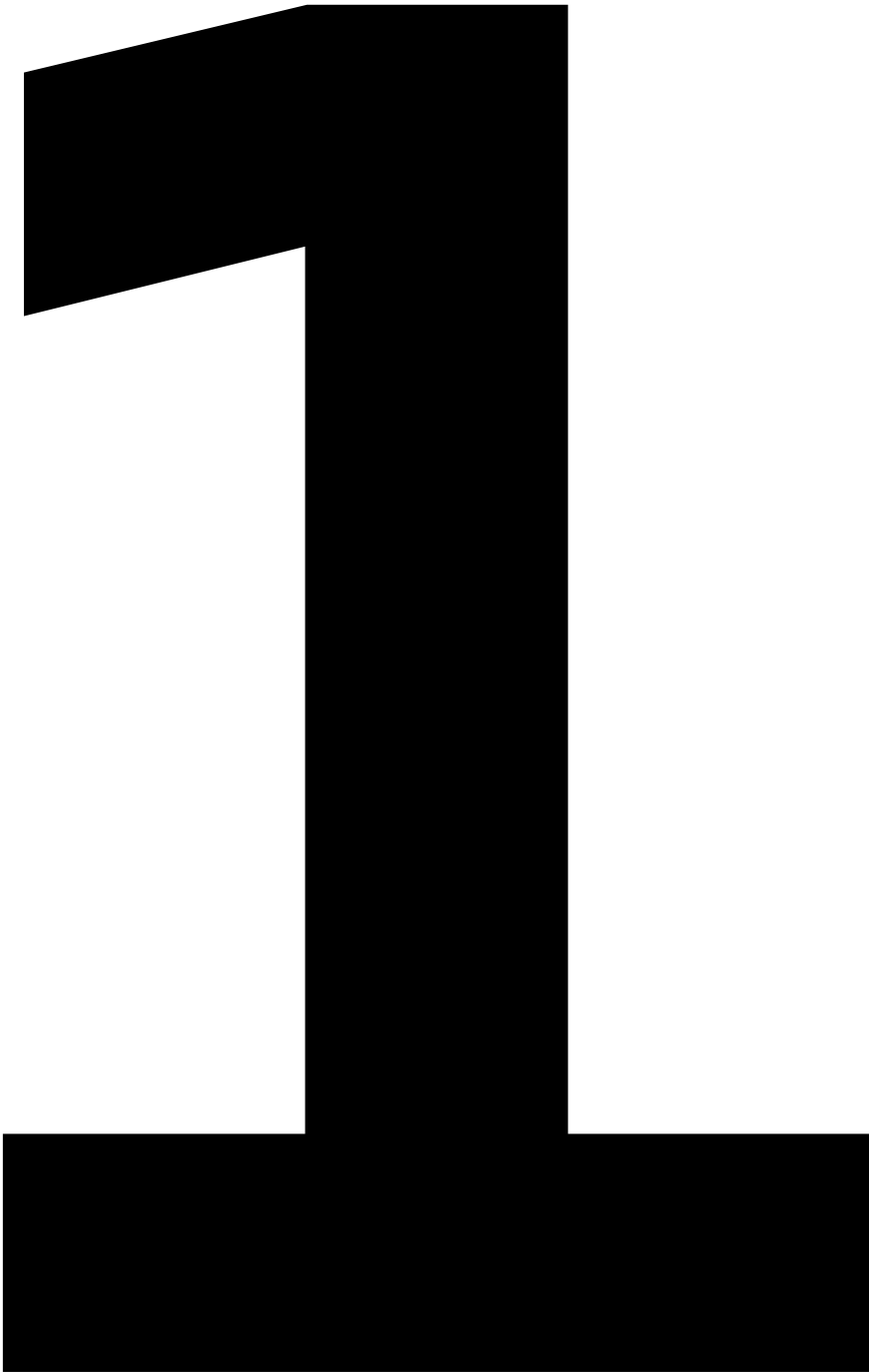


**2**













**3**



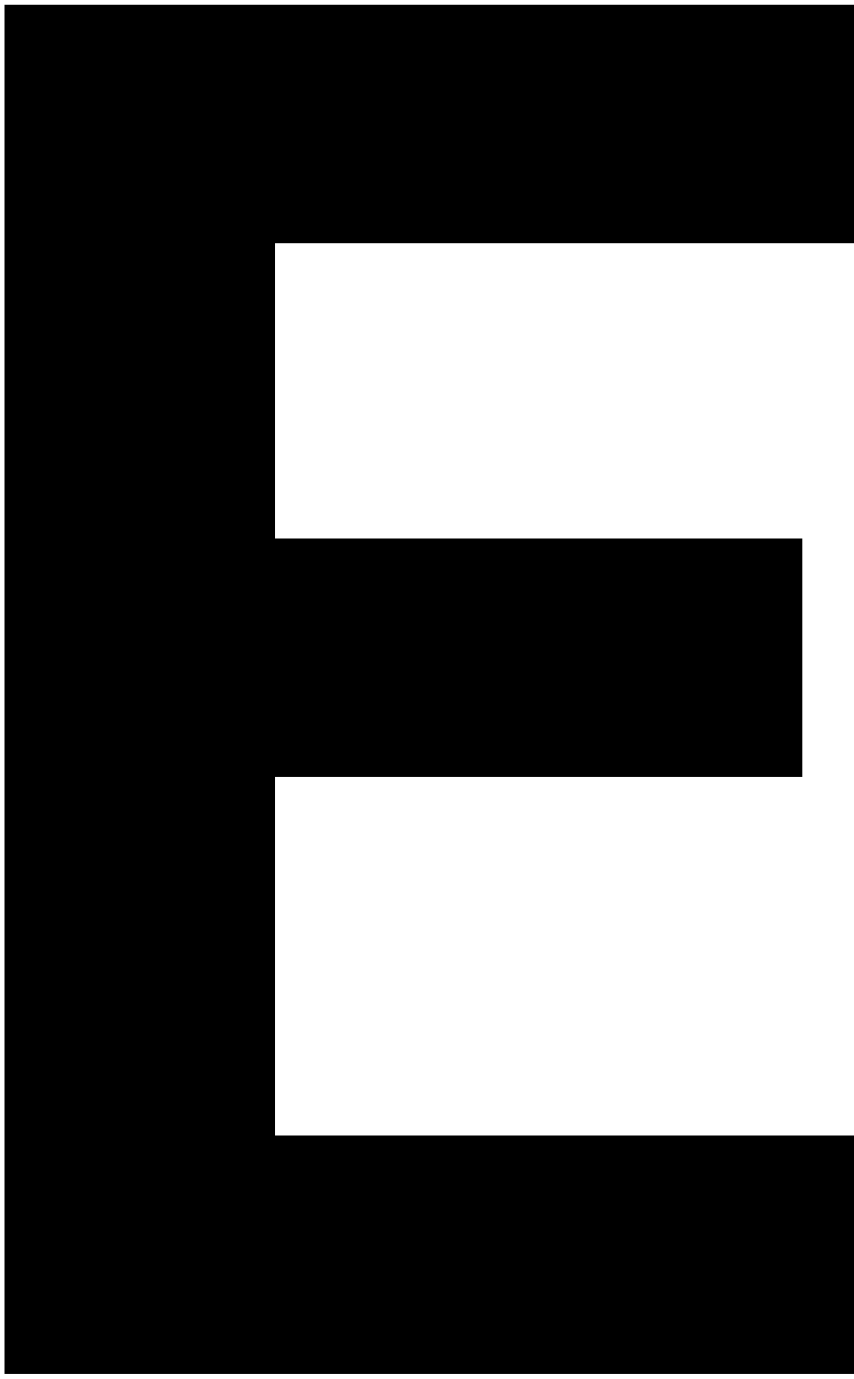






**G**









**G**



**N**







**h**







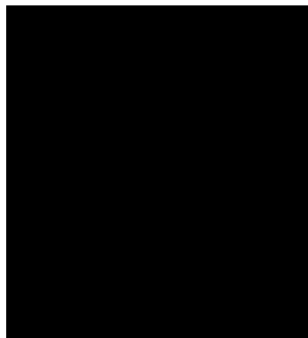
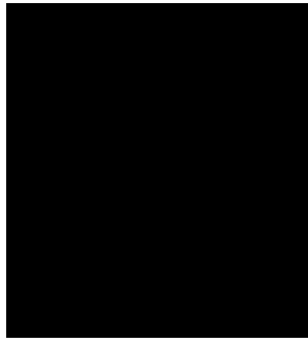






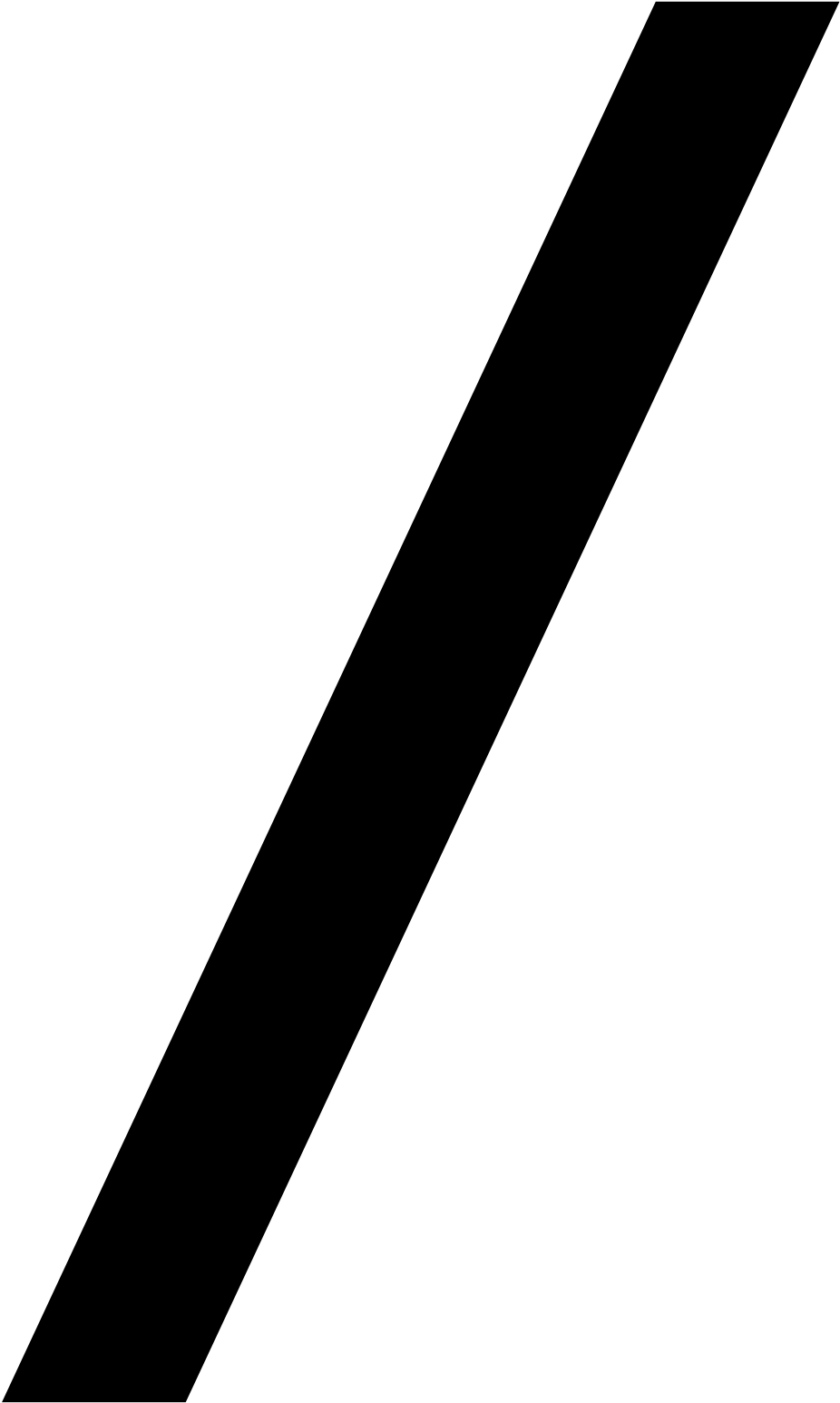
**o**



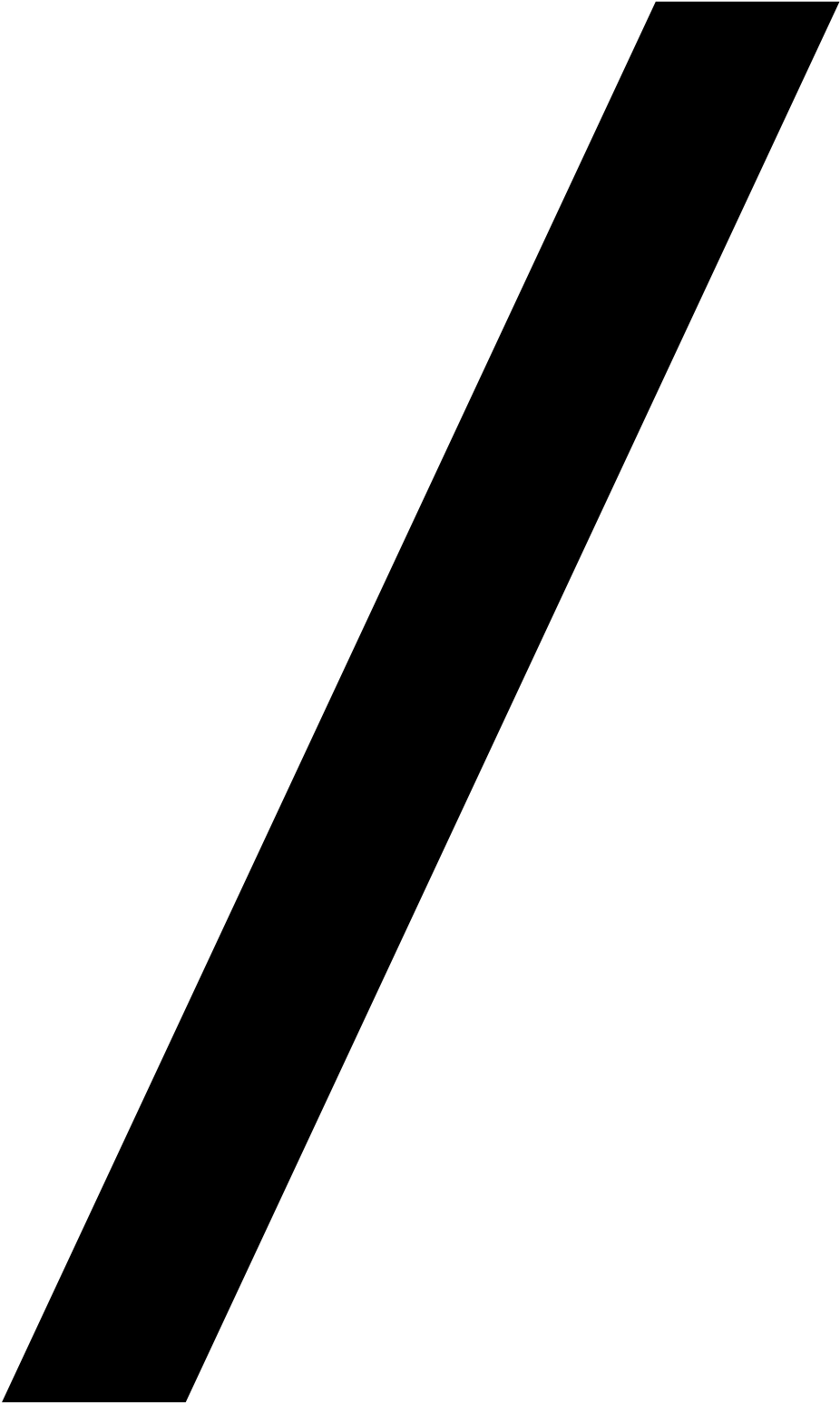














**w**



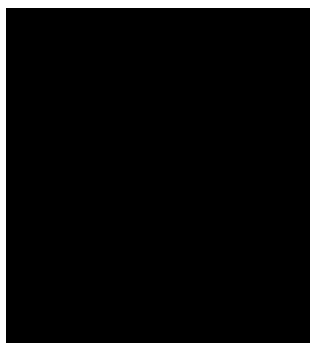
**w**





**w**







**n**



**C**



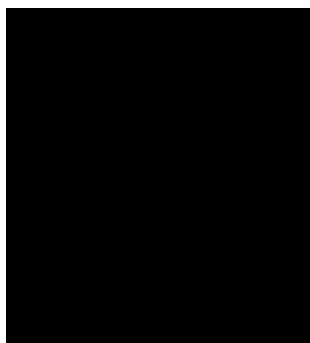


**10**











**n**



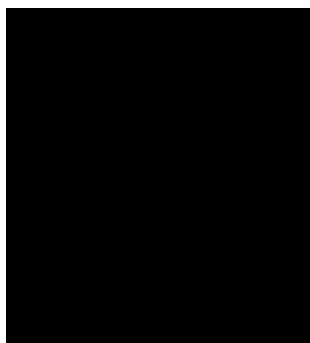


**J**



**m**







**n**



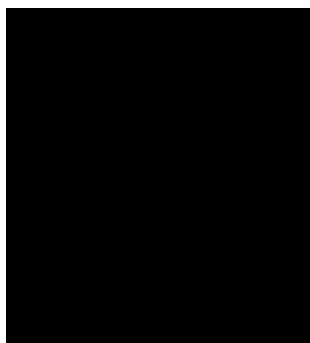






**h**







**Q**



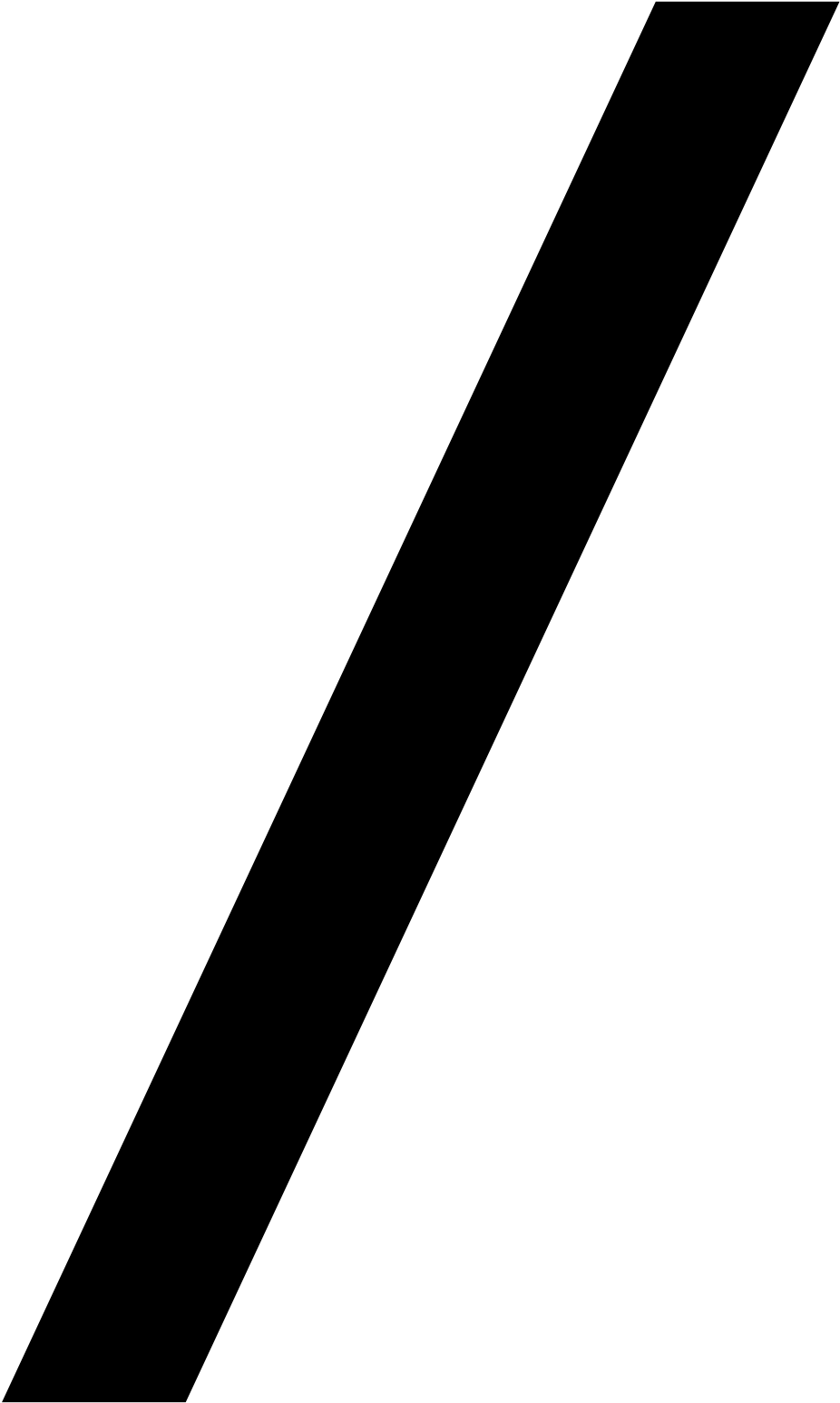






**V**







**o**



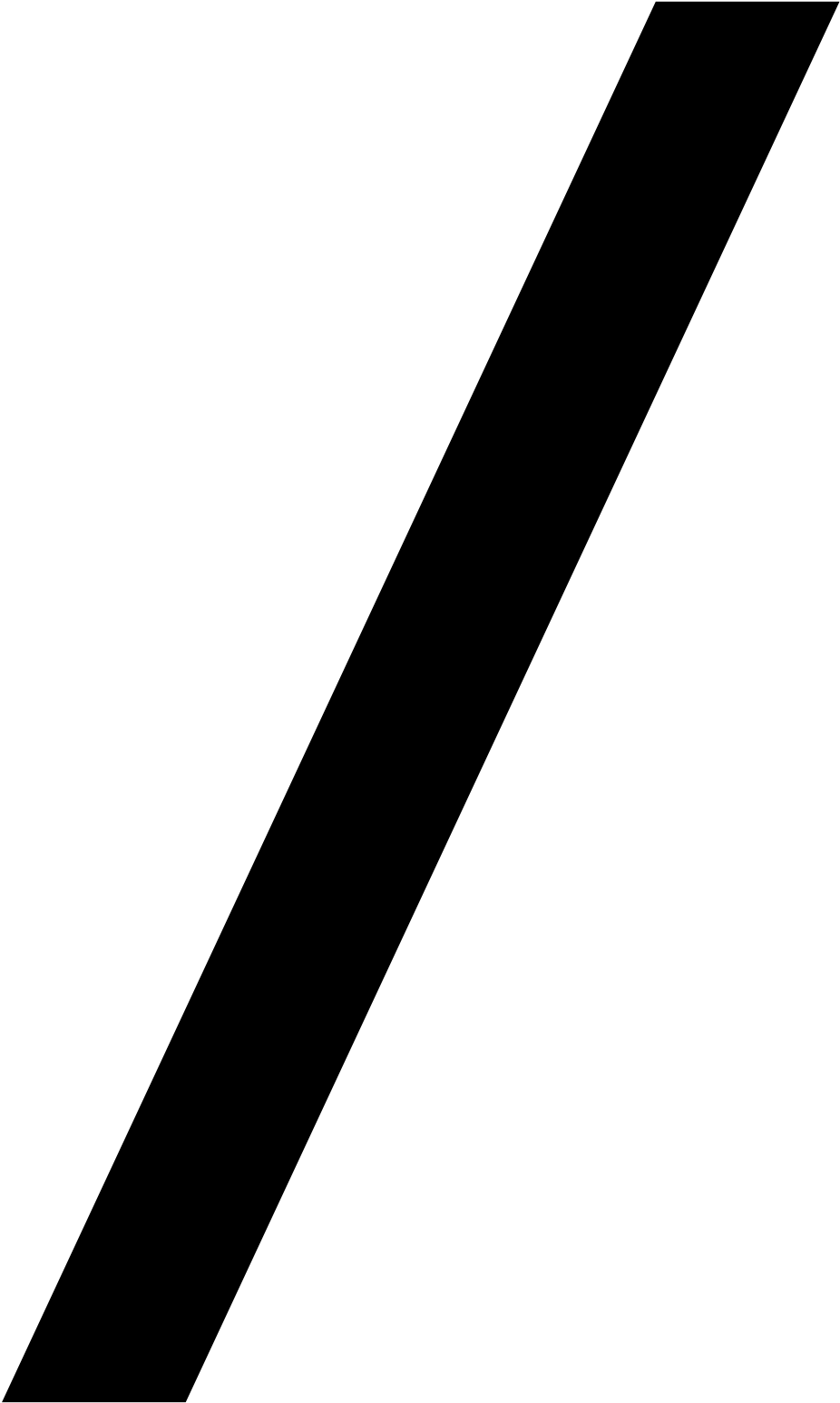


**m**



**C**







**sa**



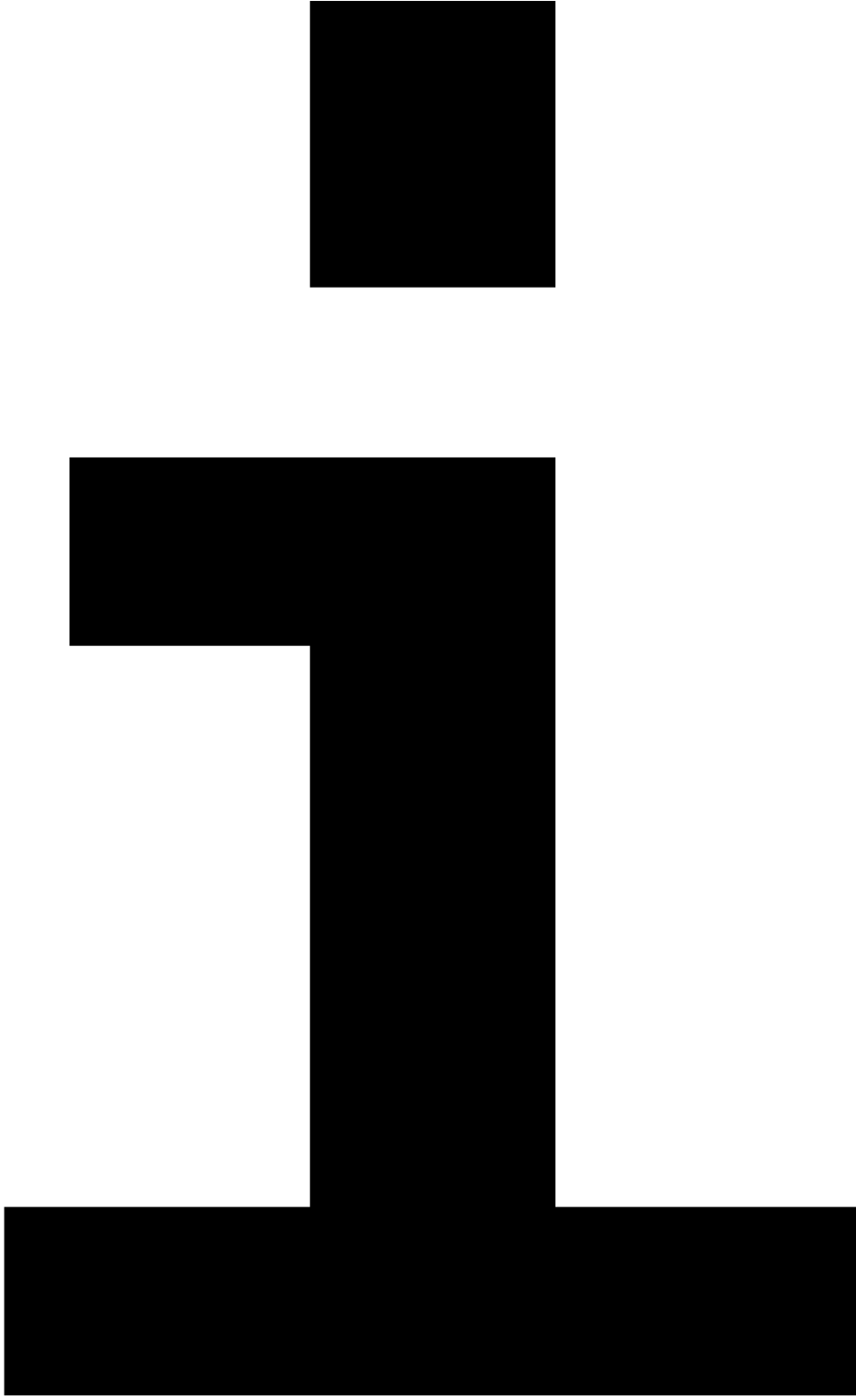














**C**





**J**

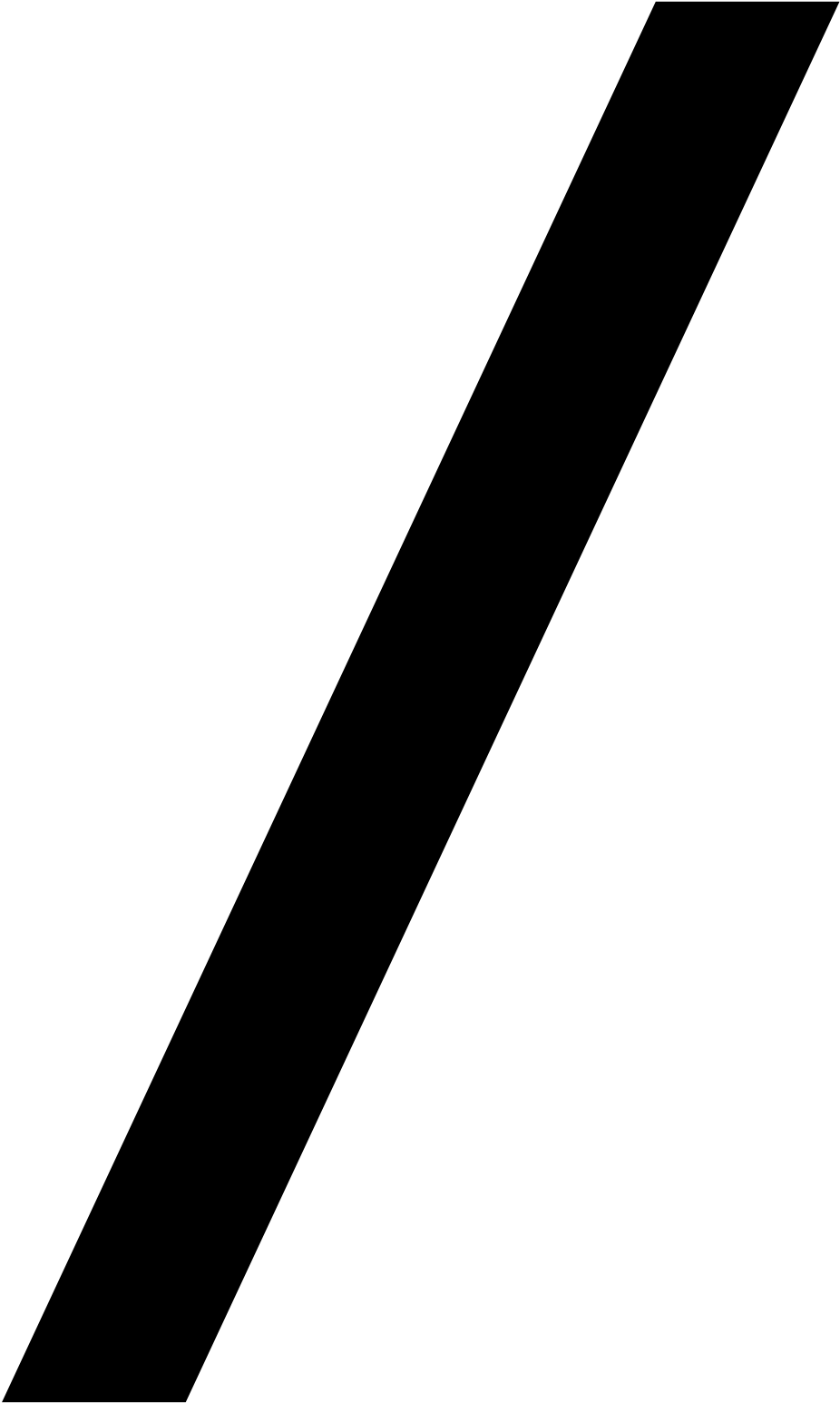


**e**



**S**









**P**



**M**



**C**



**3**





**5**



2



6



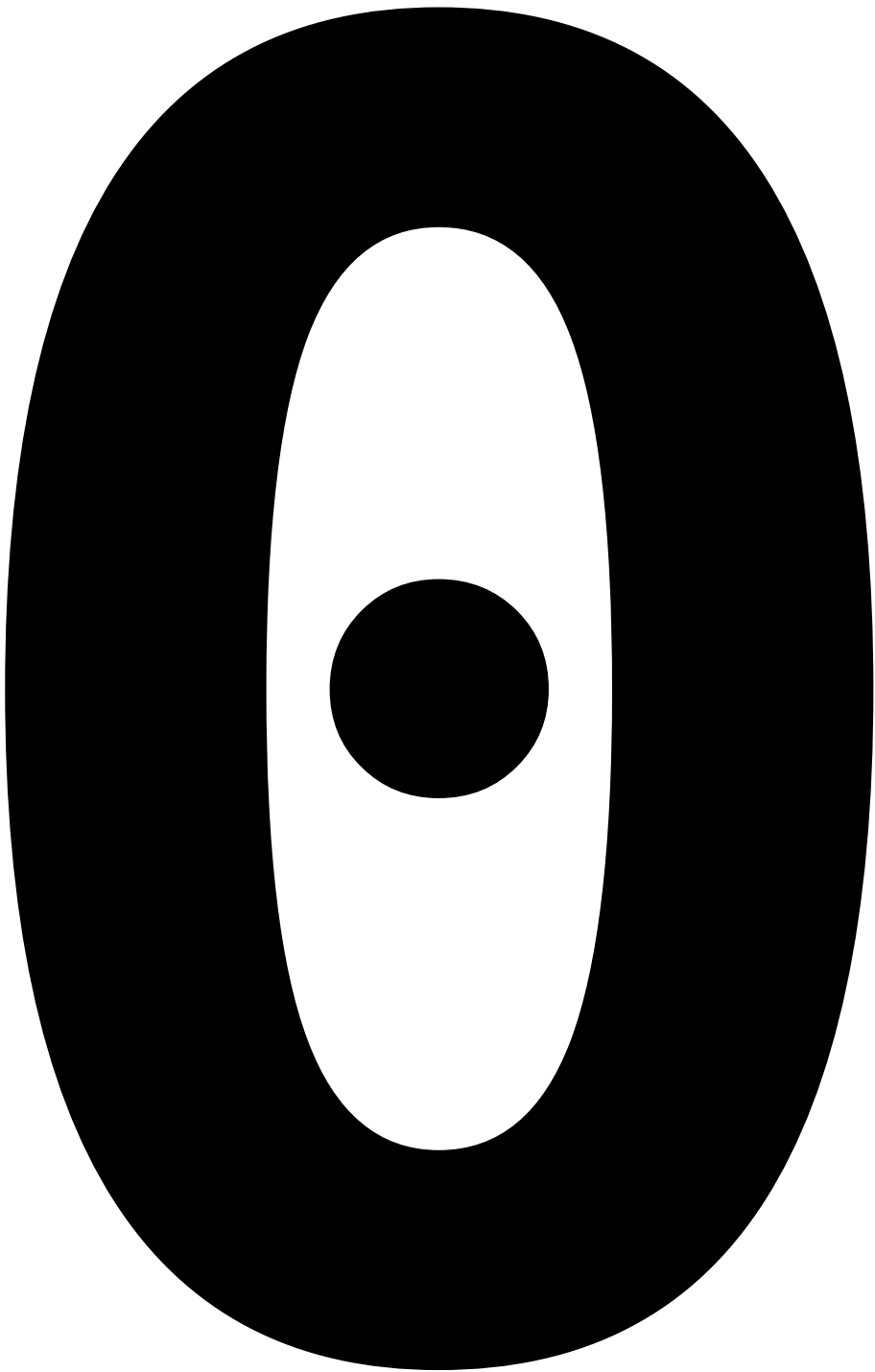
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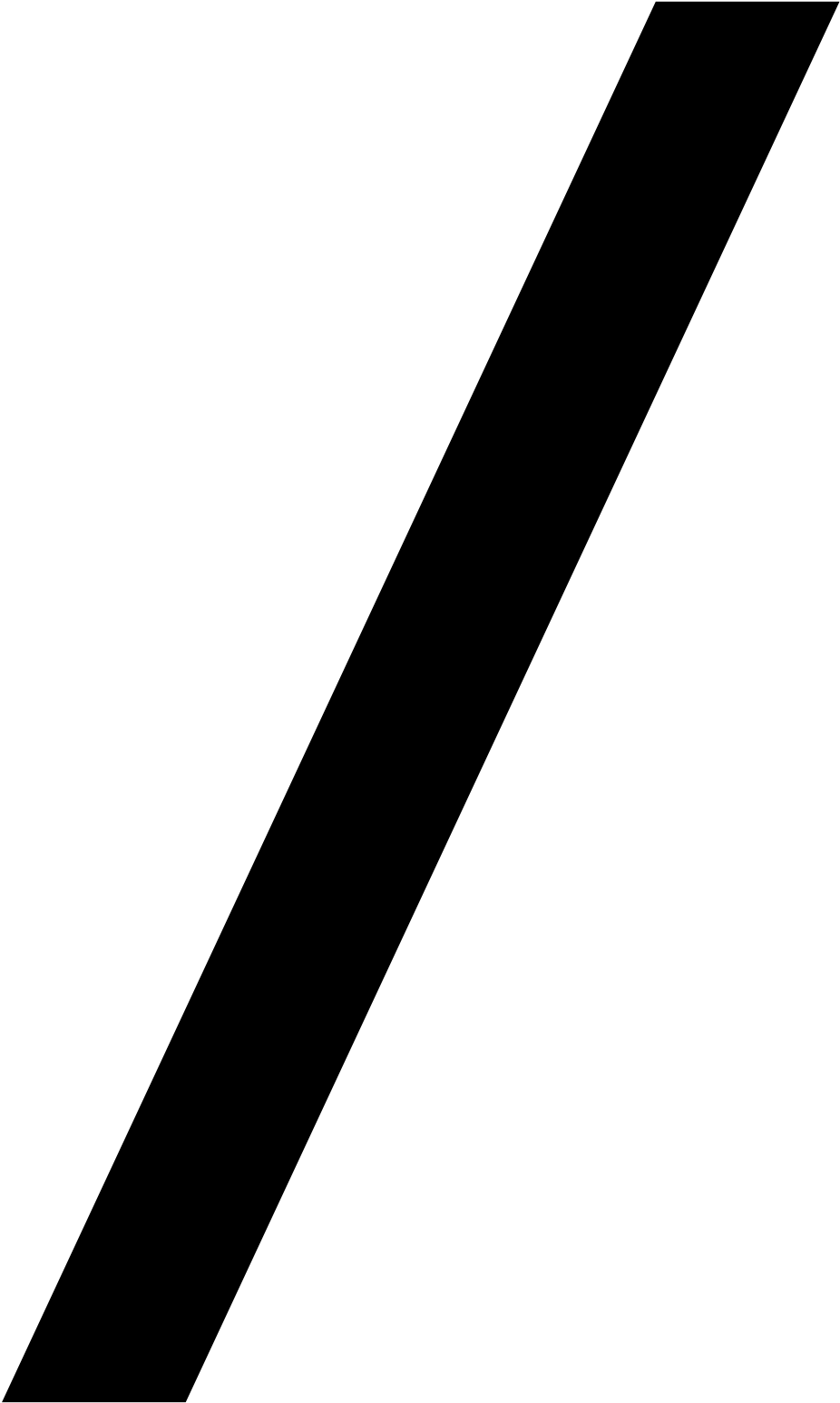


**3**





















**e**



**o**







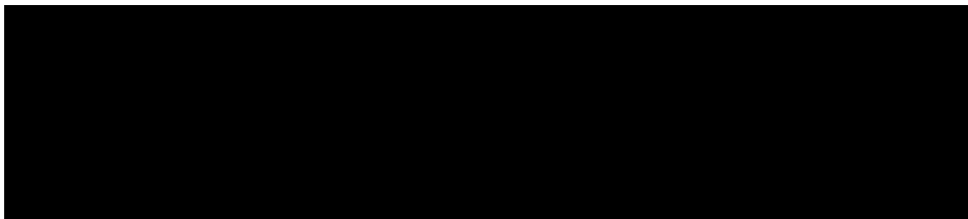
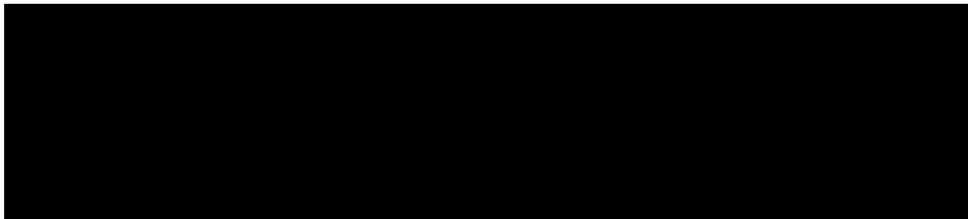














**C**





**J**



**sa**



**S**



**S**









**C**







**sa**





**10**



**Q**



**e**









**u**







**e**



**n**



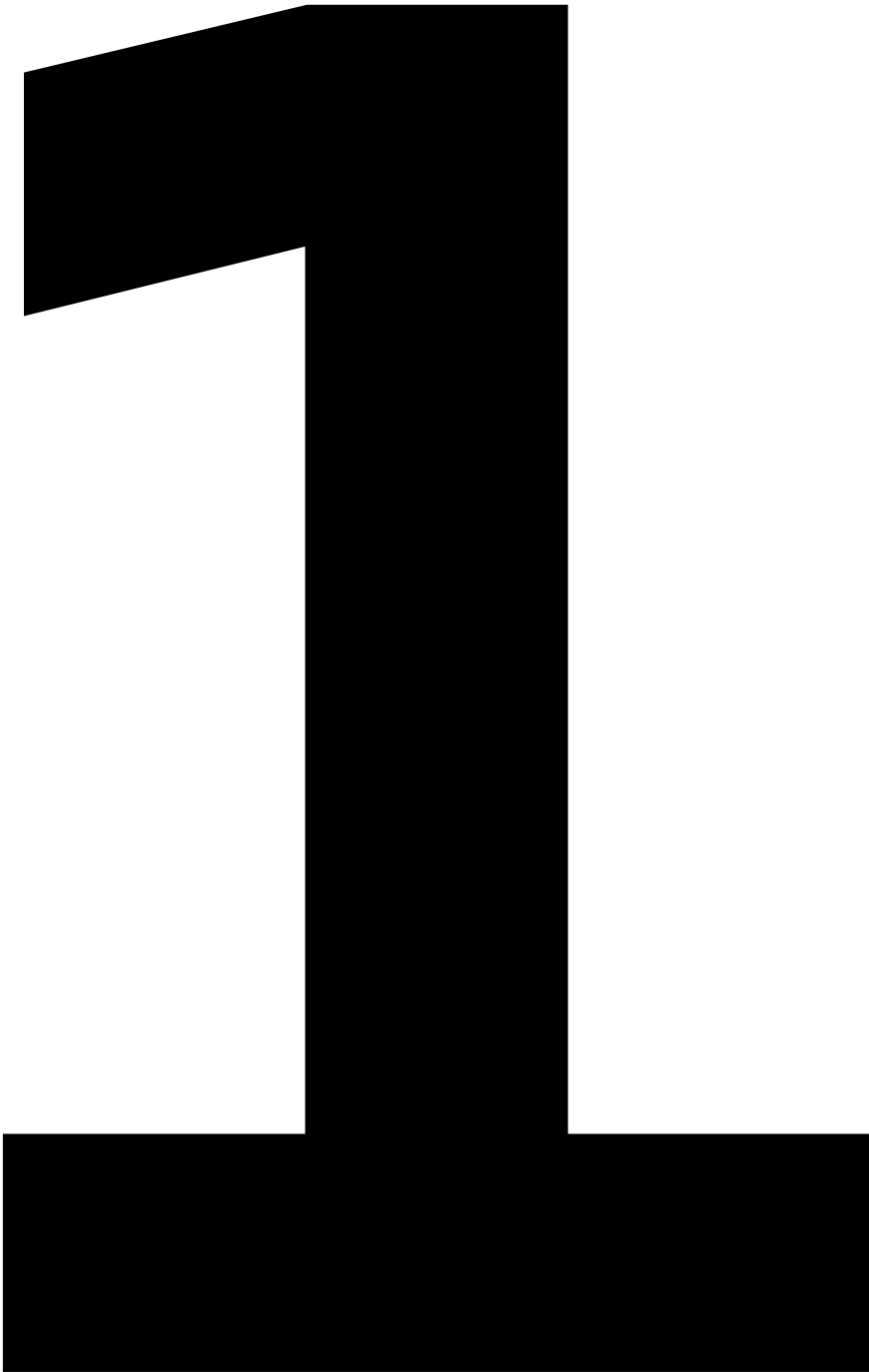


**sa**



**m**



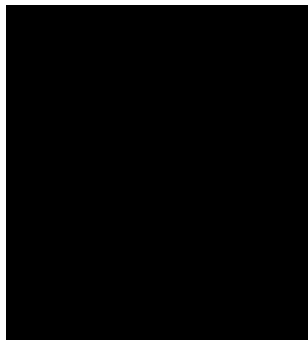




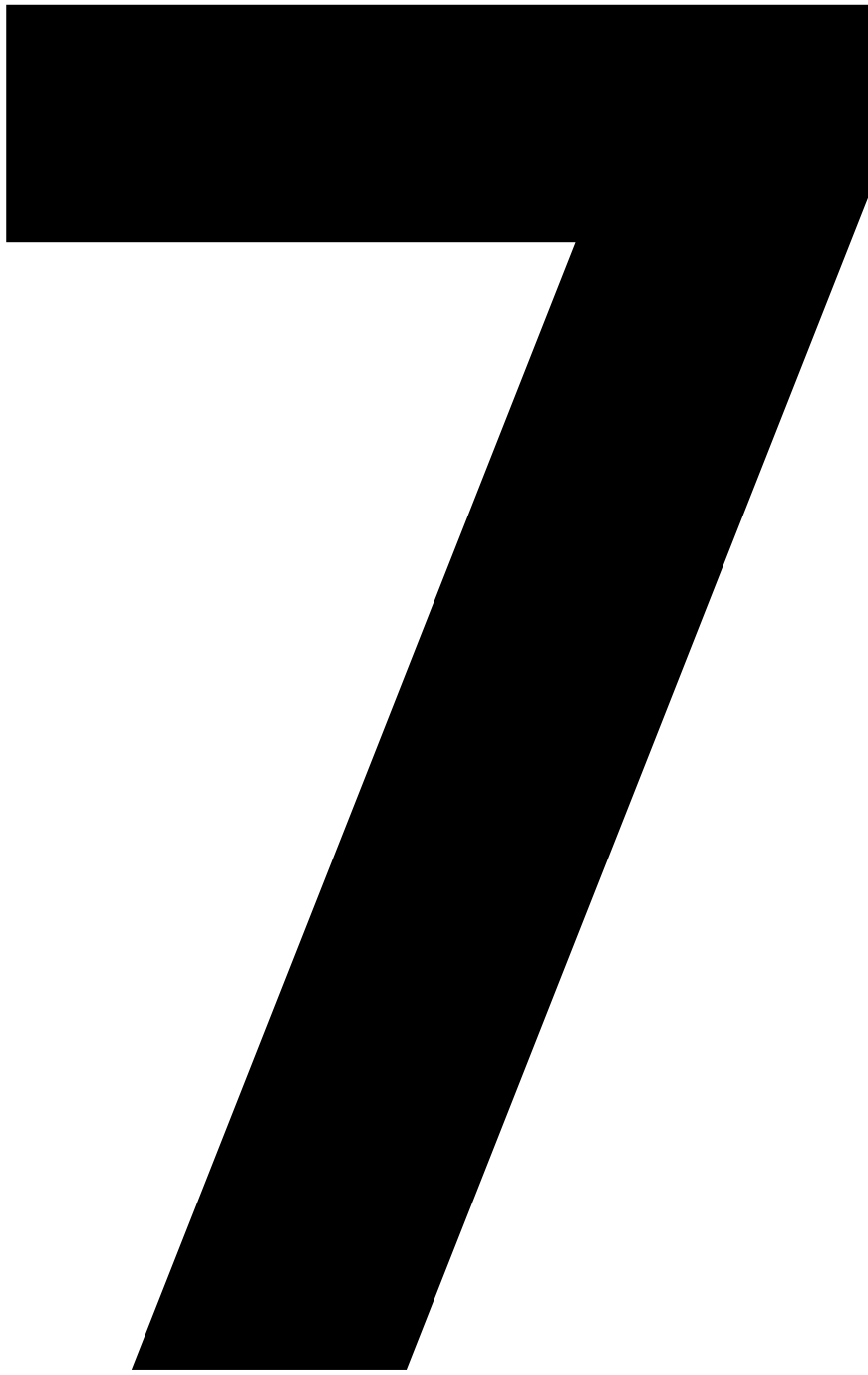
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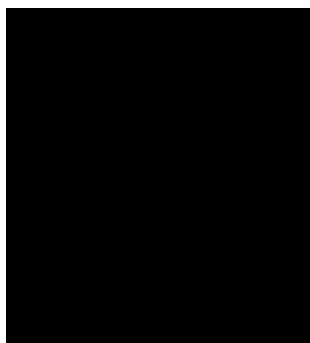










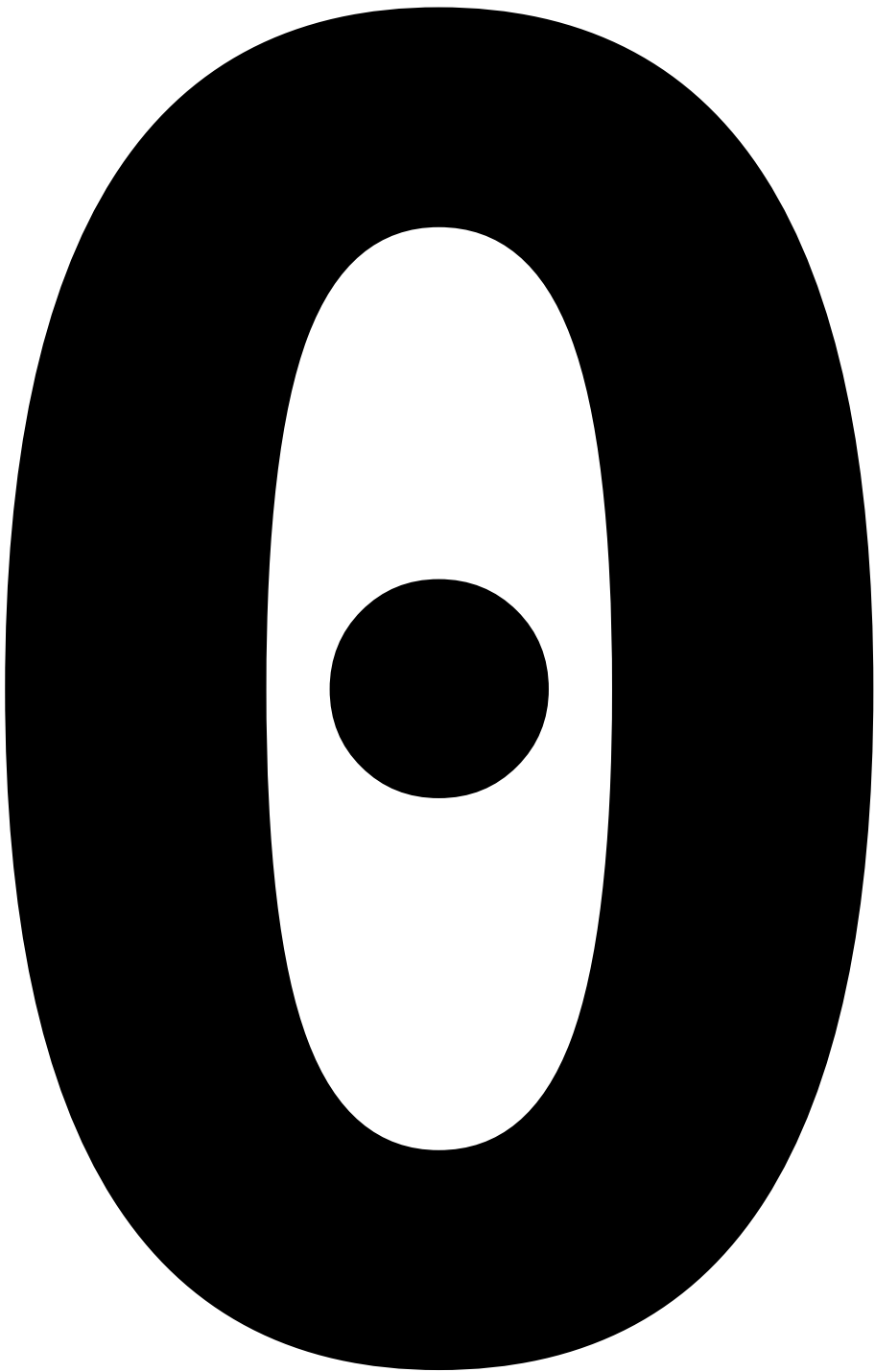




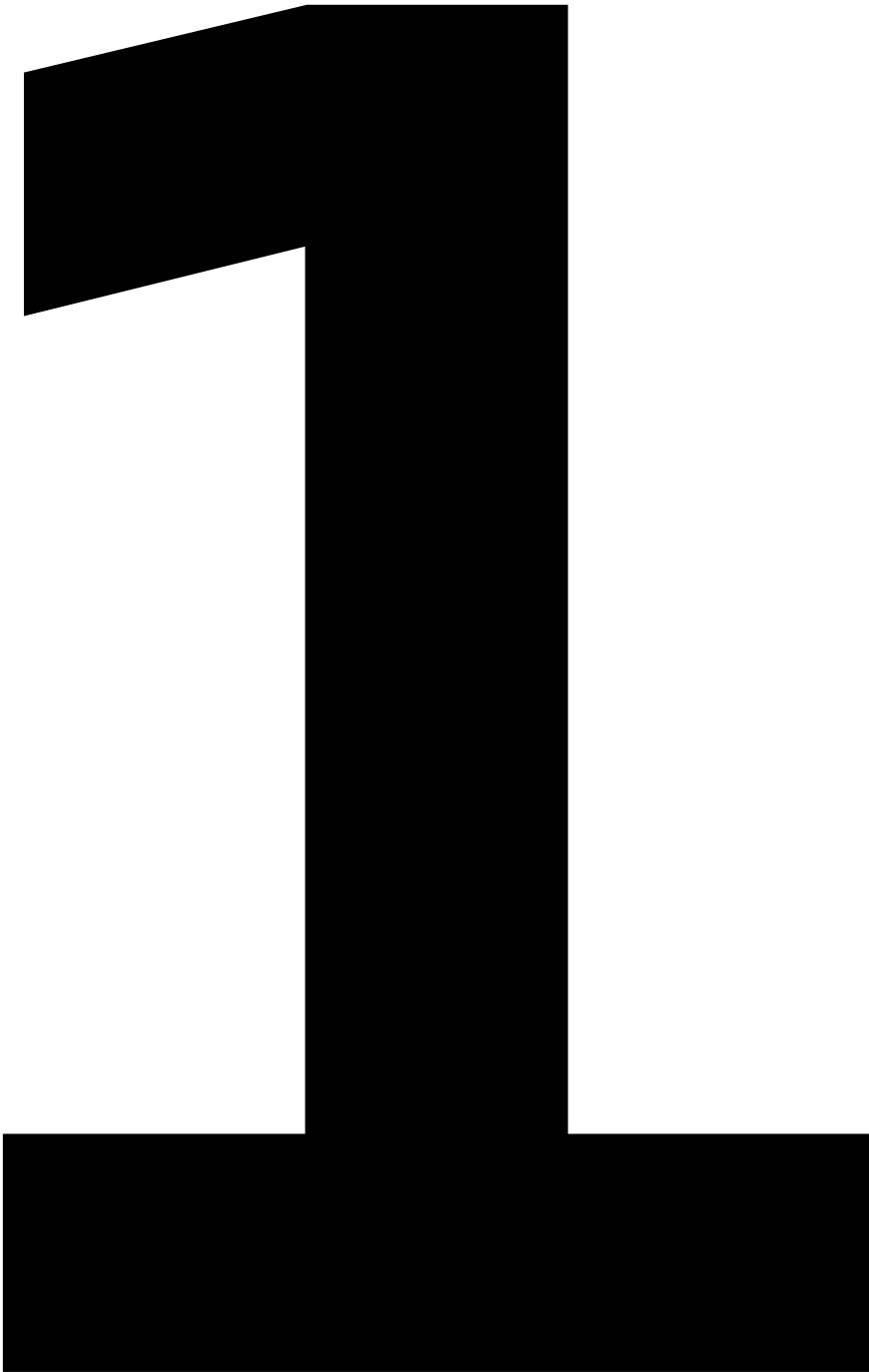
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**3**

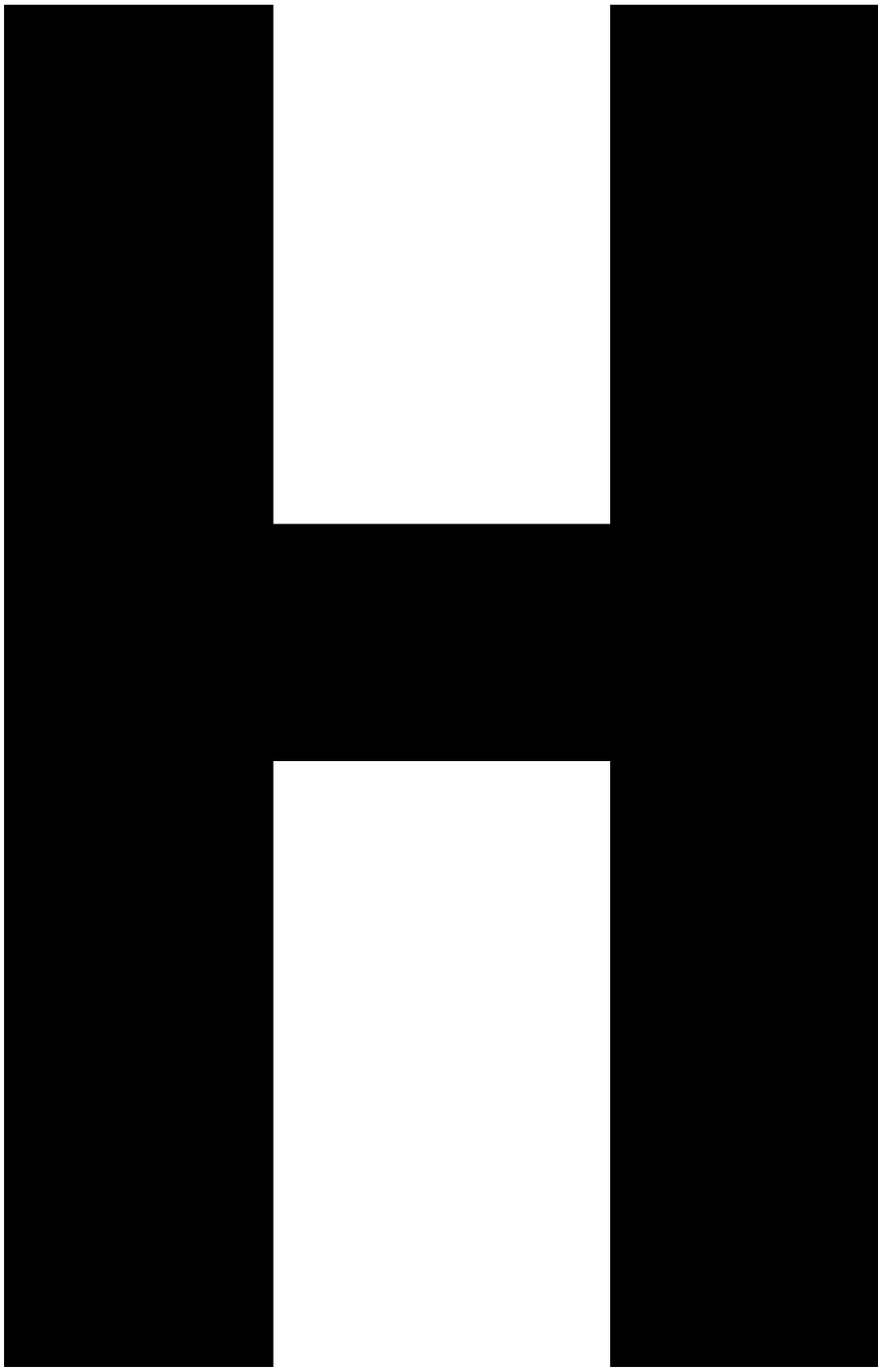














**O**



**R**





**M**







**h**







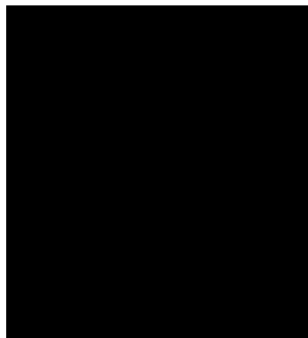
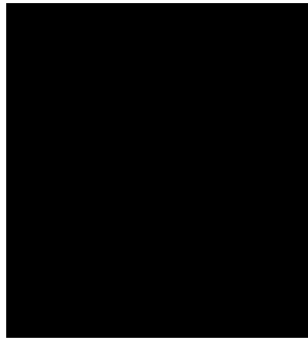




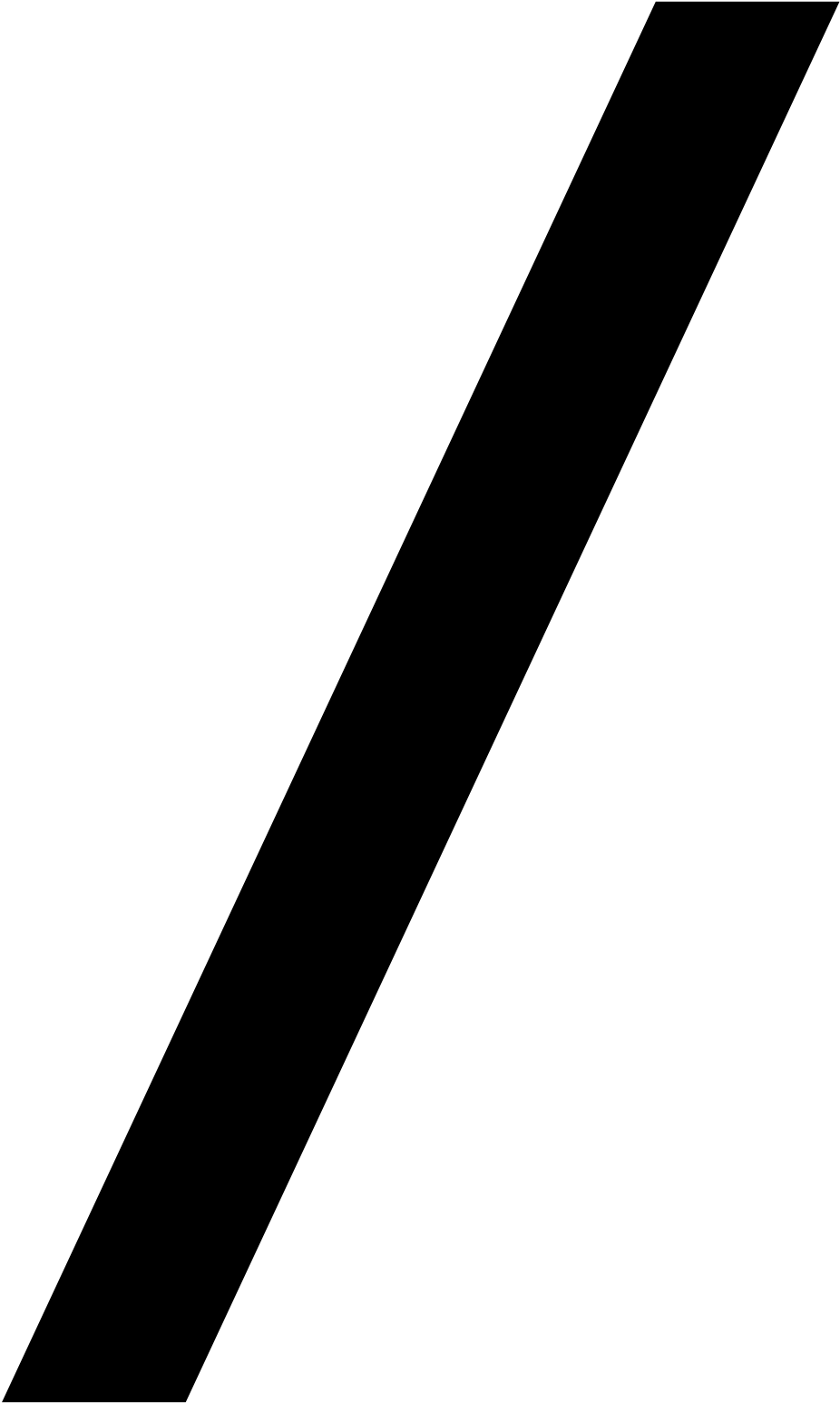


**o**



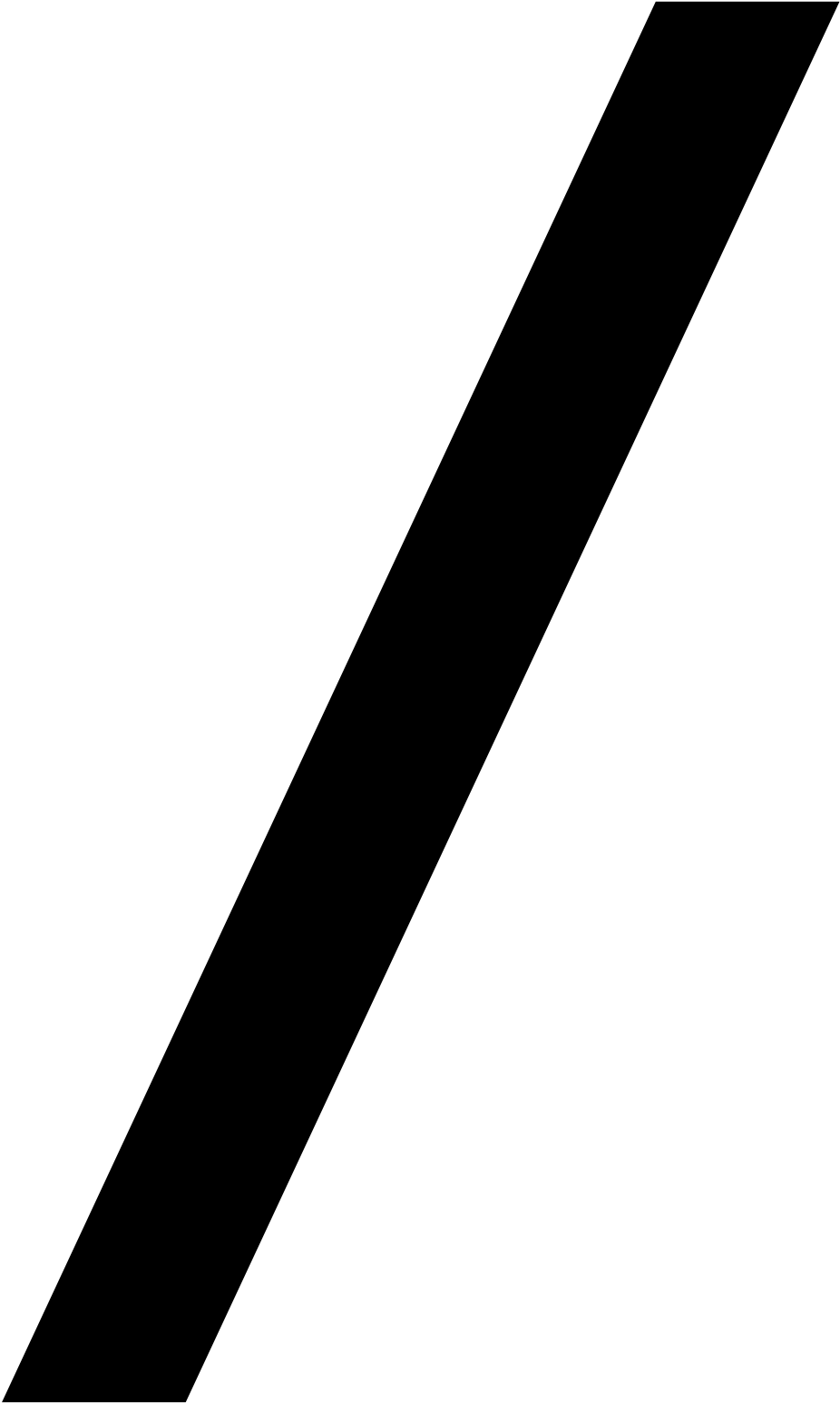












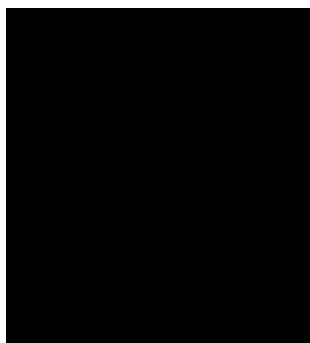


**Q**



**e**







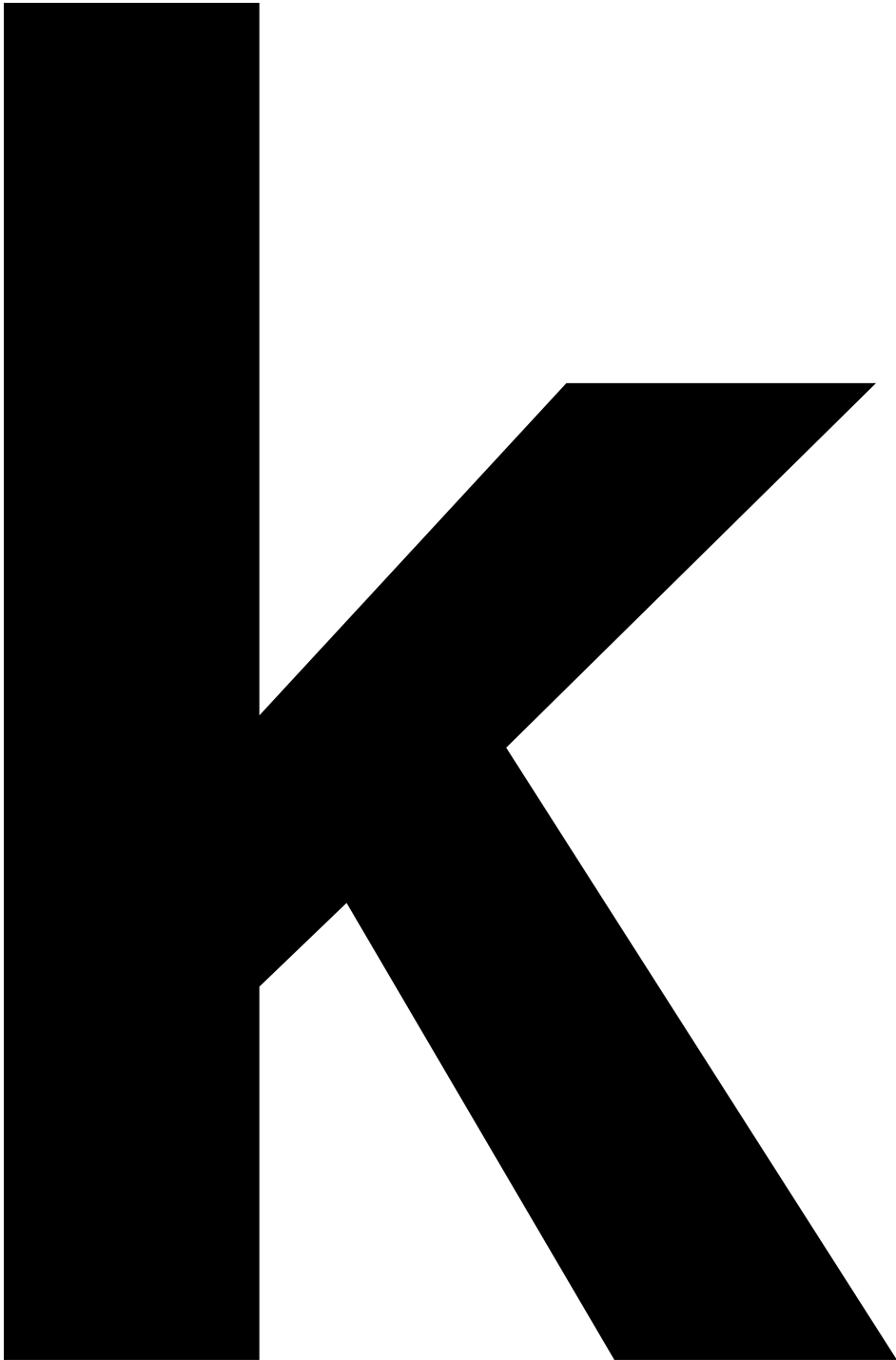


**w**

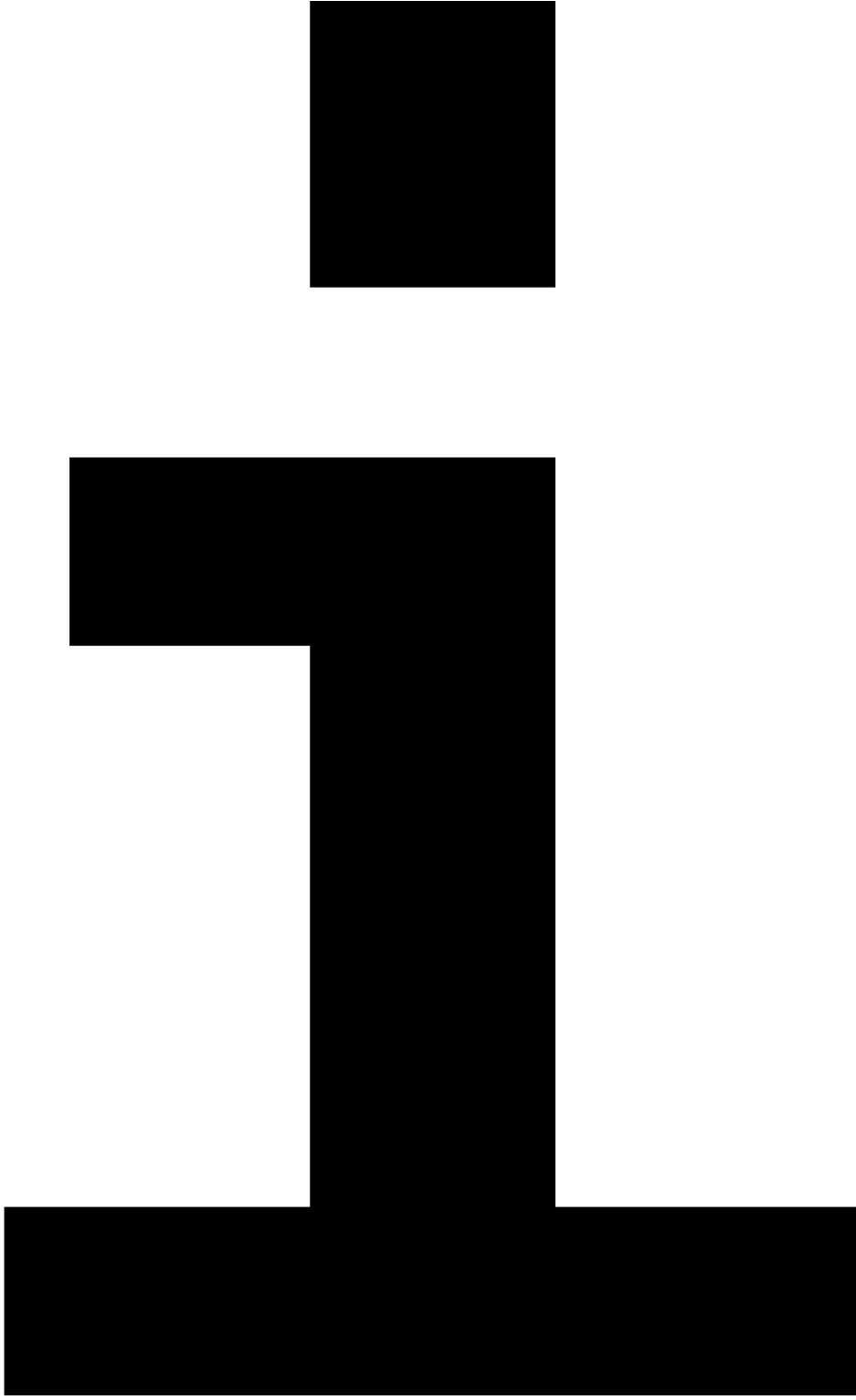
















**o**



**e**



**Q**



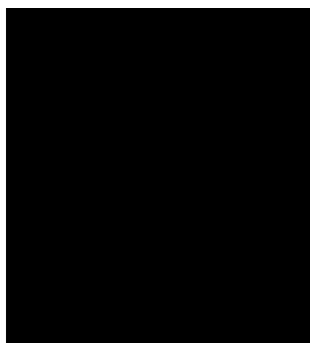






**sa**











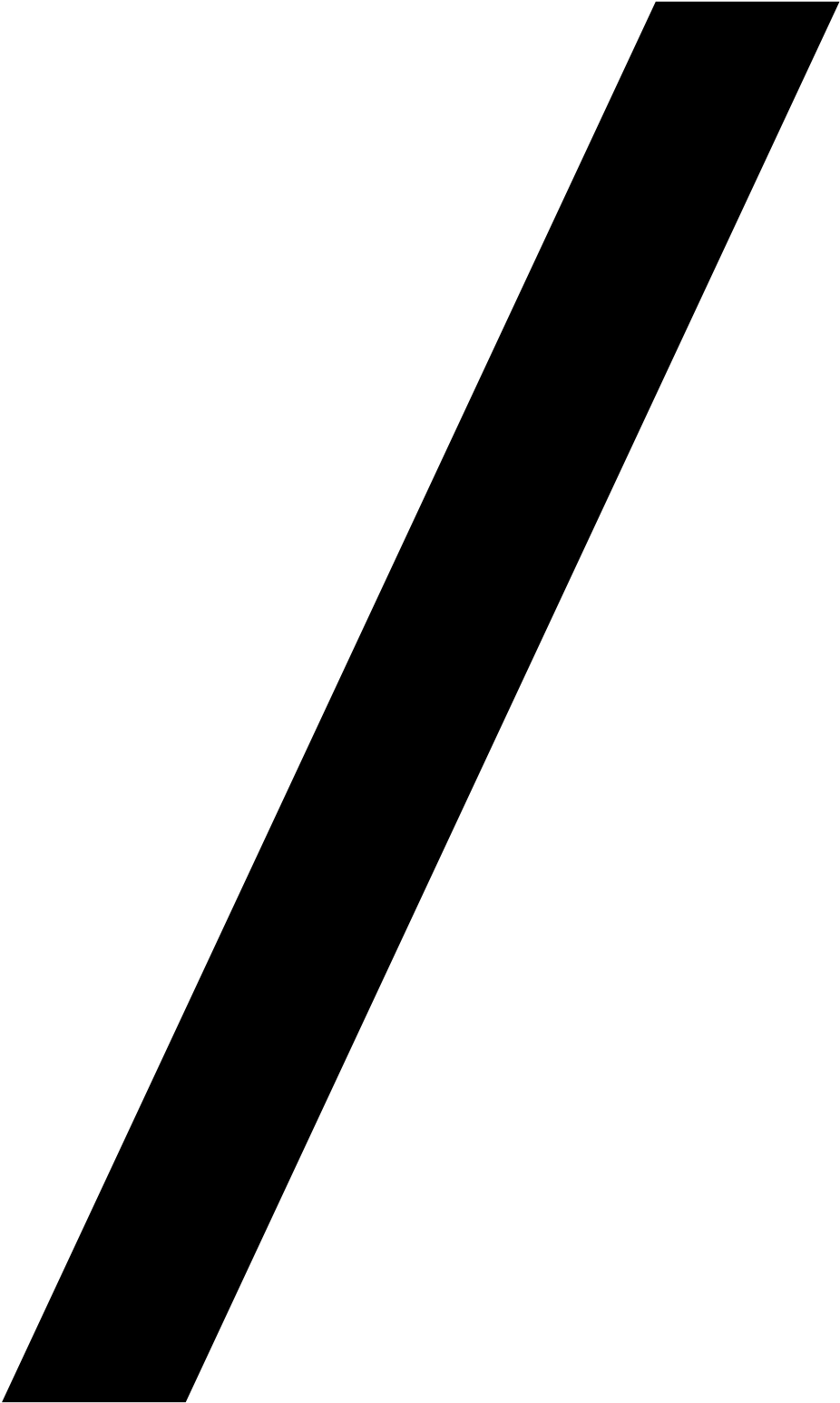






**Q**







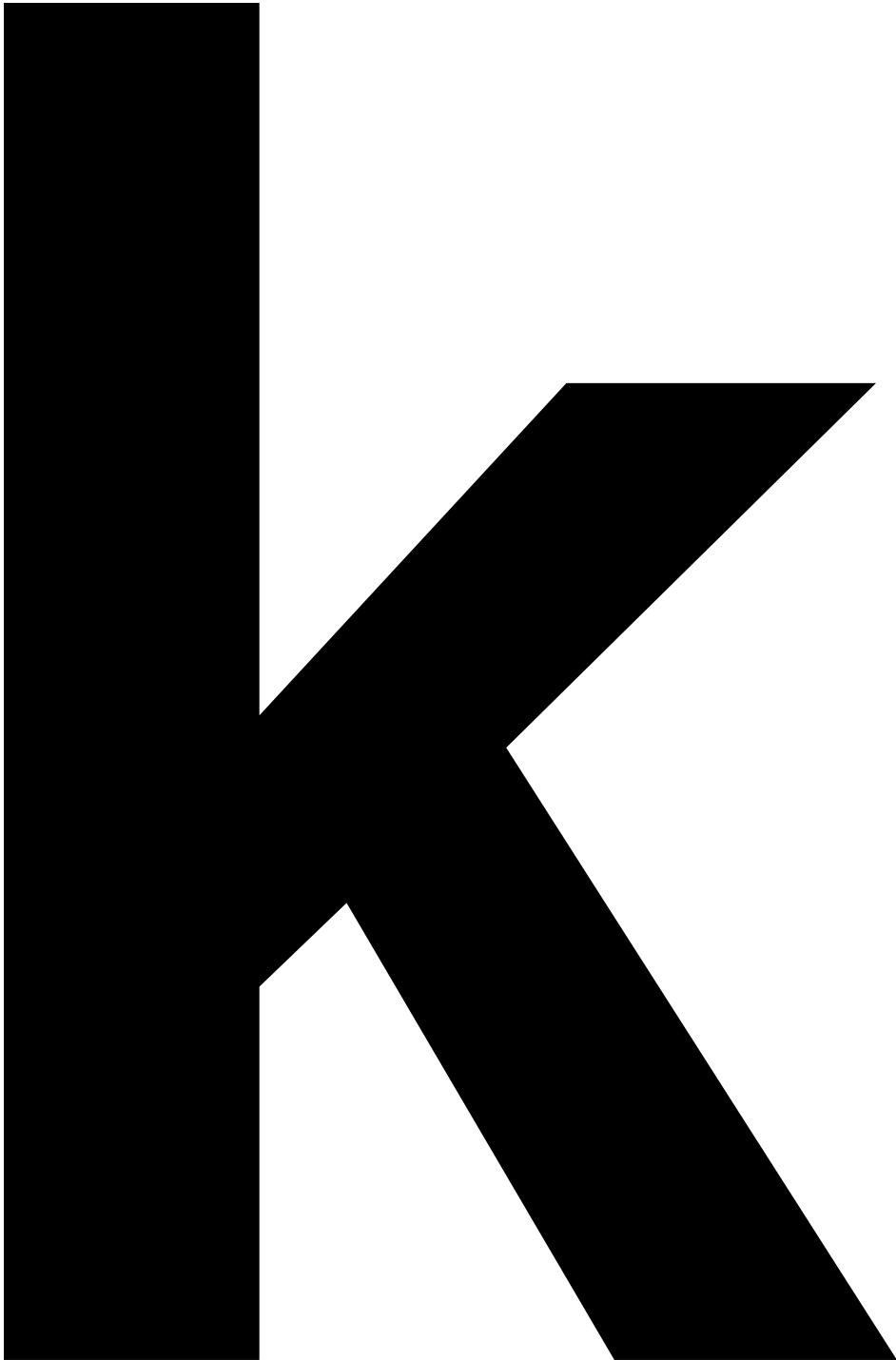
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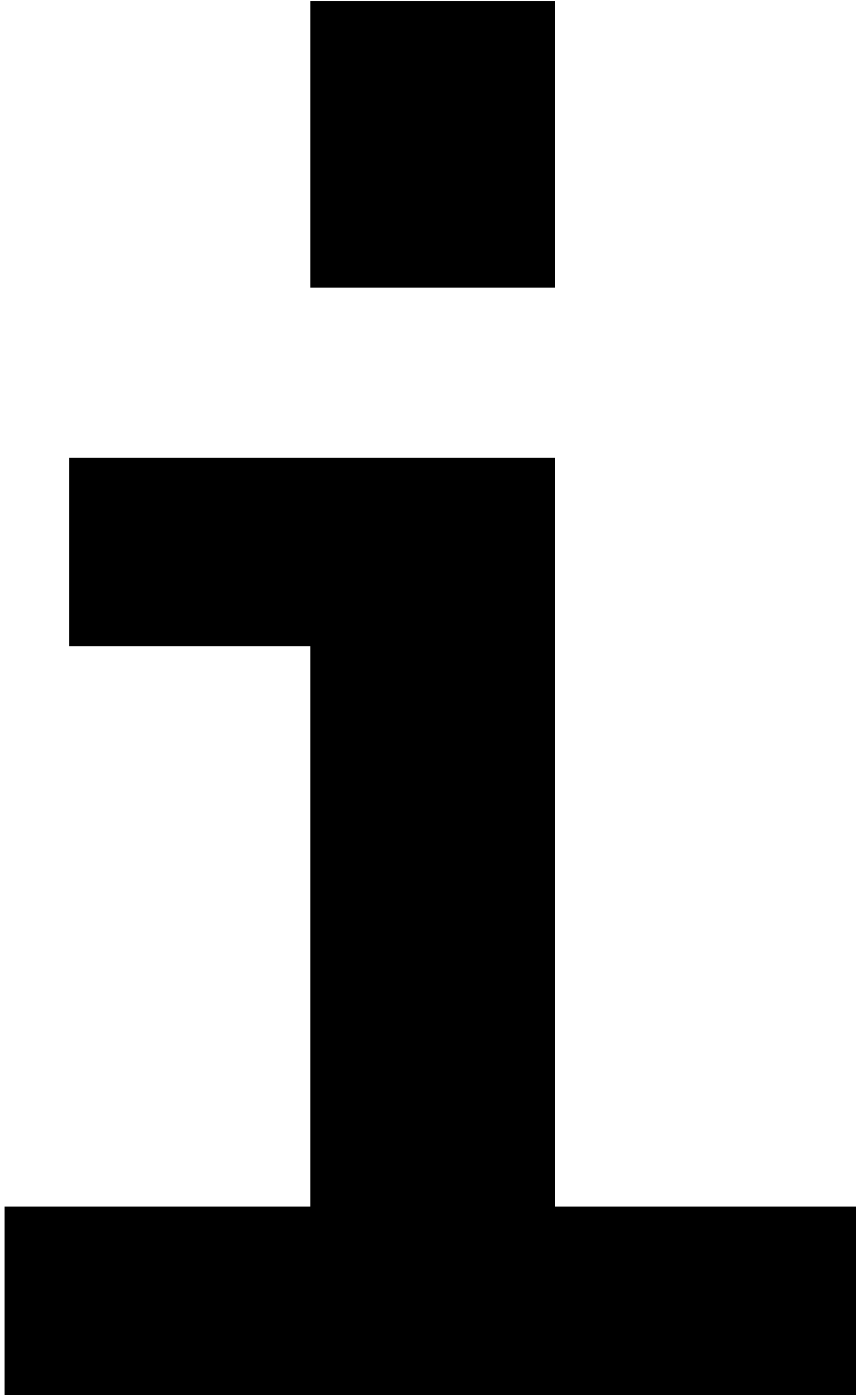




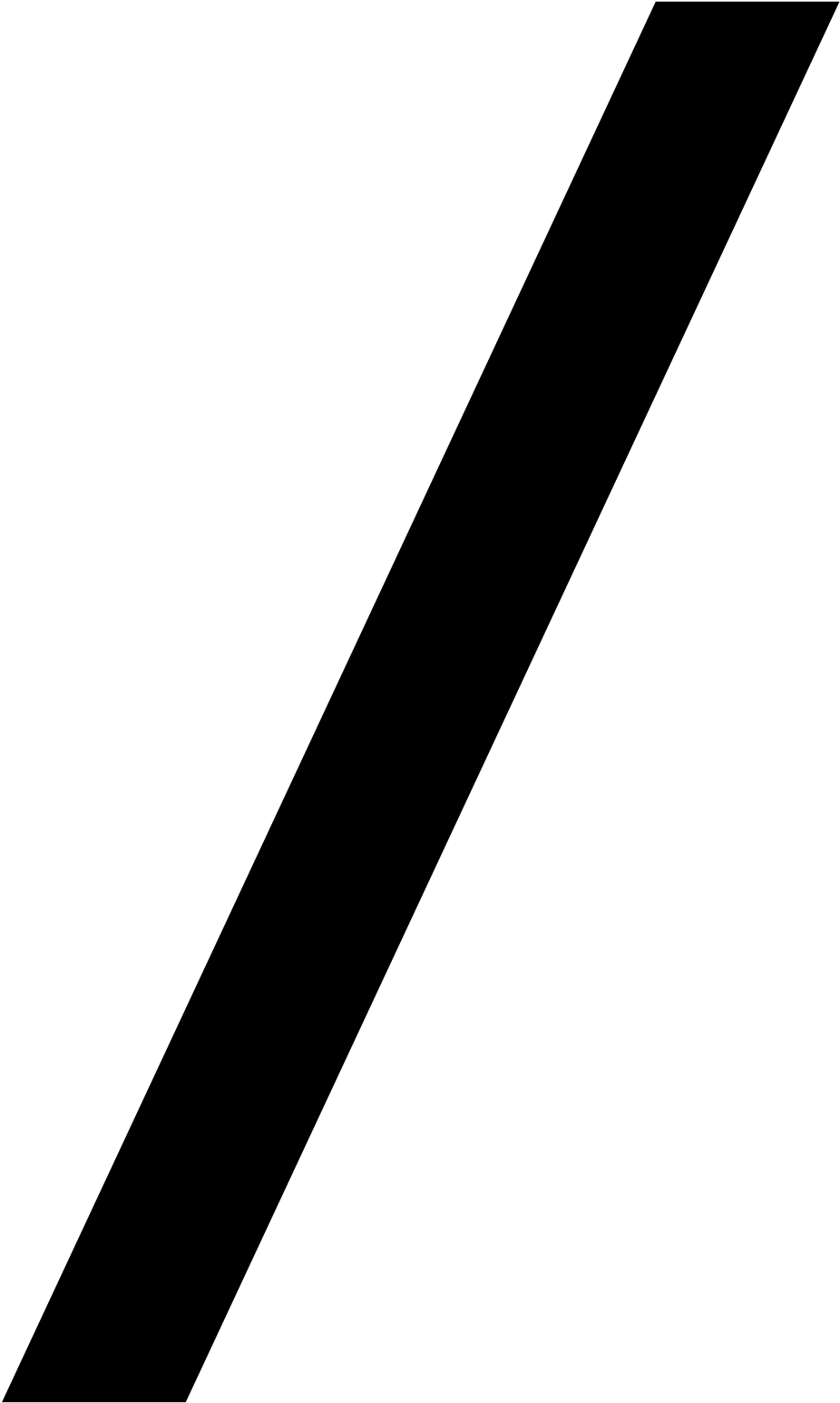




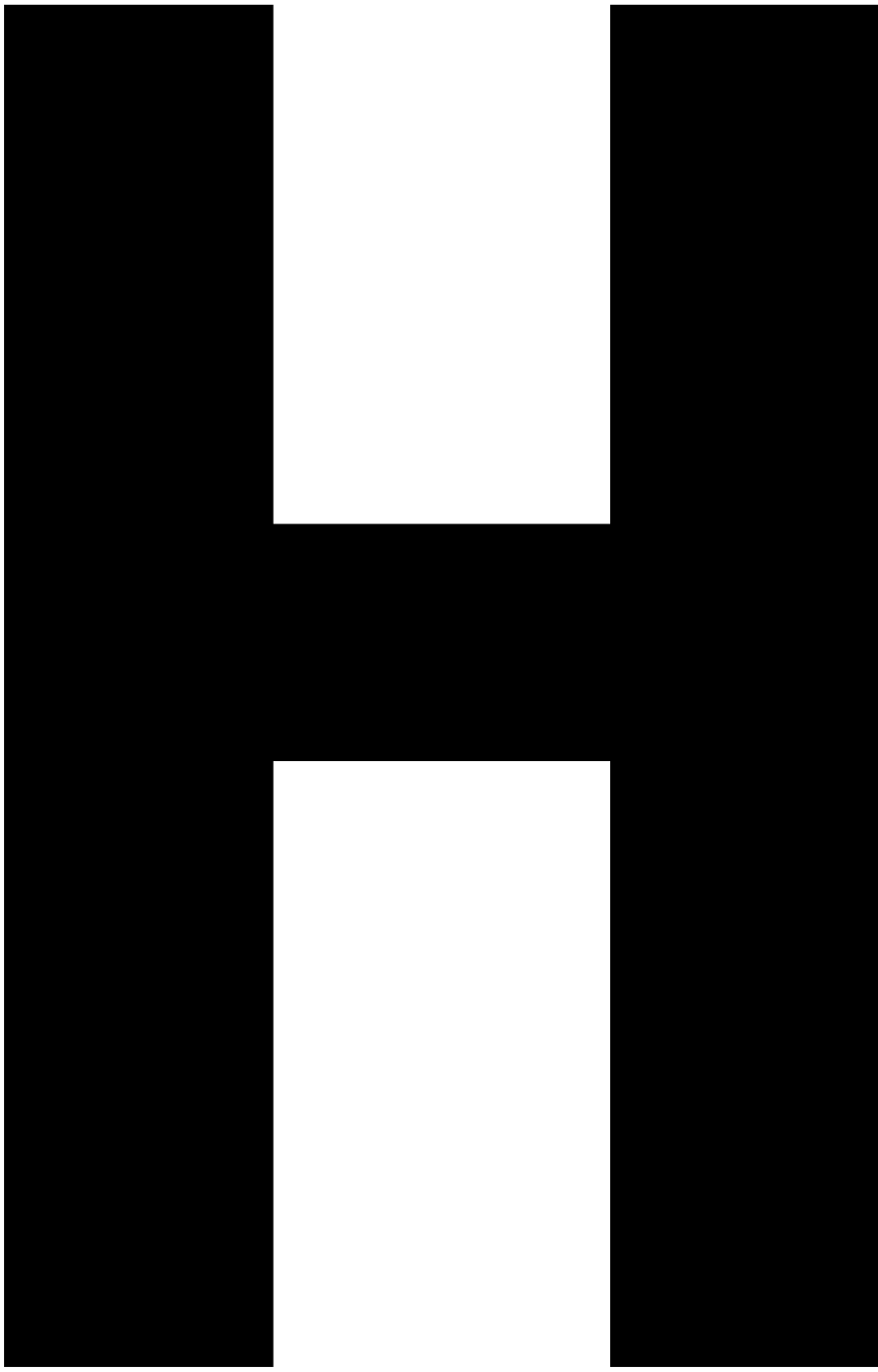
























**m**



**e**





**S**







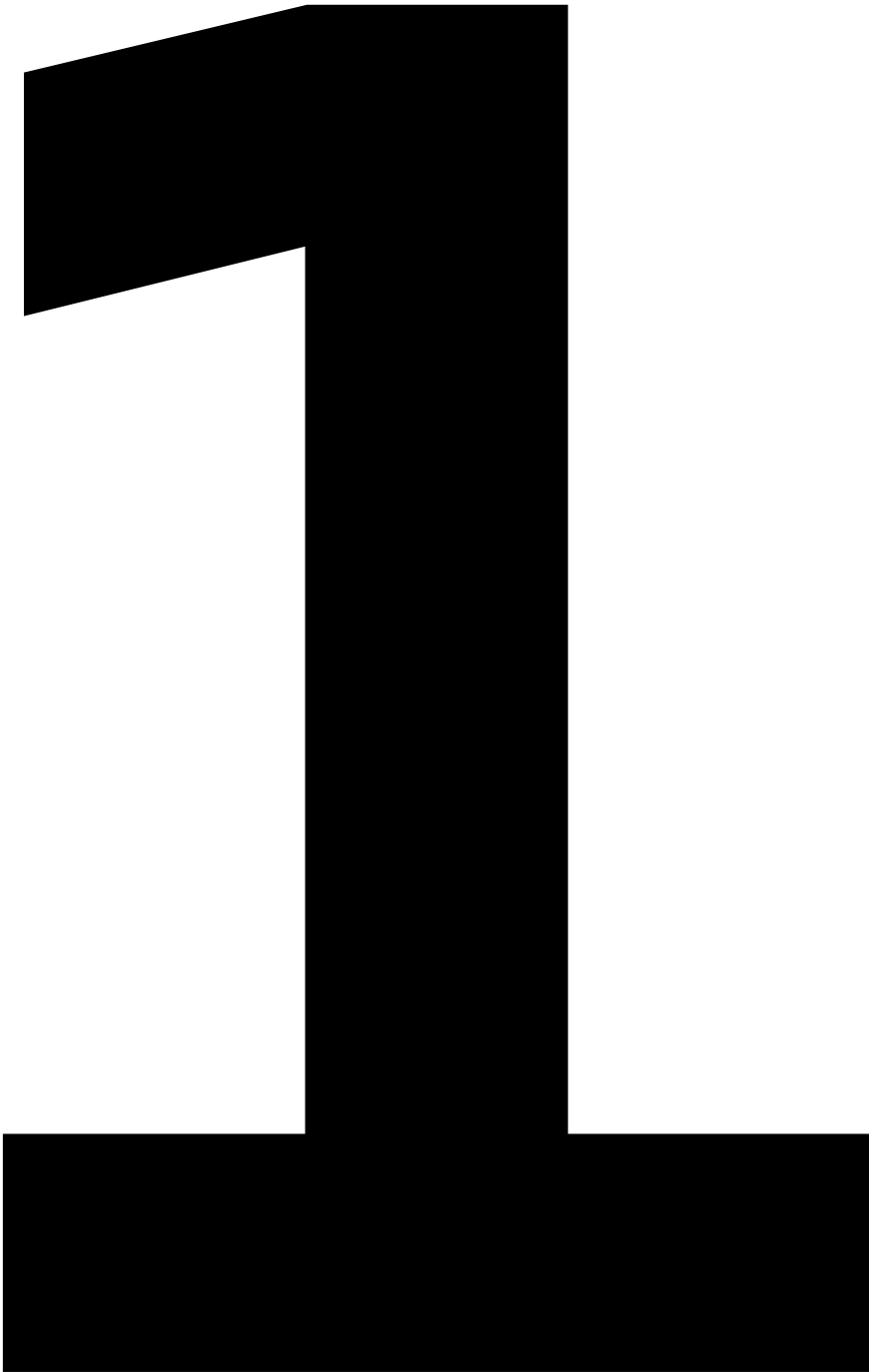
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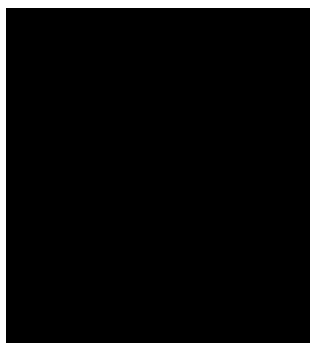




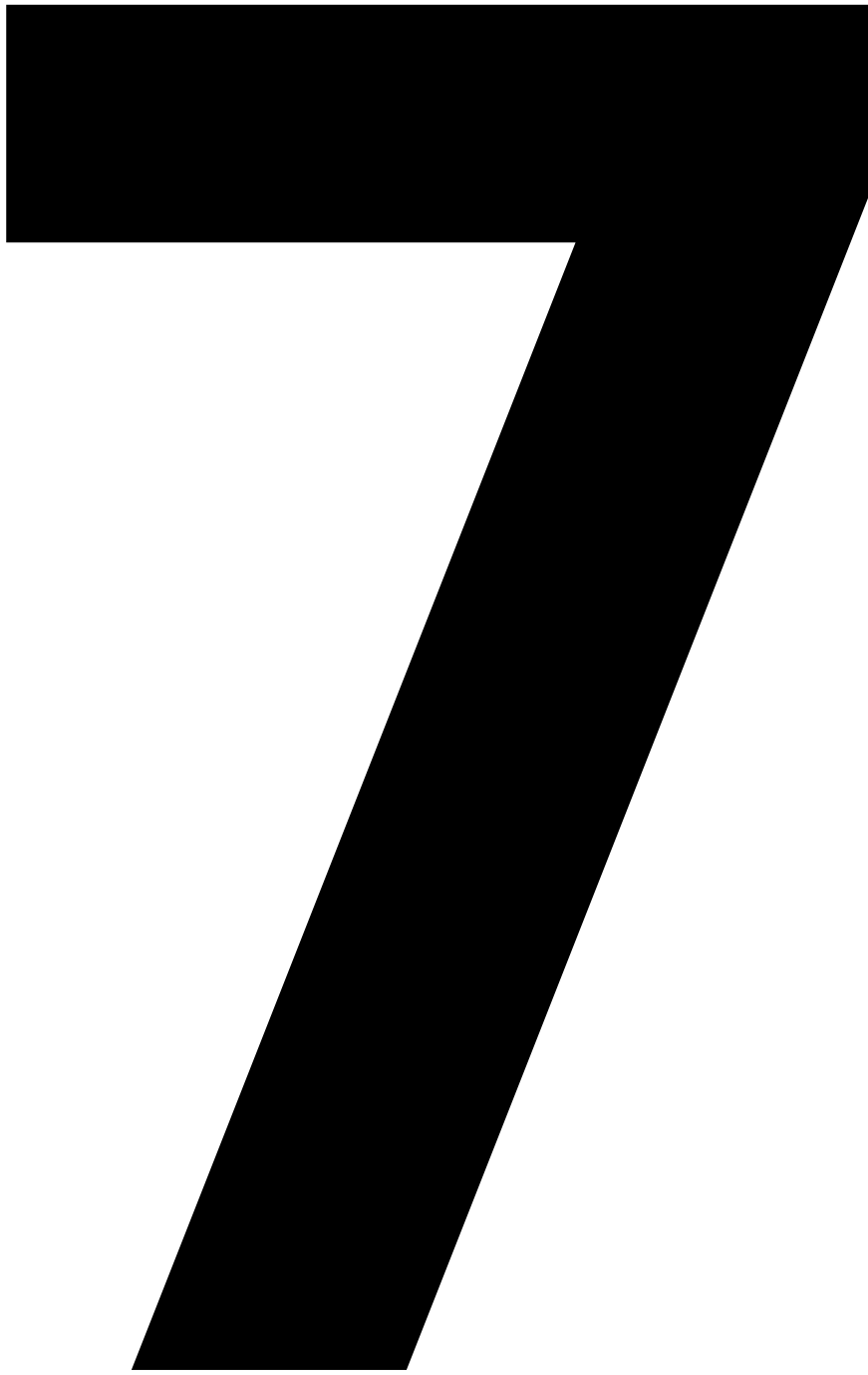


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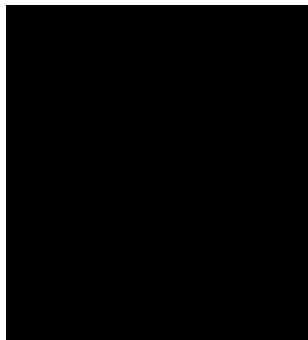












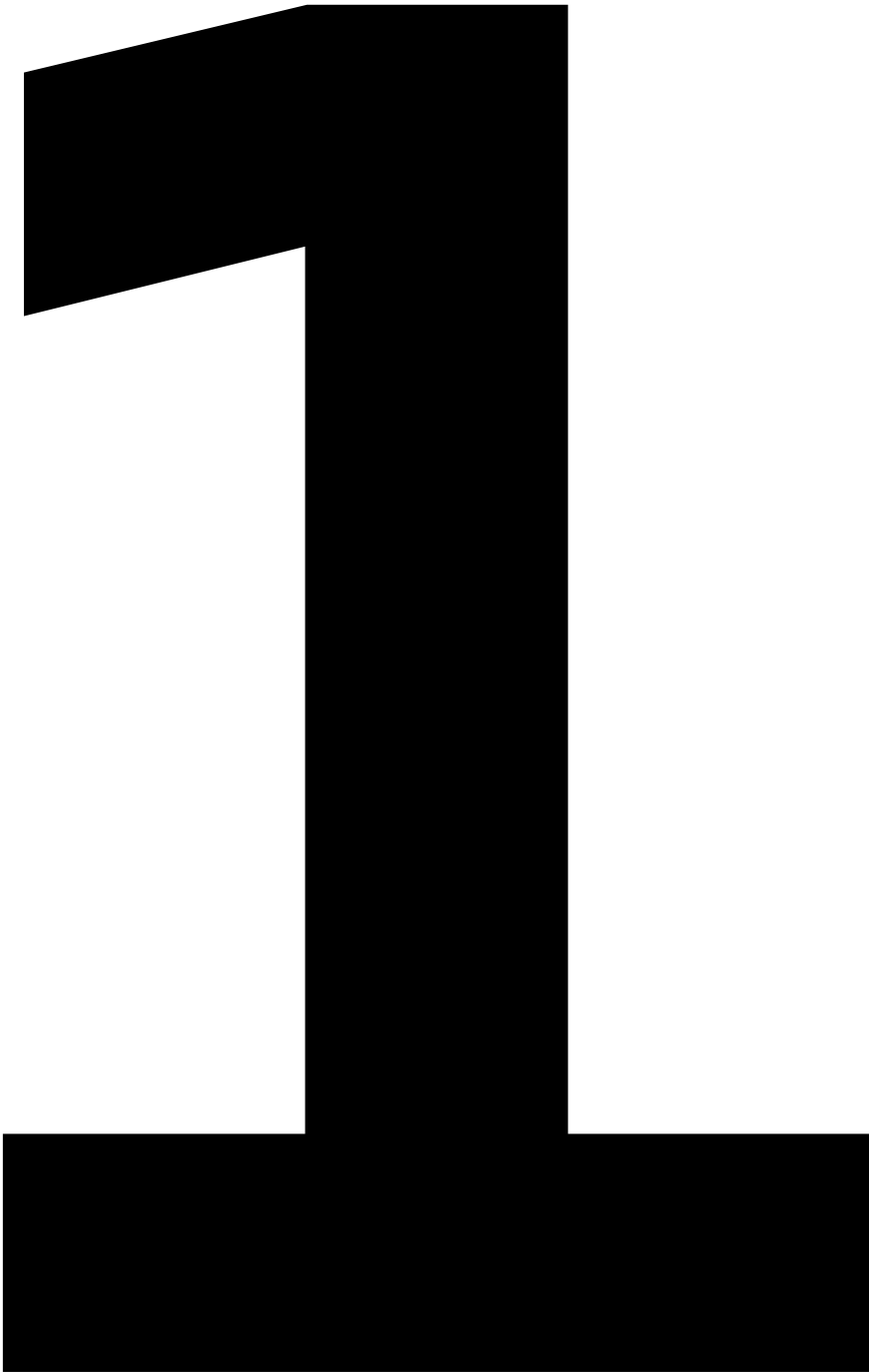


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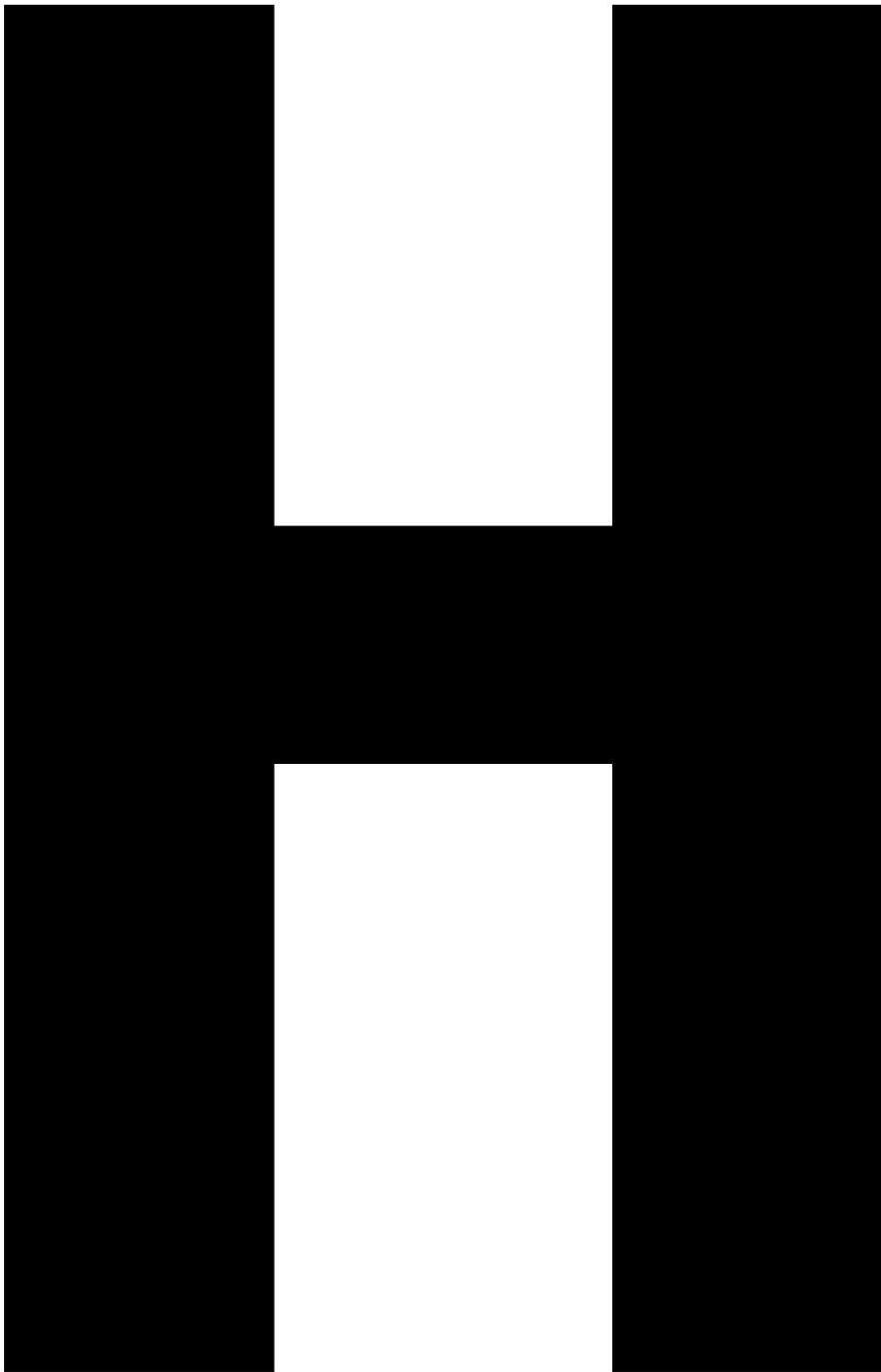
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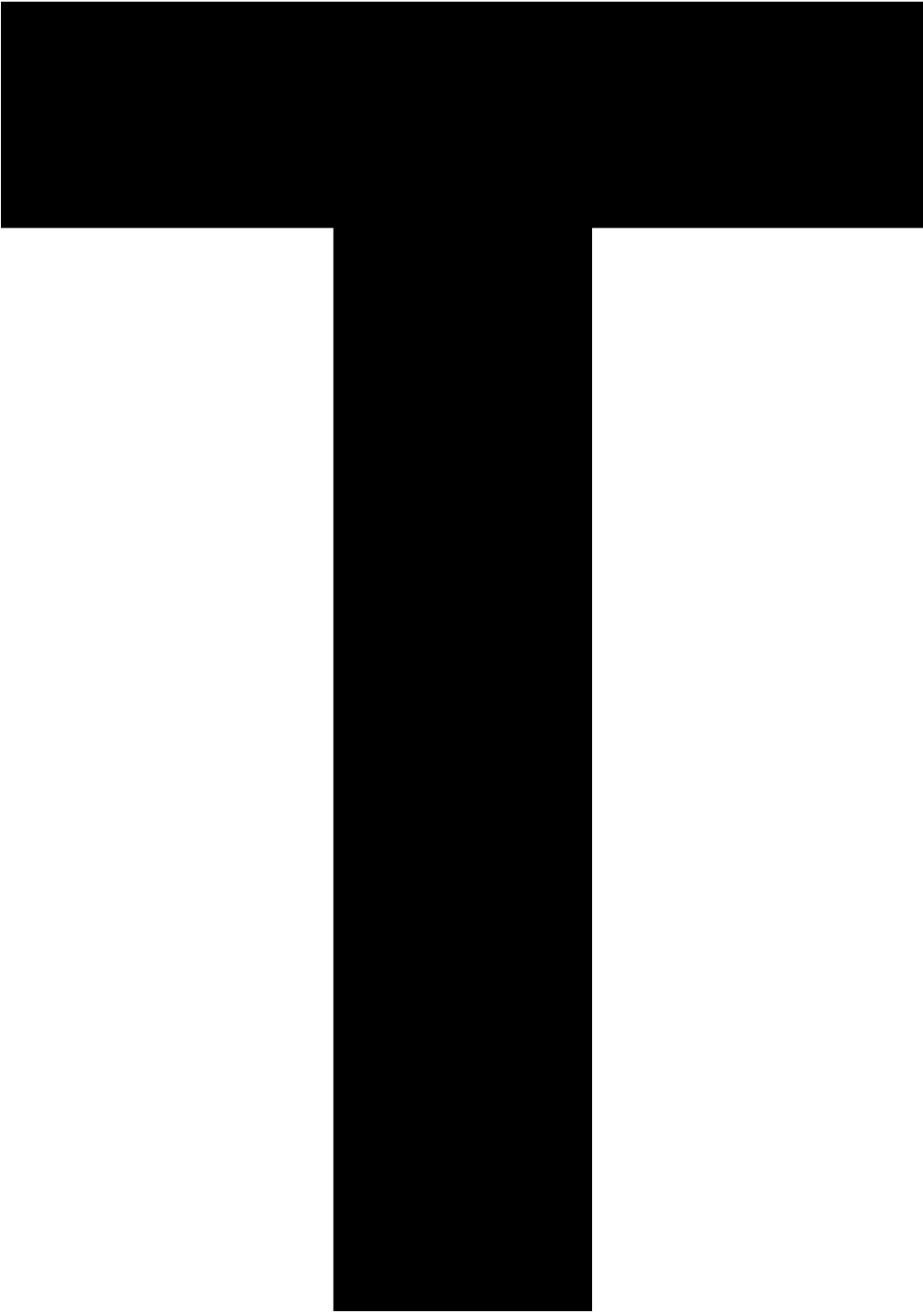
**U**

















**h**







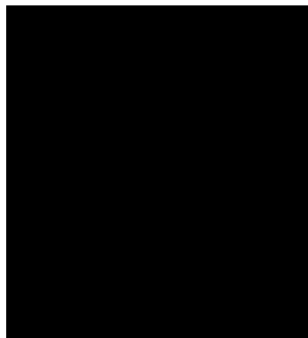
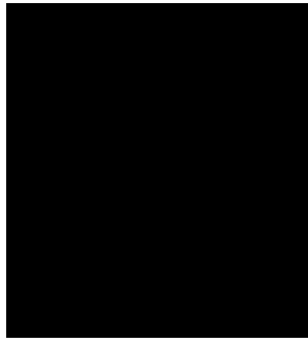






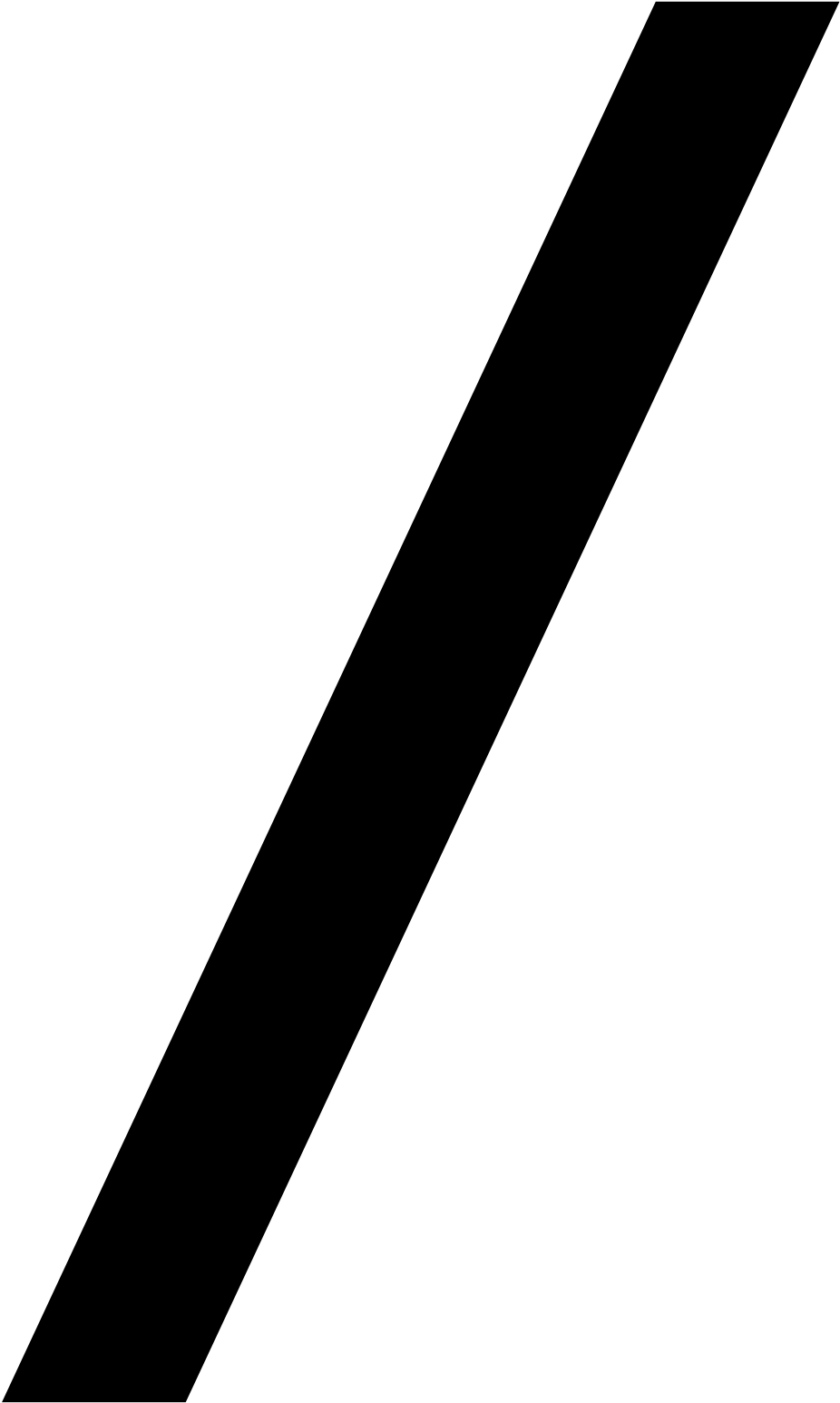
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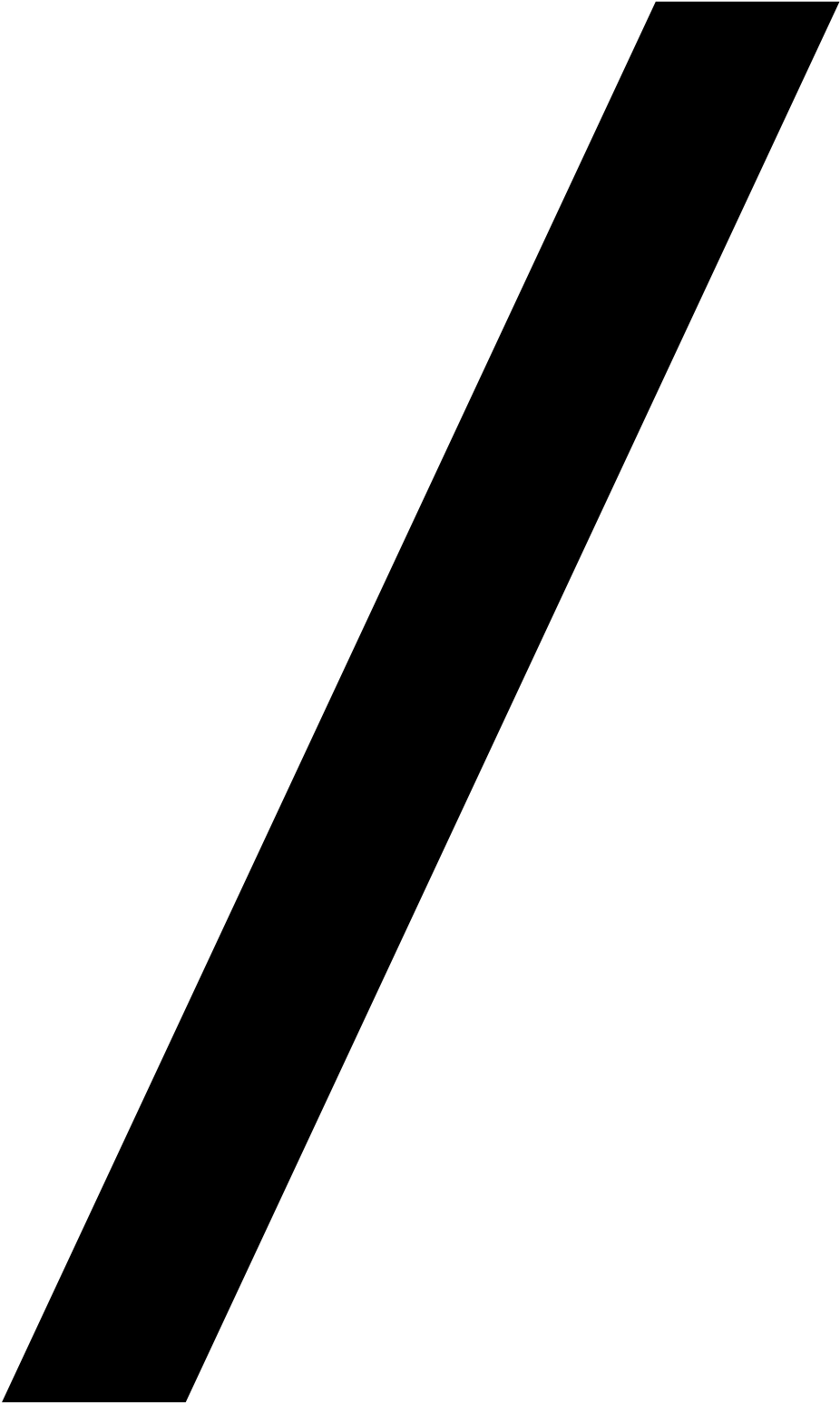














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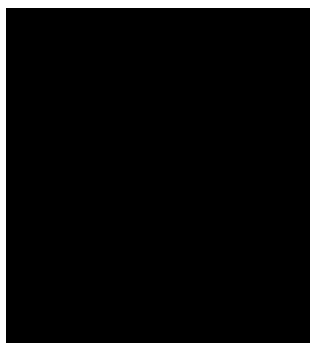
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**w**







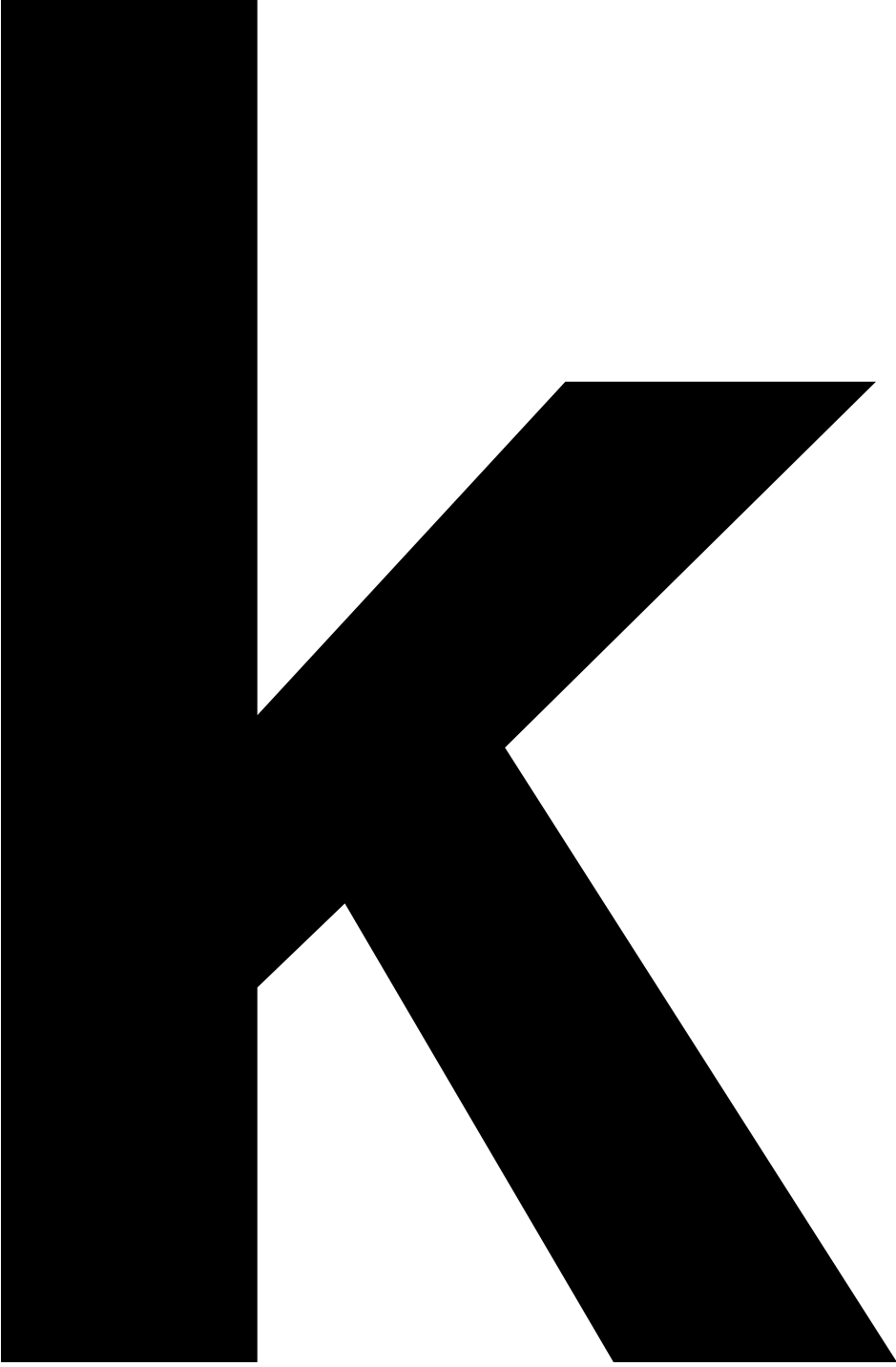
**e**













**e**













**J**







**m**



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**Q**



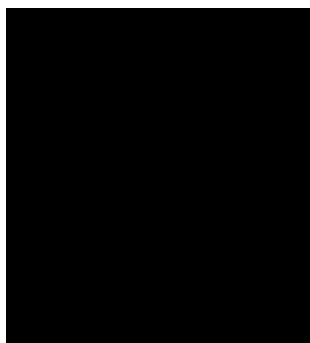




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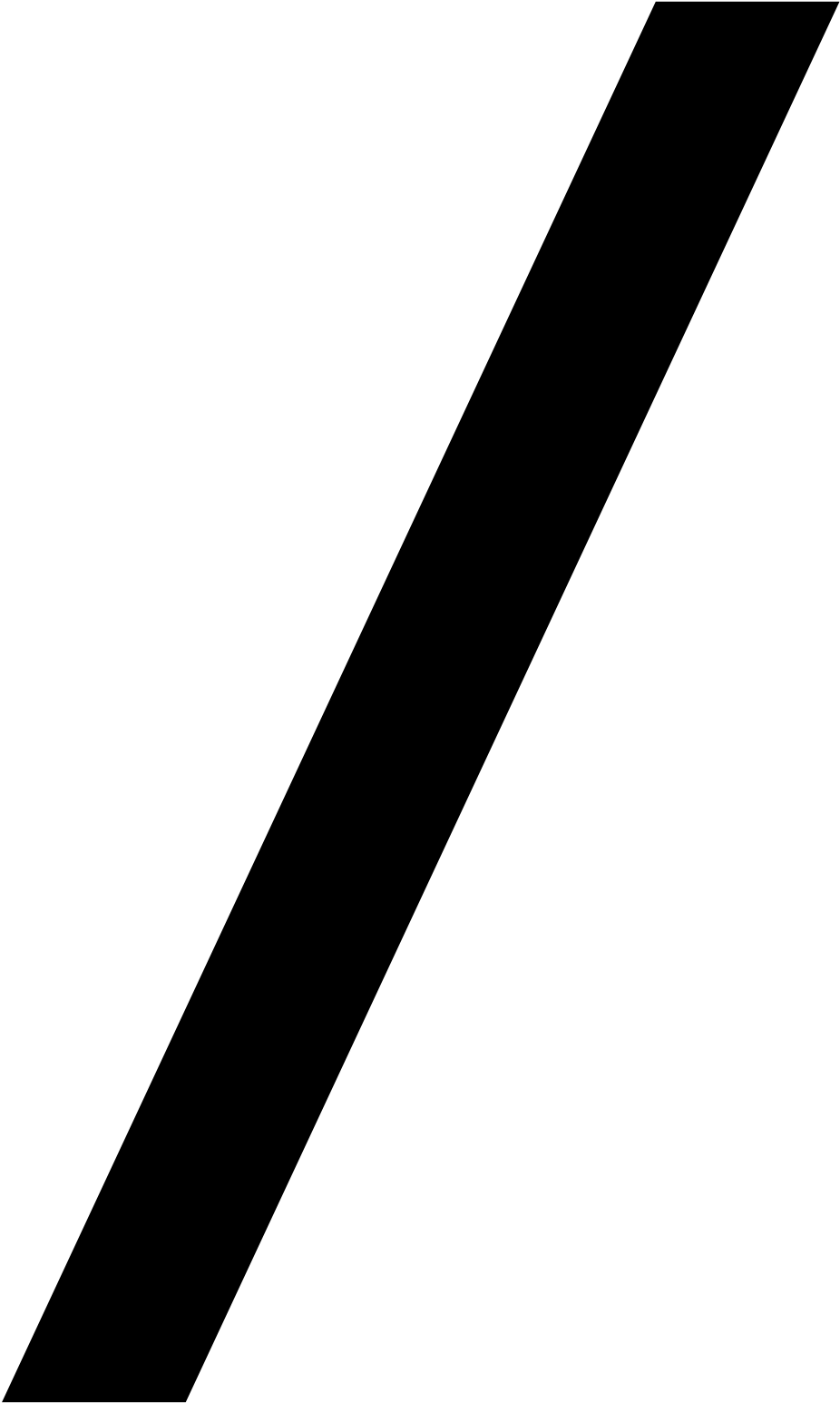


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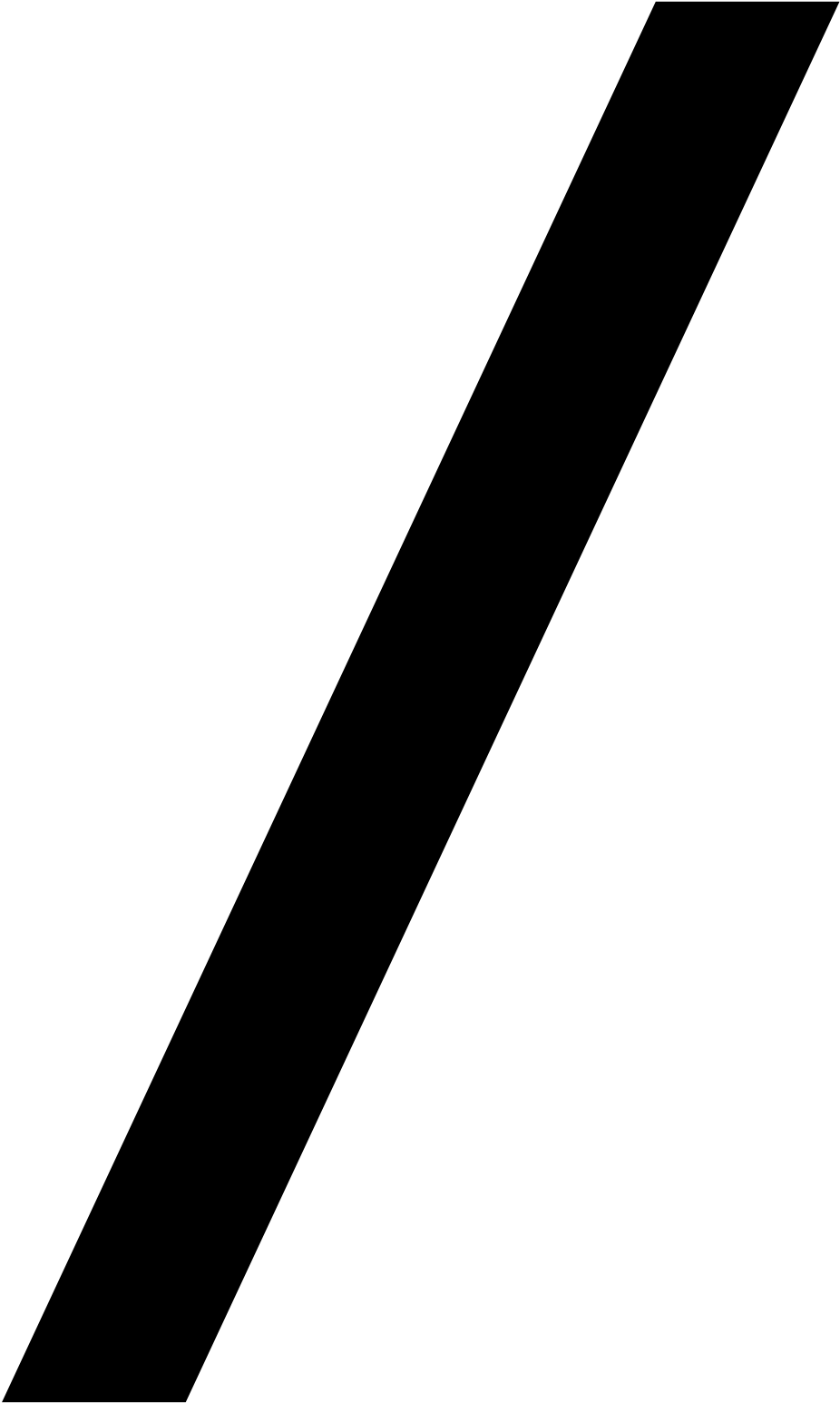


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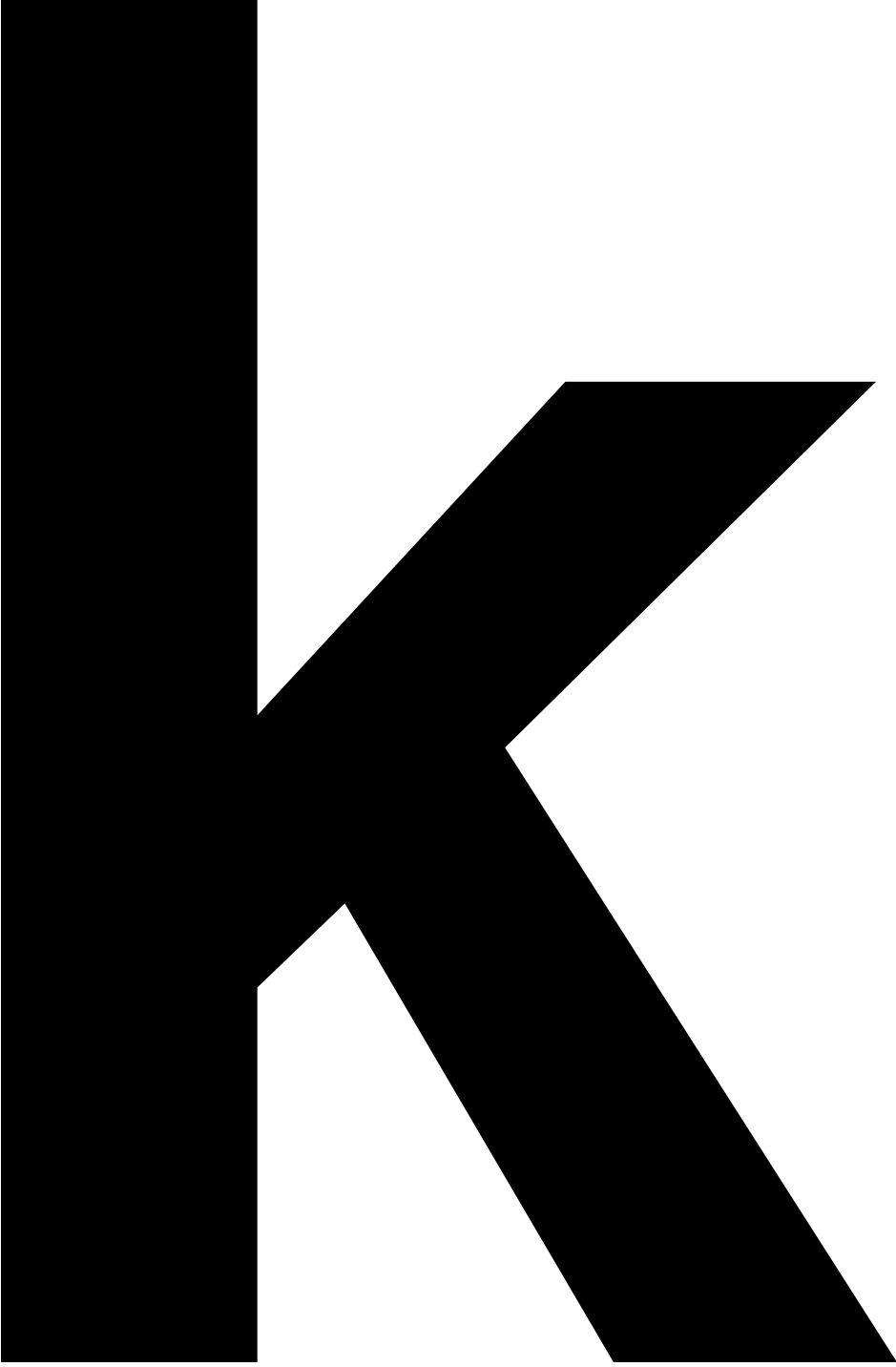






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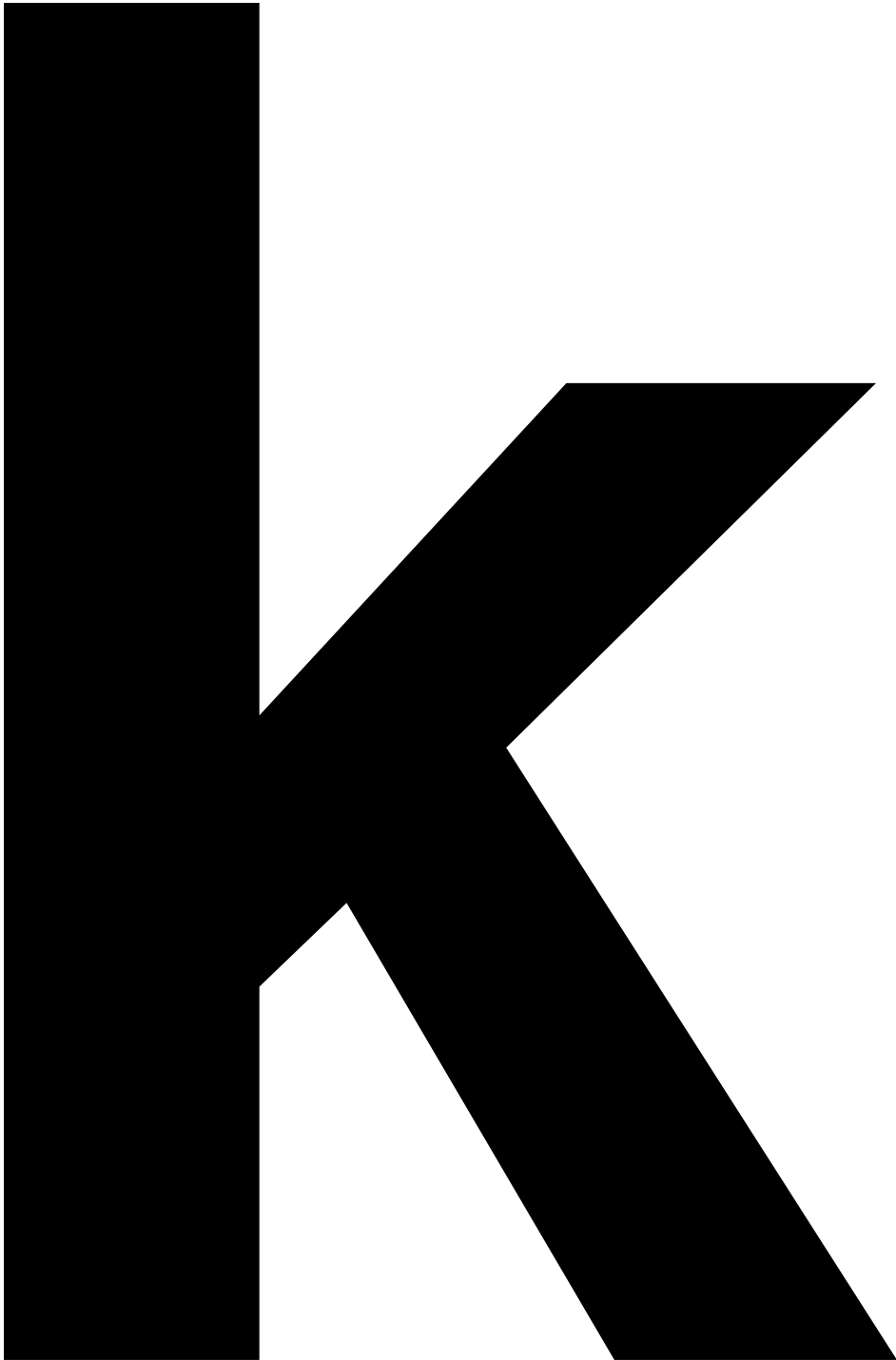






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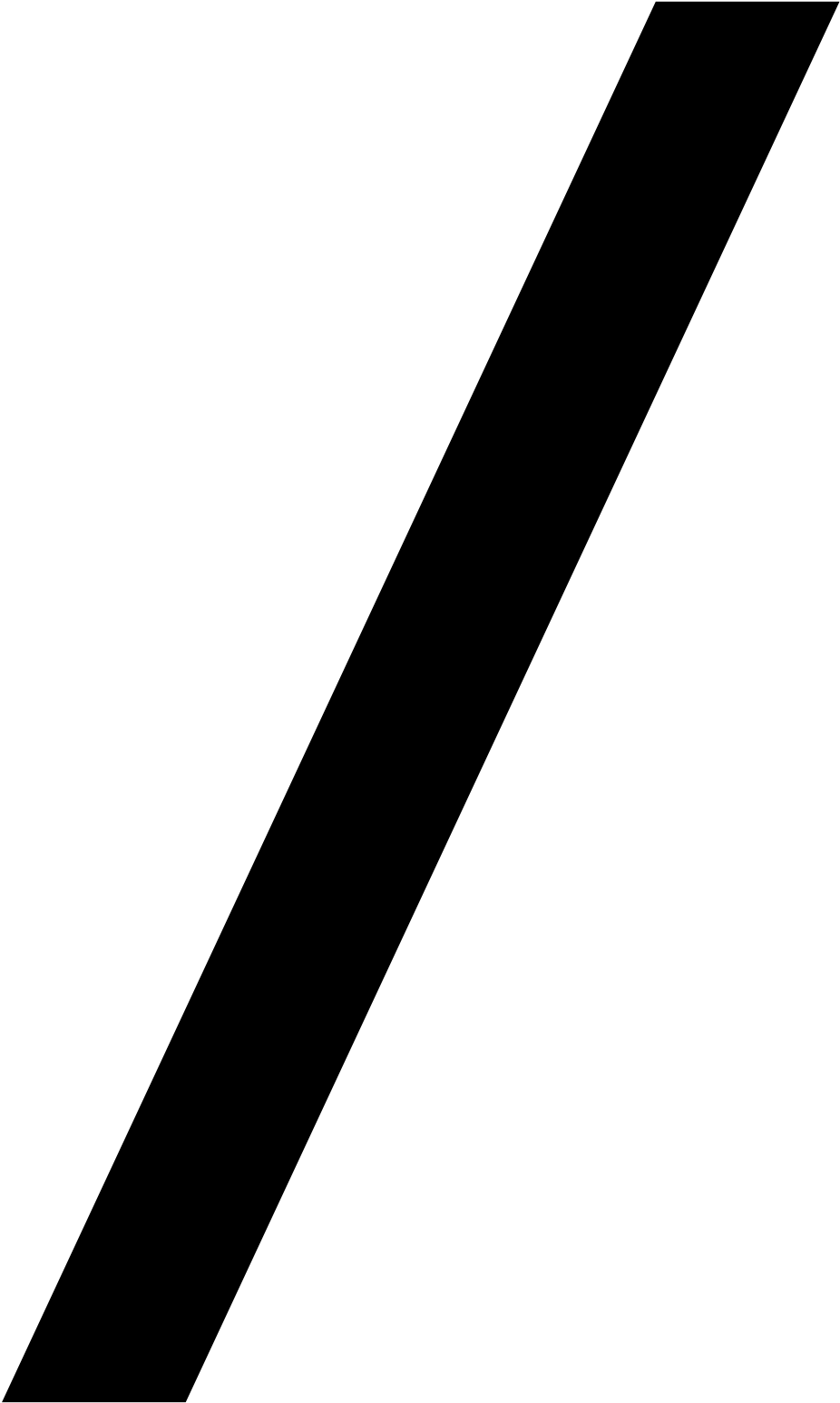


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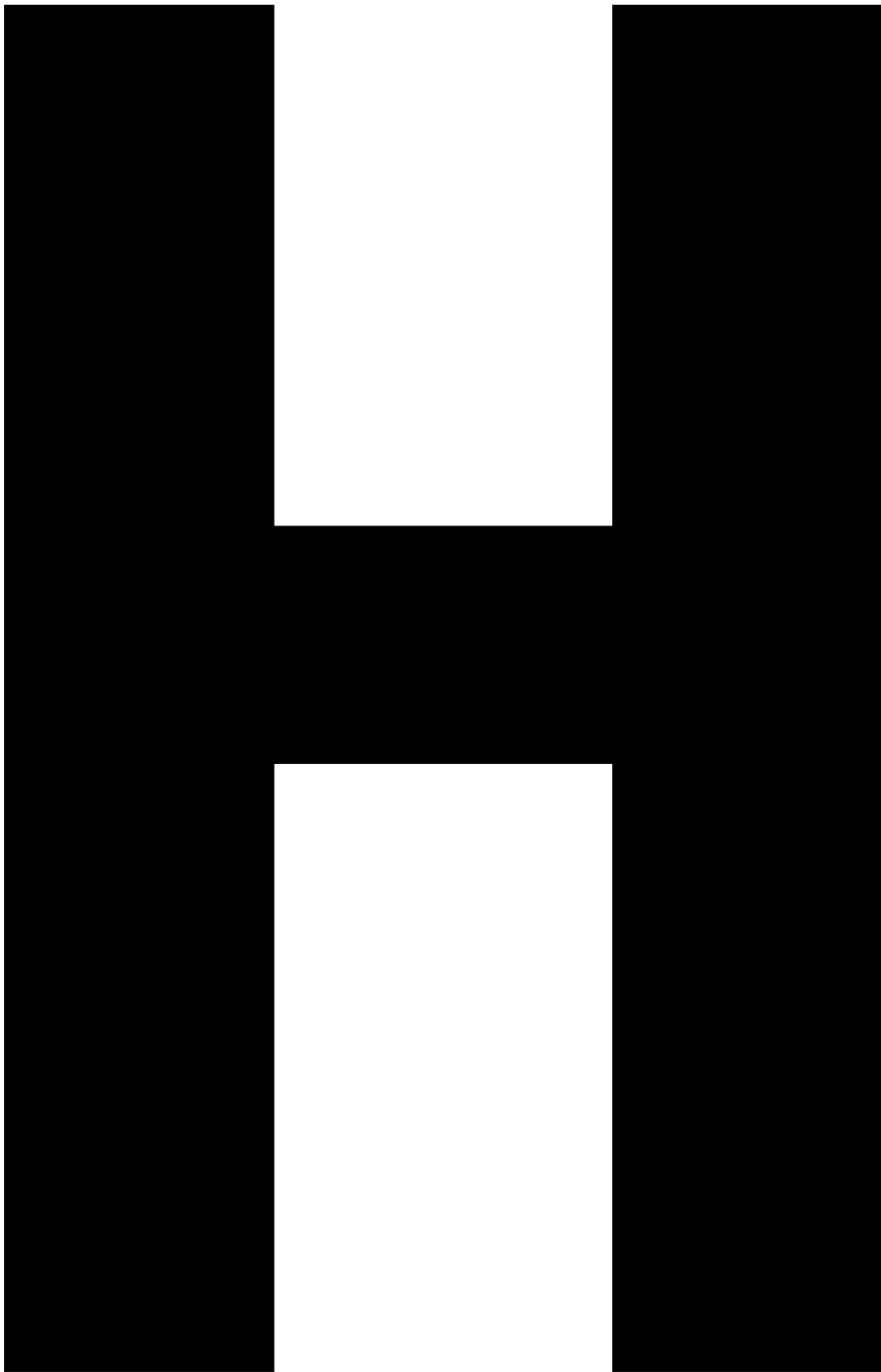














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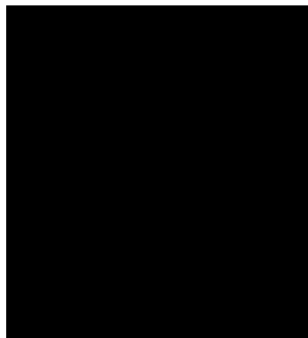
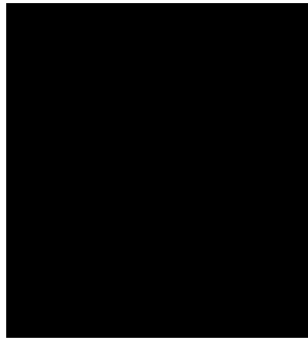




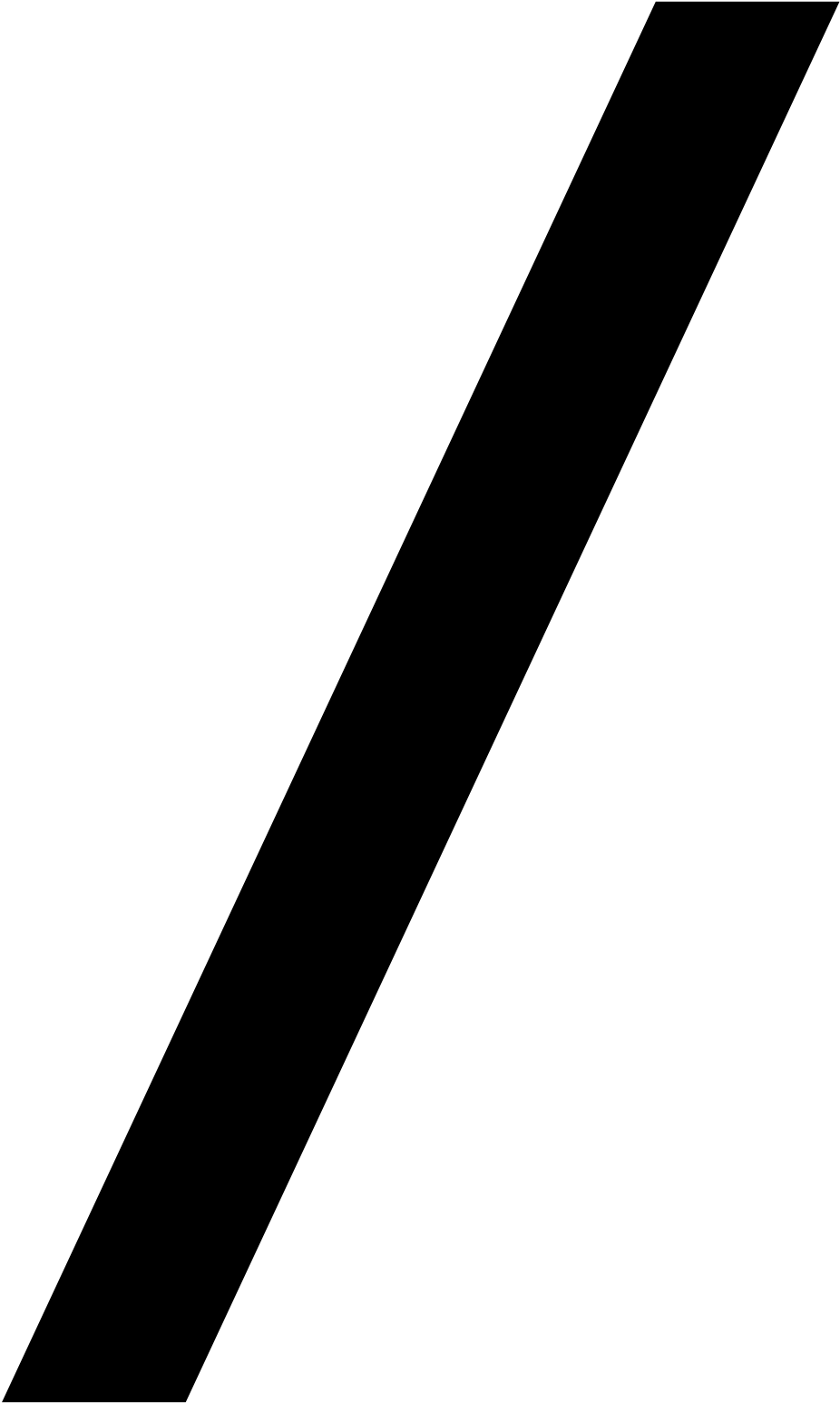


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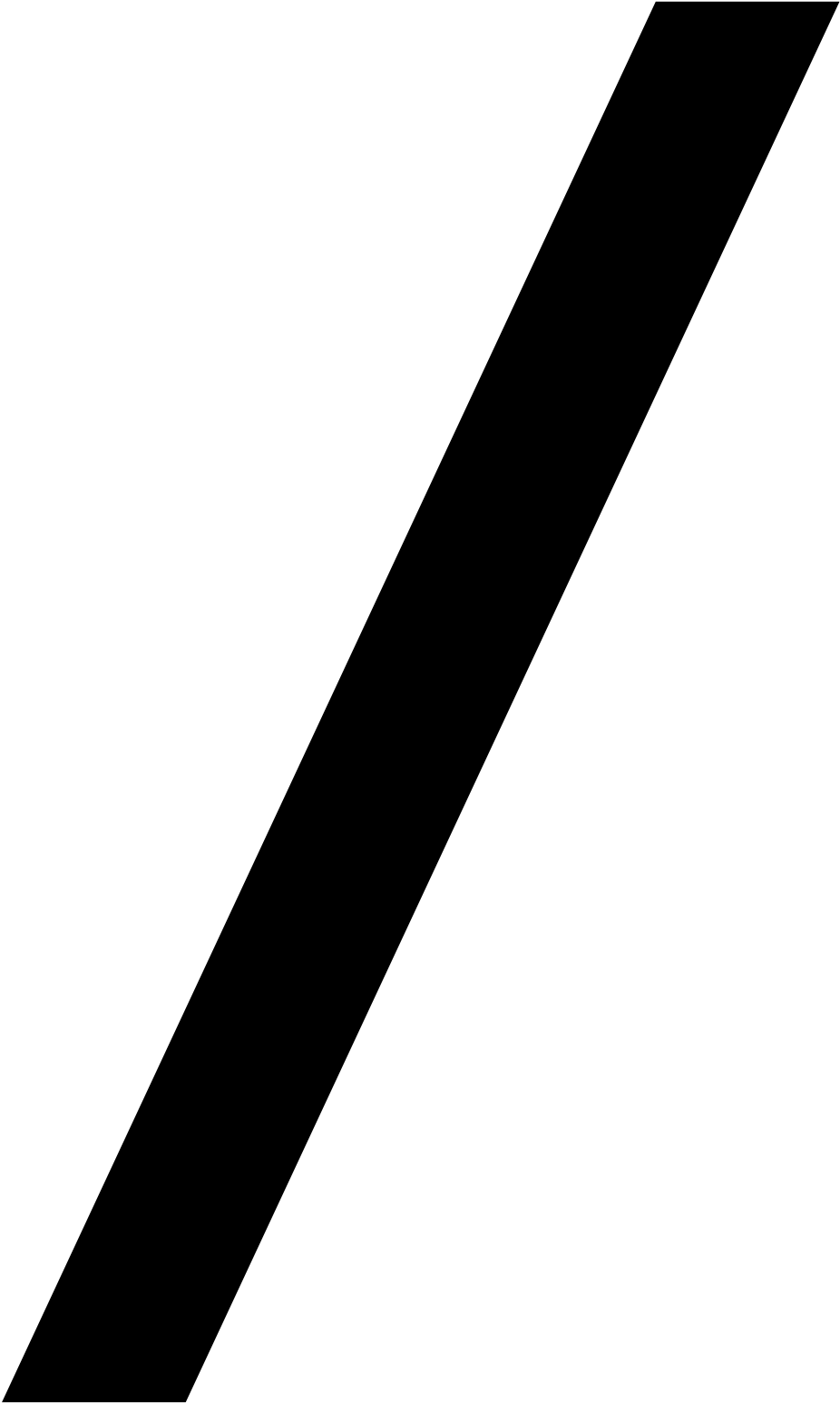














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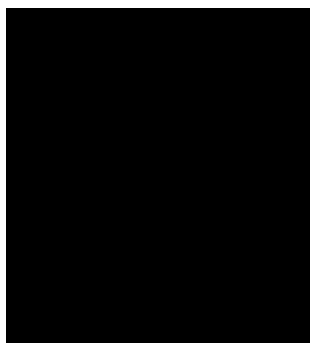
**w**



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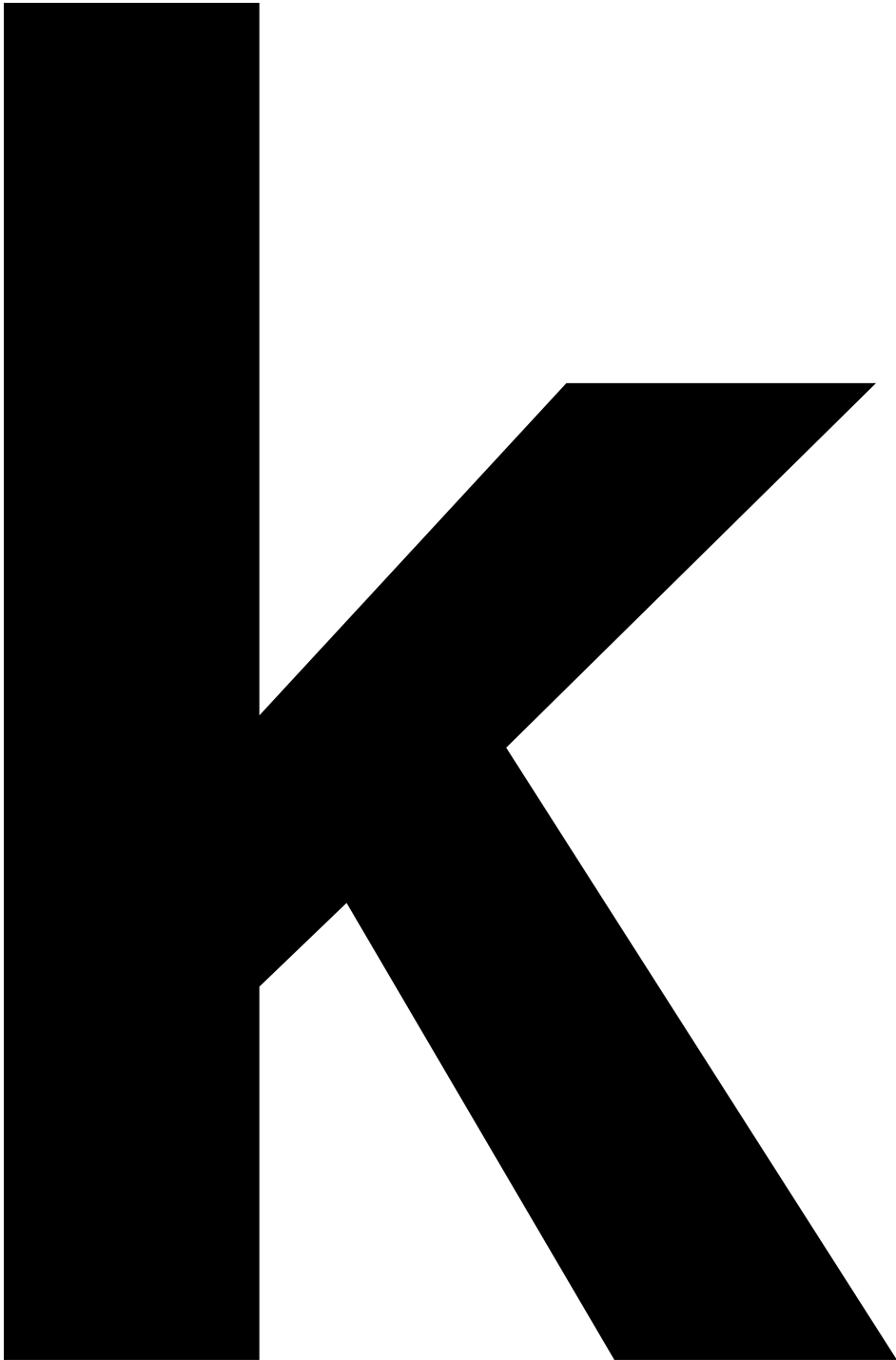


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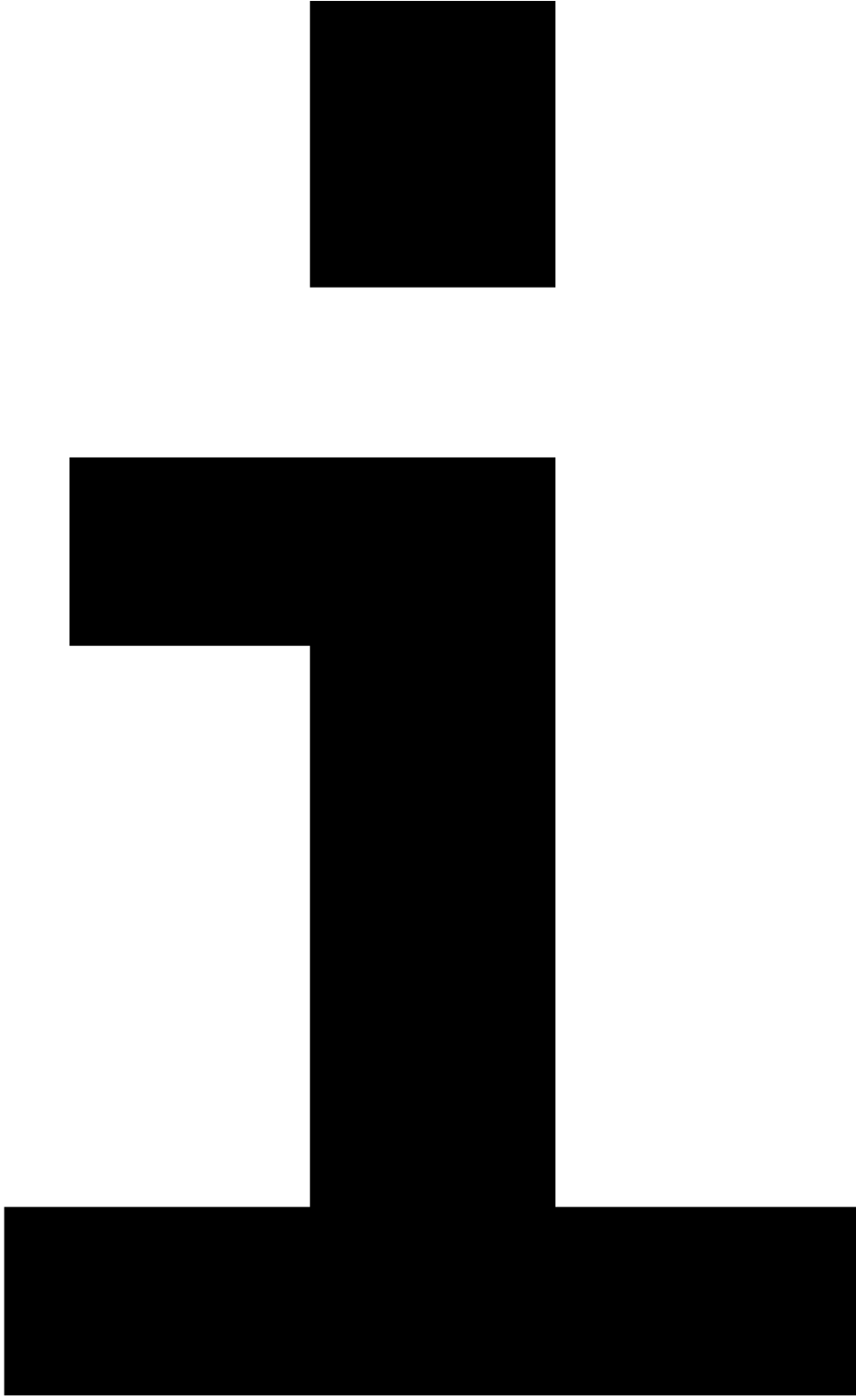




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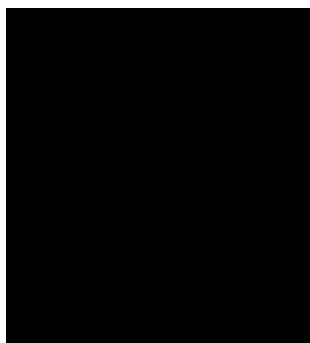






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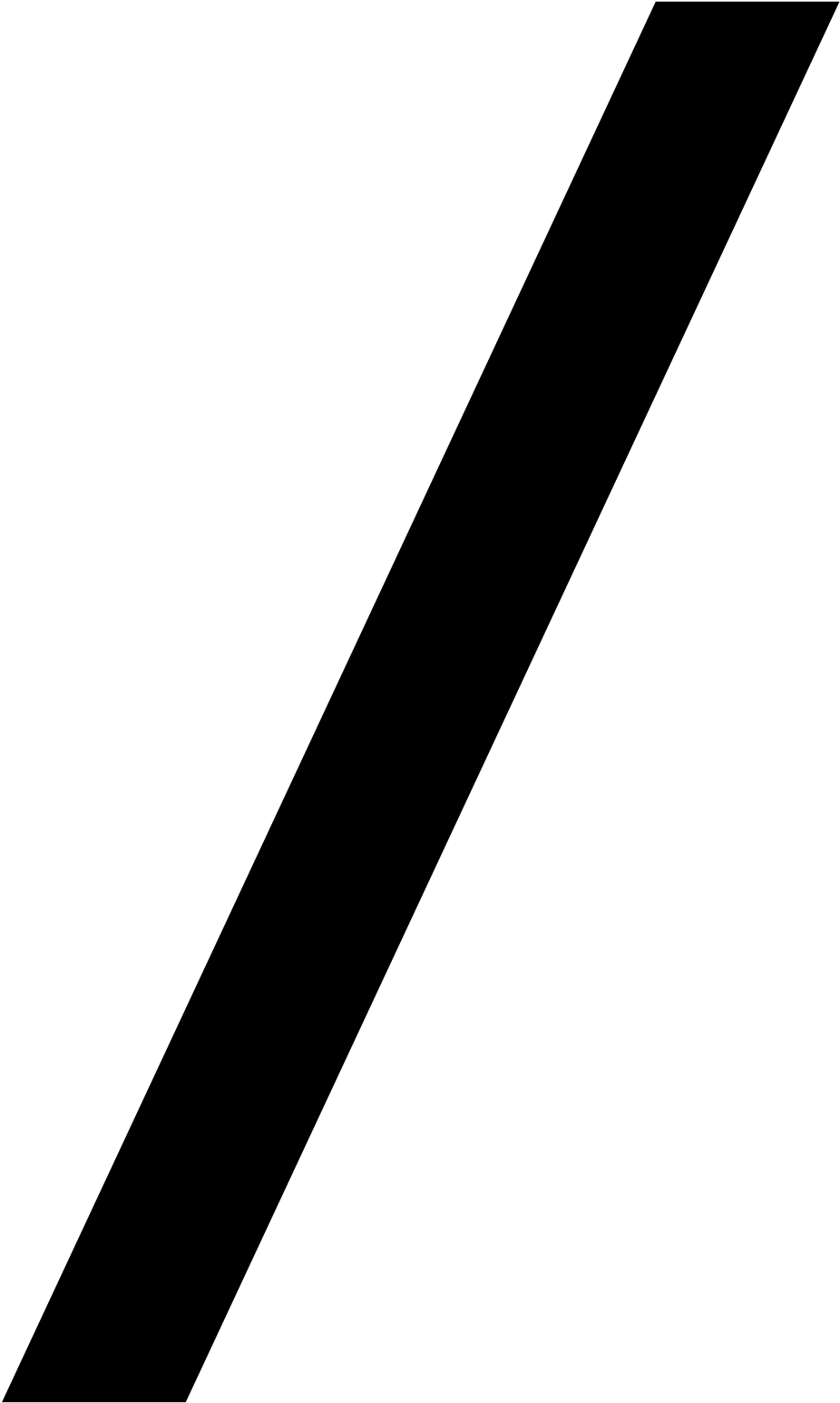


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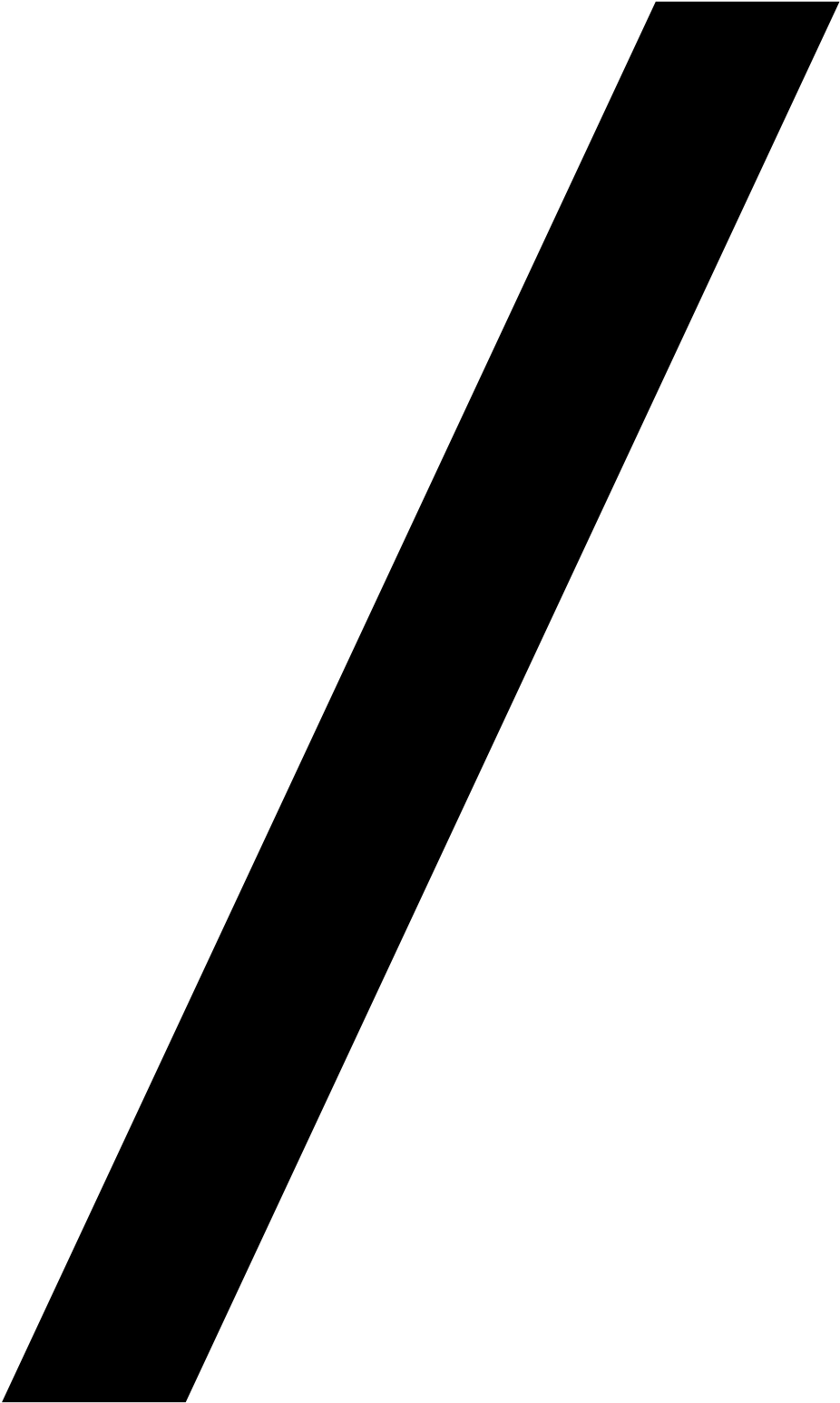
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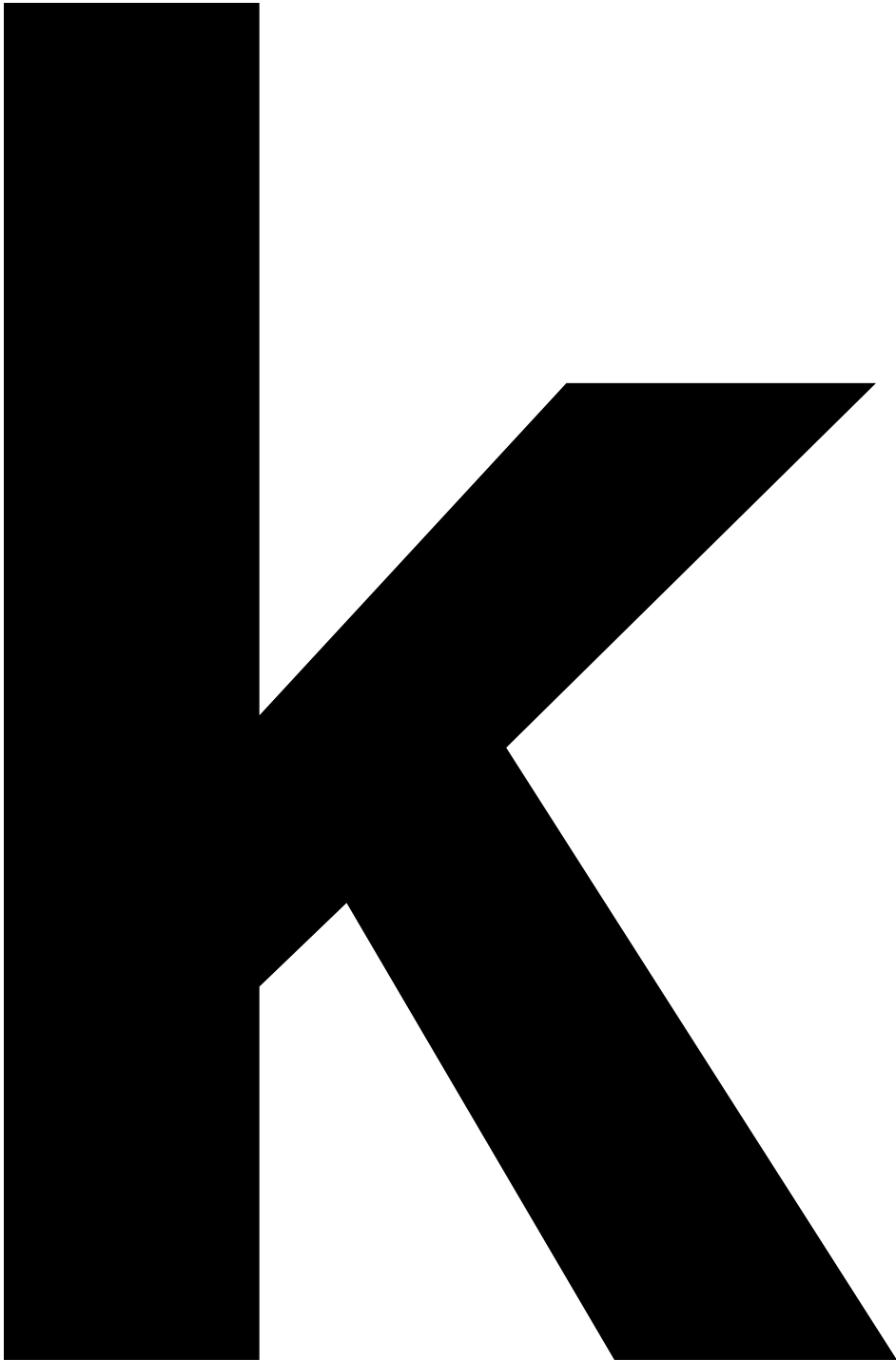




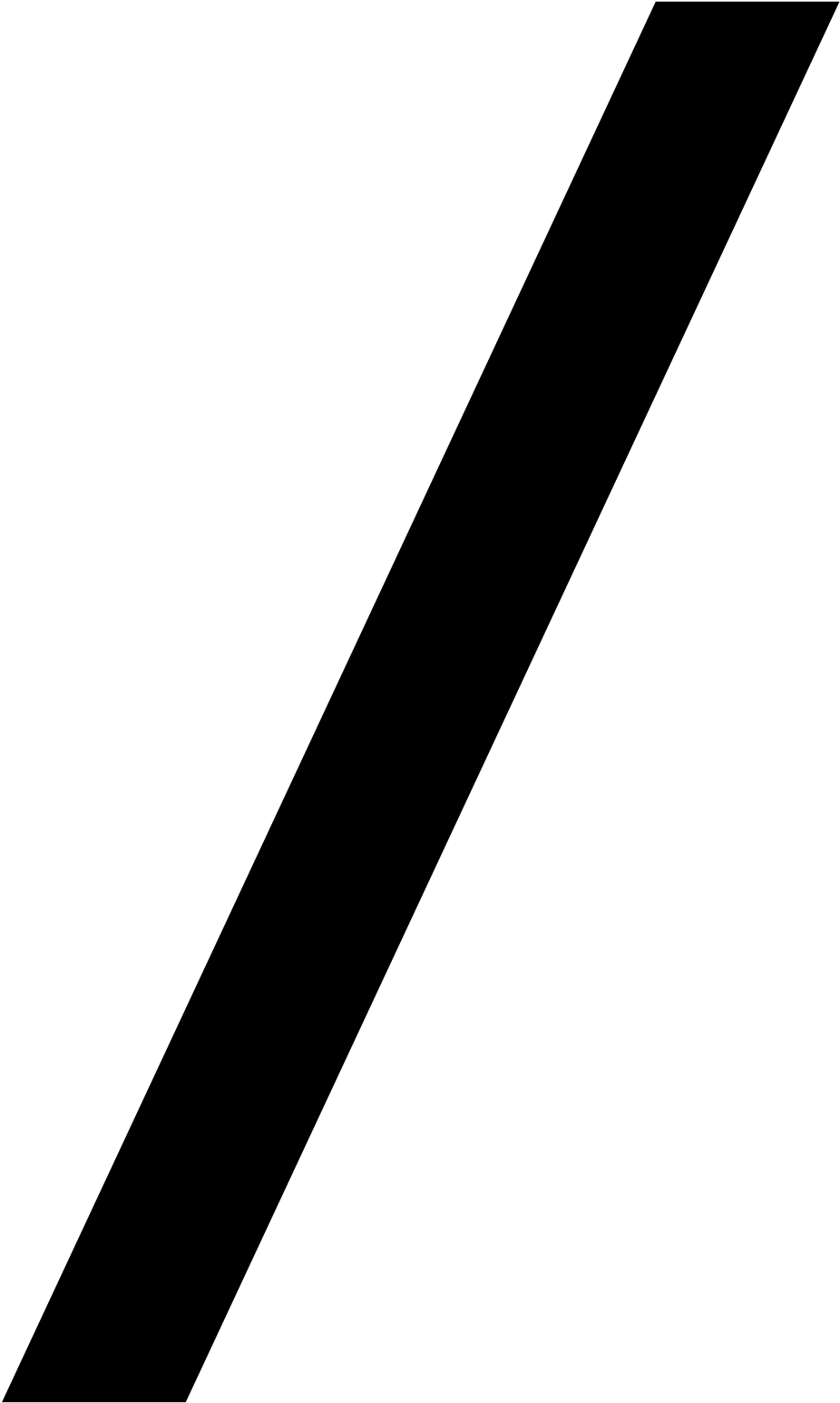




















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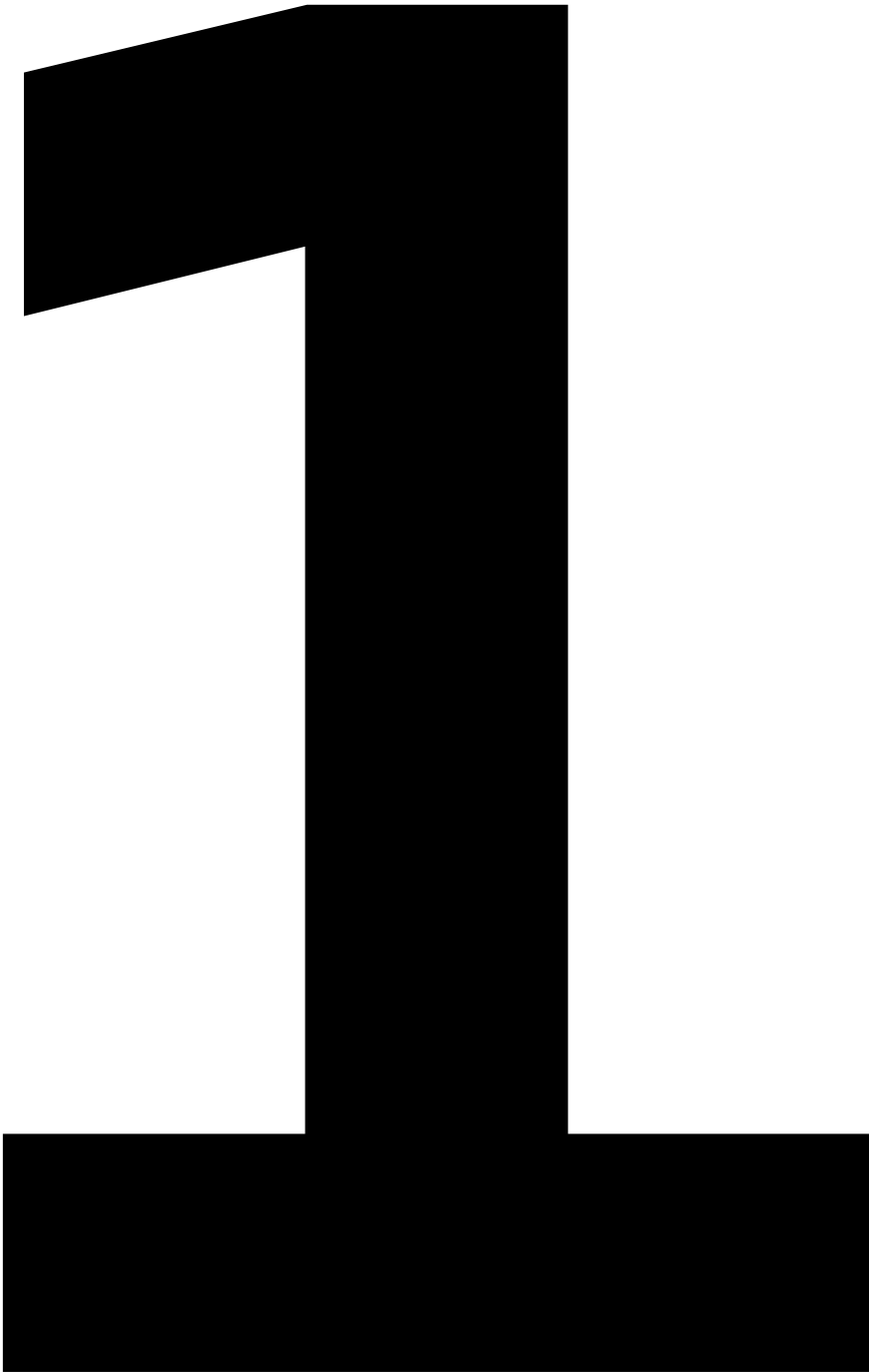


**sa**



**m**



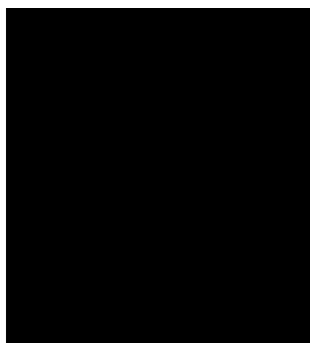




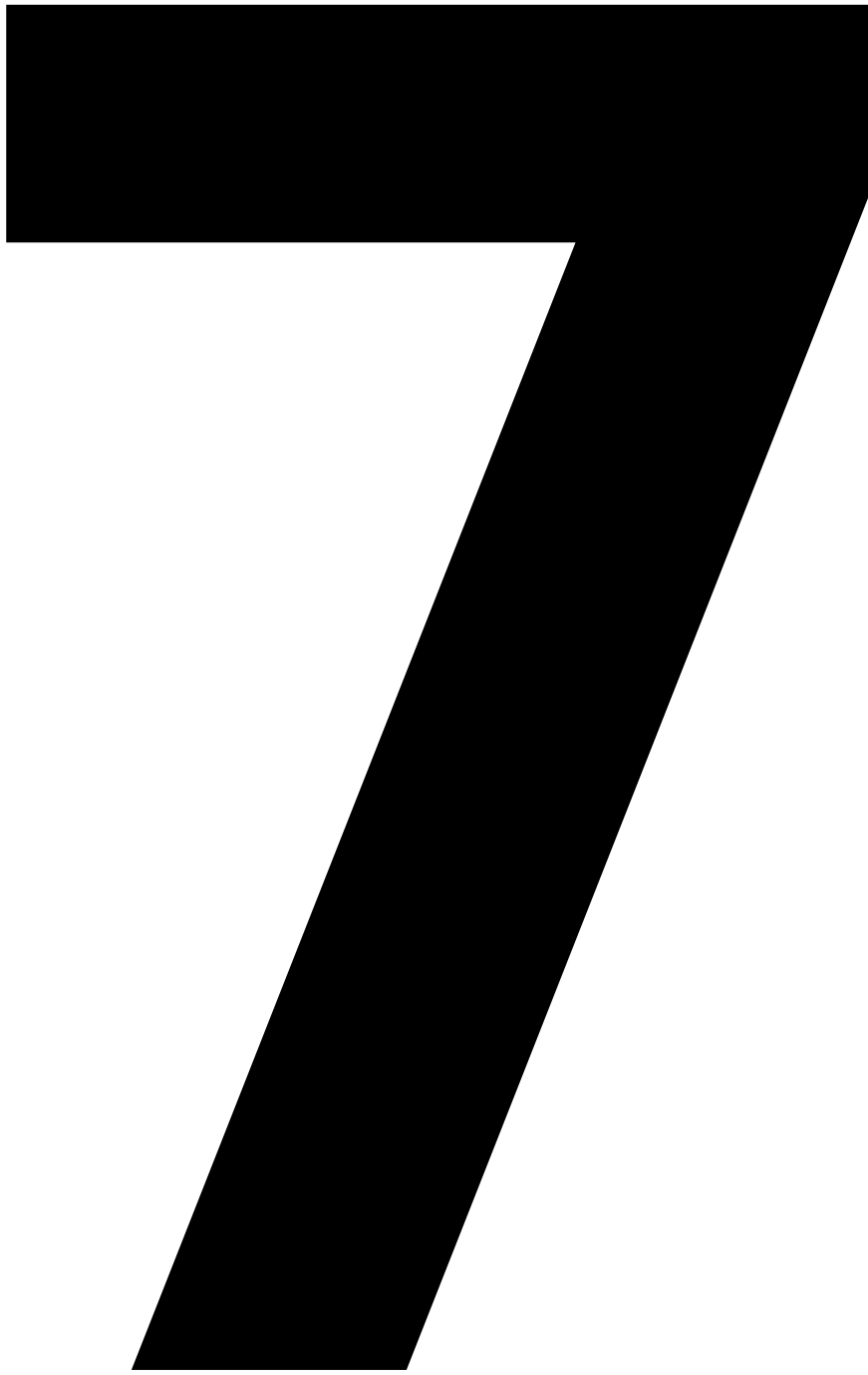


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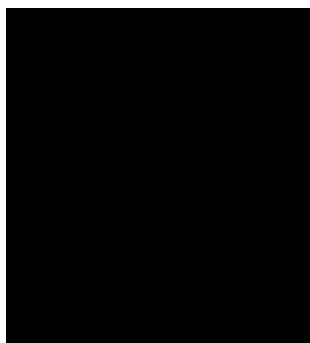










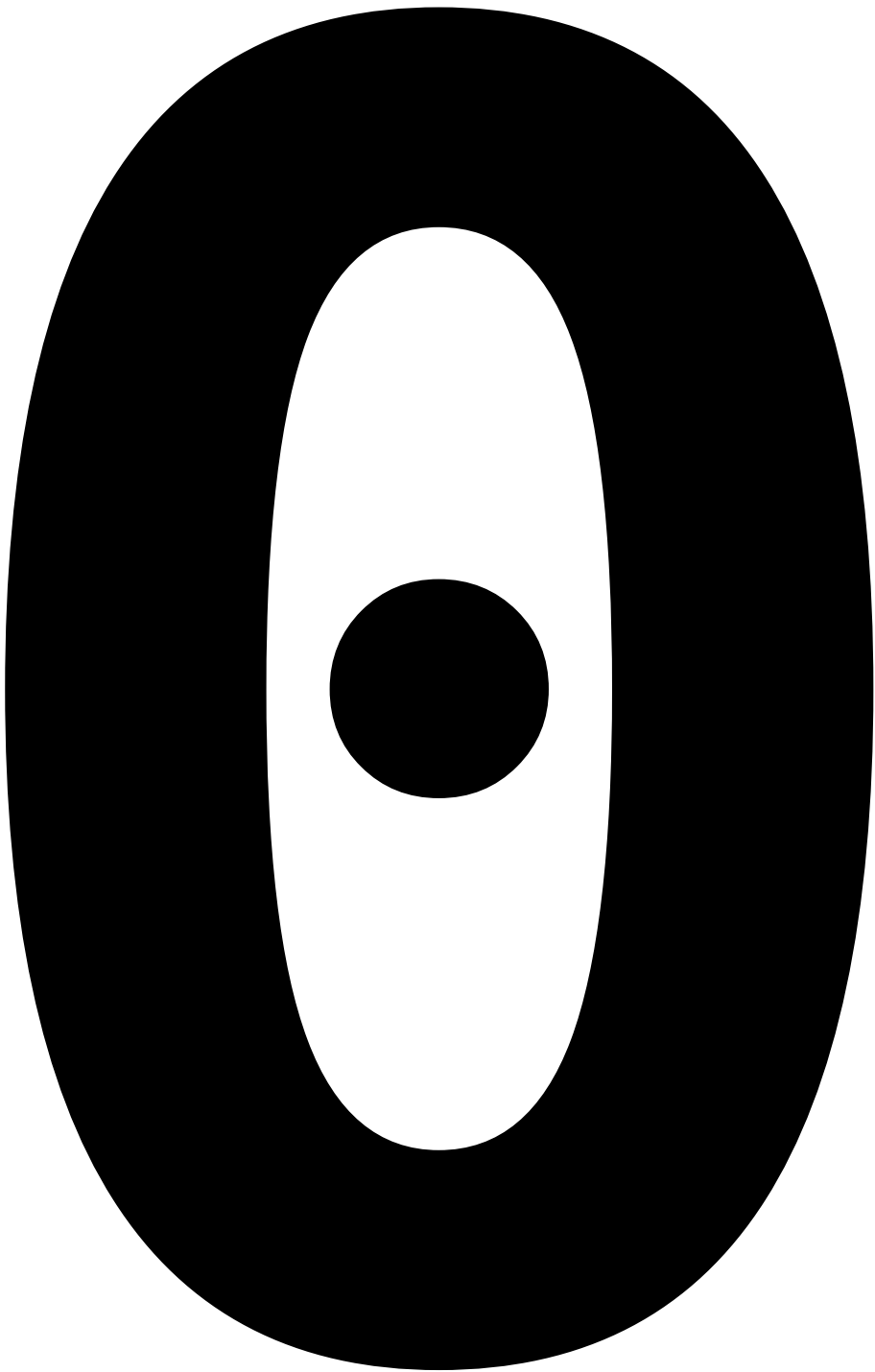




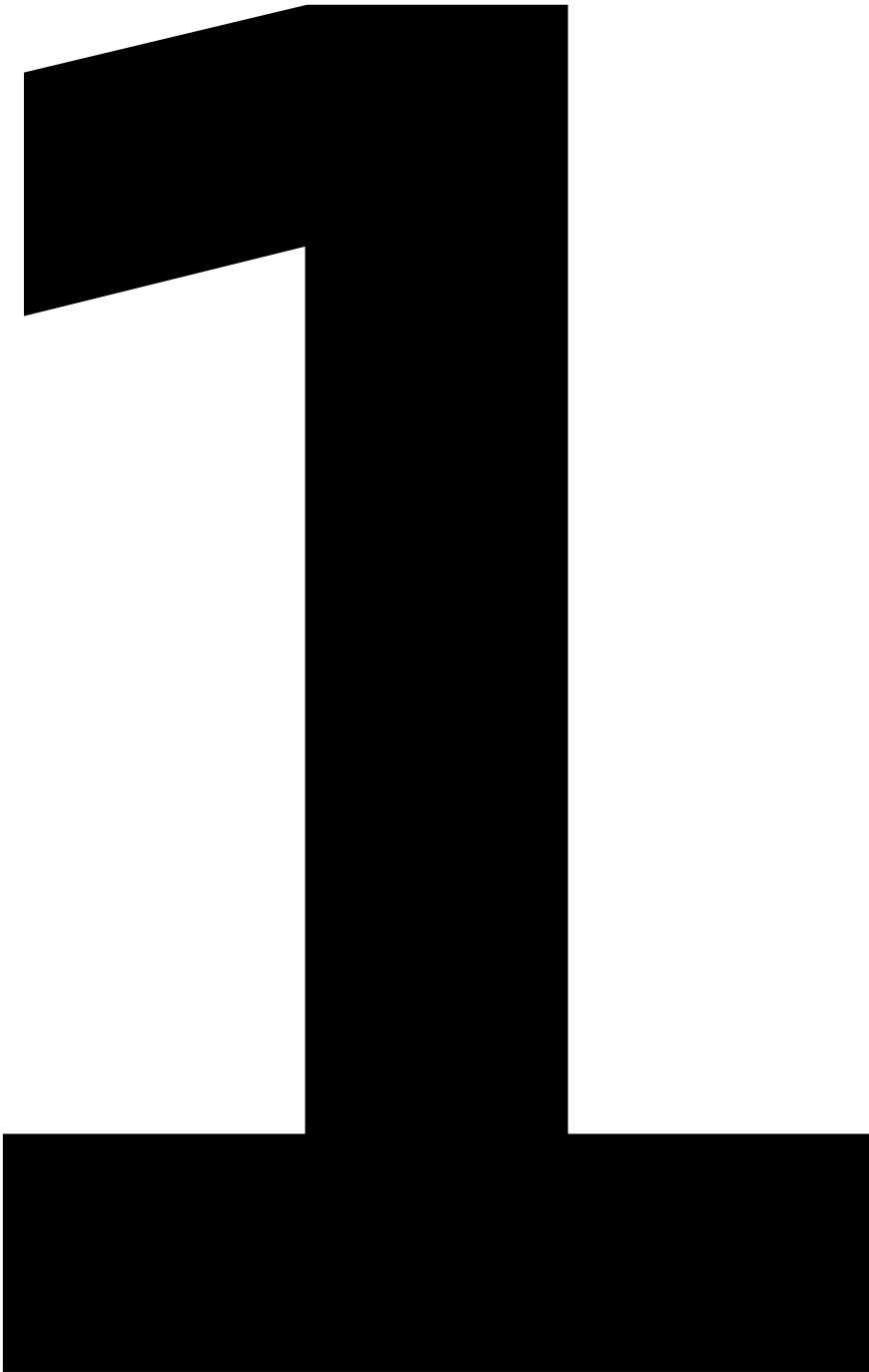


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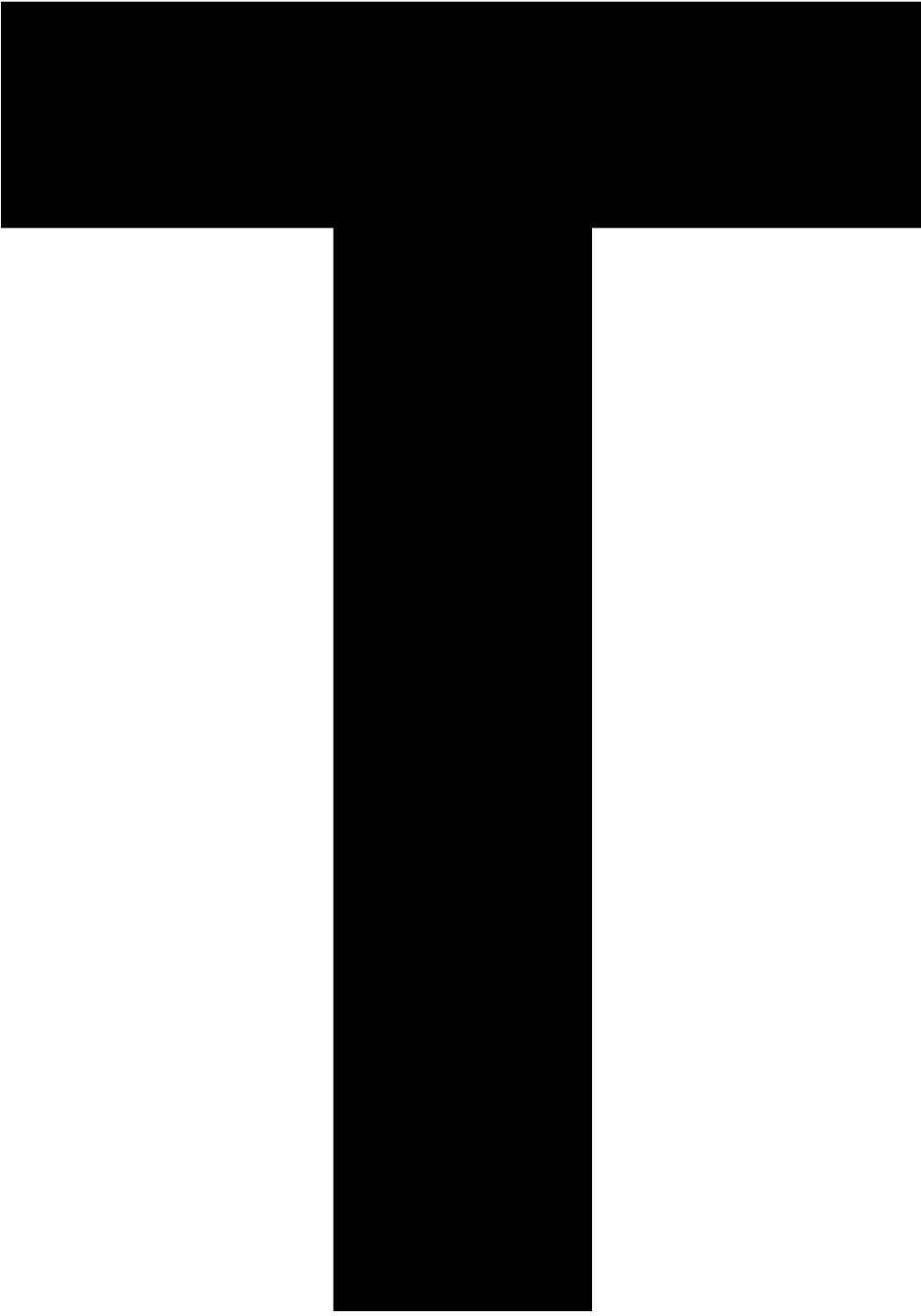






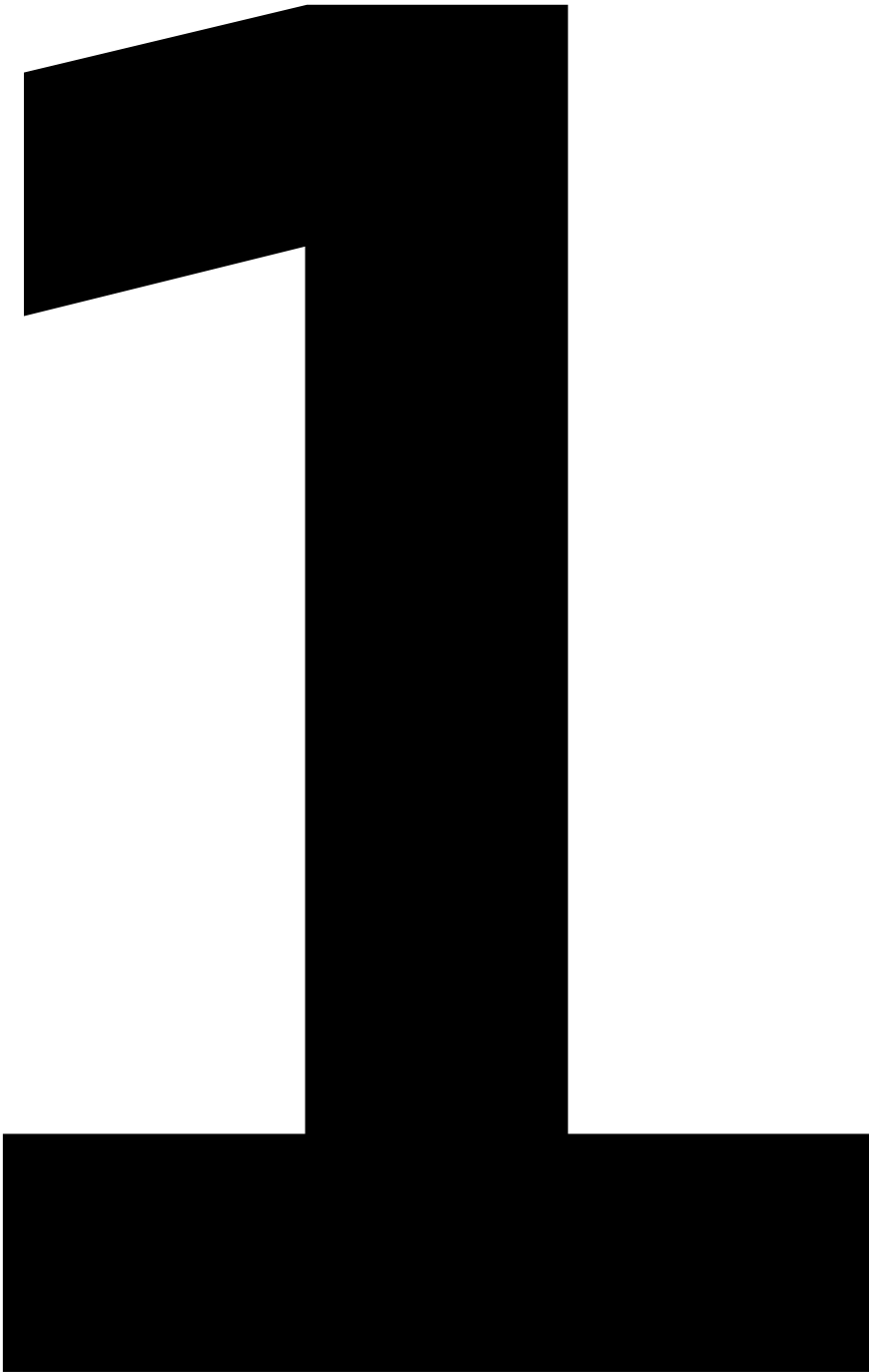
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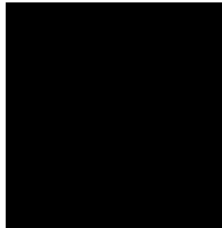
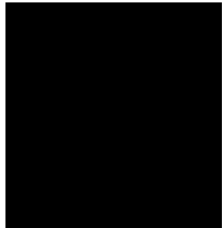






**B**





**u**









**Q**



**e**



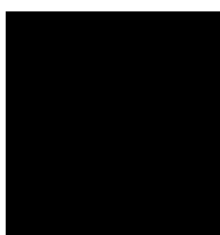










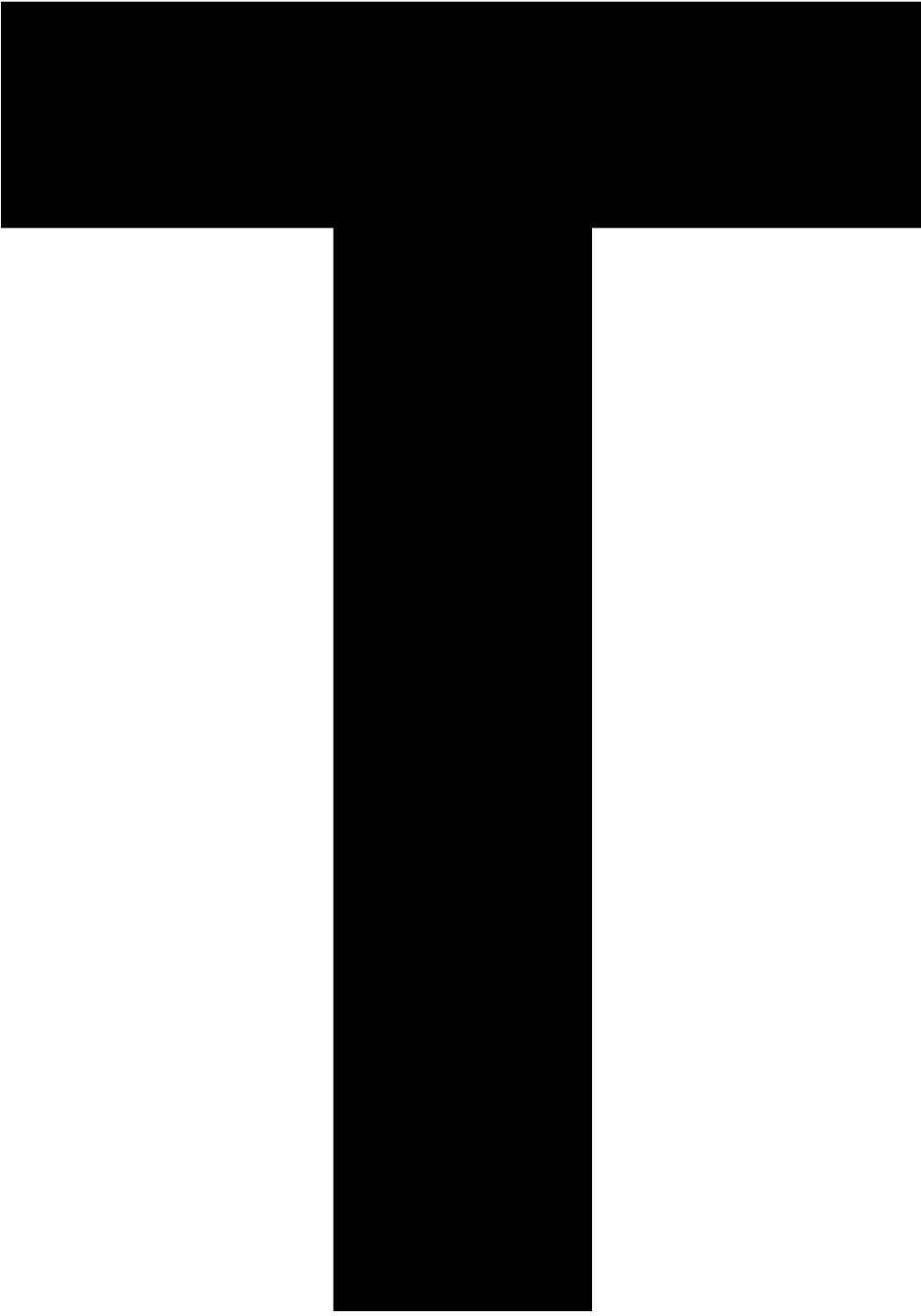


**u**













**e**



**C**



**h**



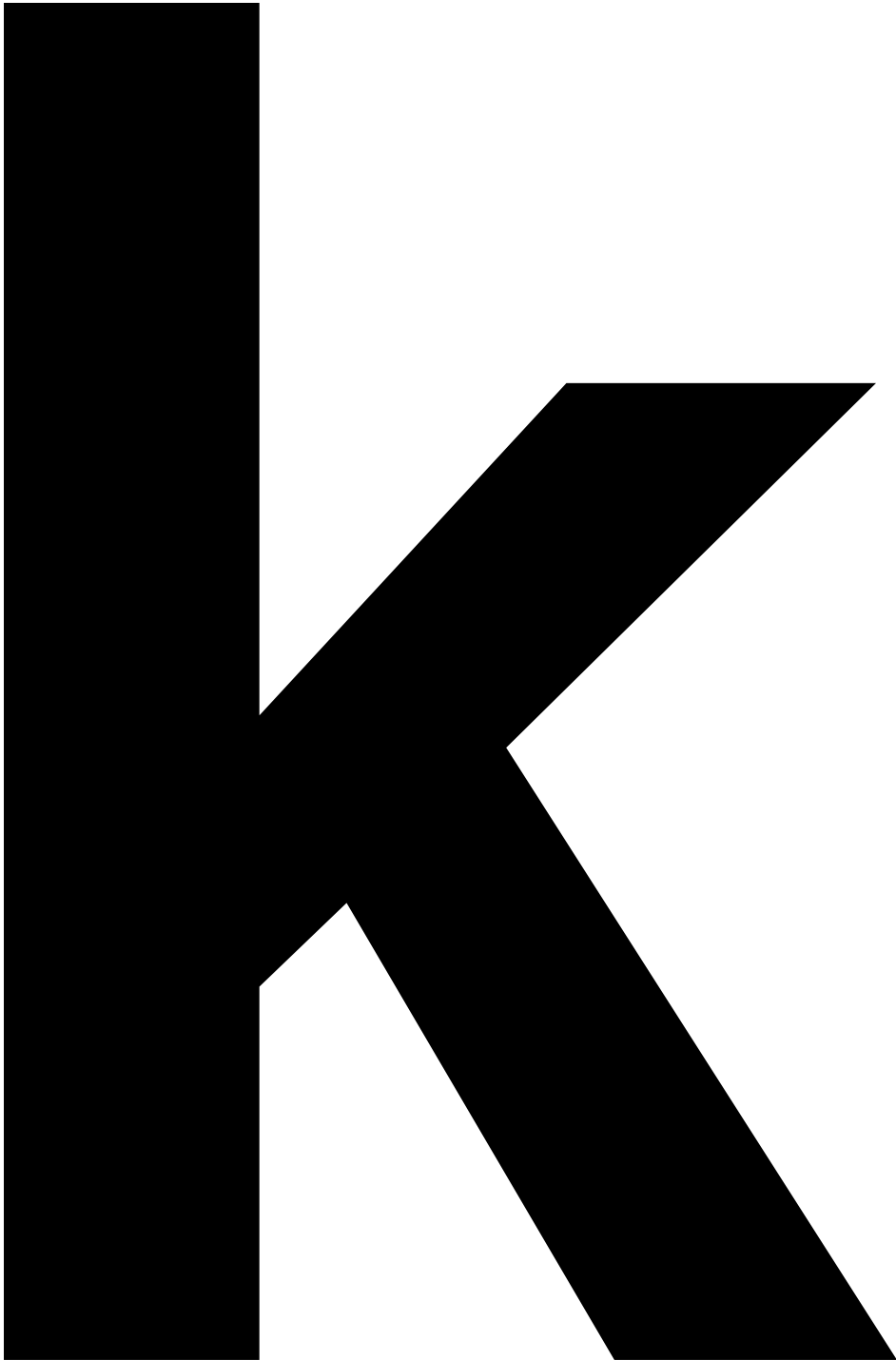
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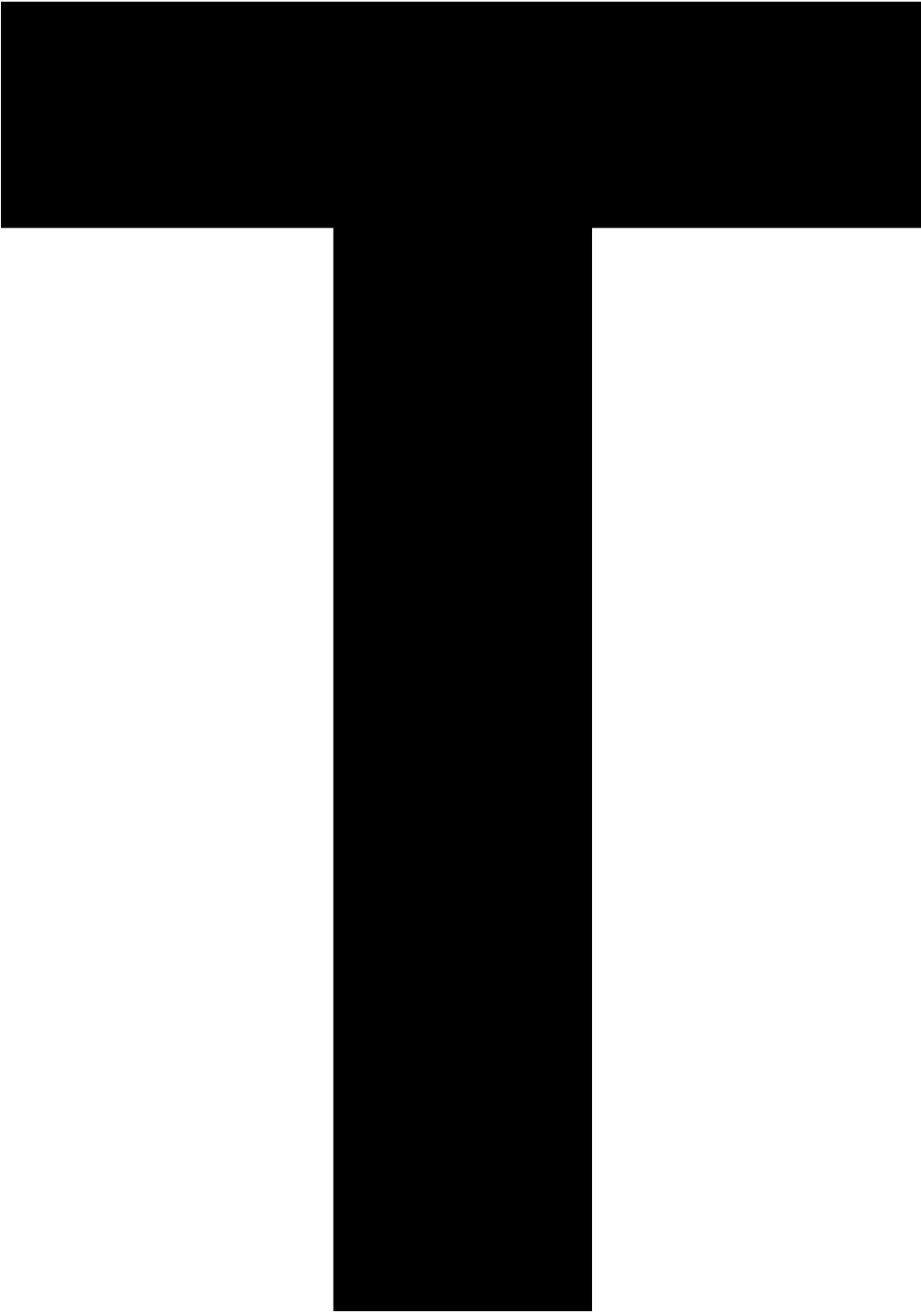














**sa**





**Q**



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**Q**



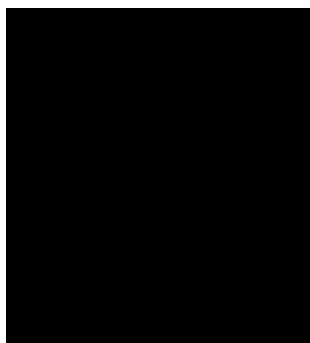


2



4











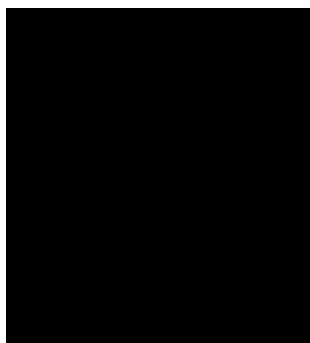


2



6



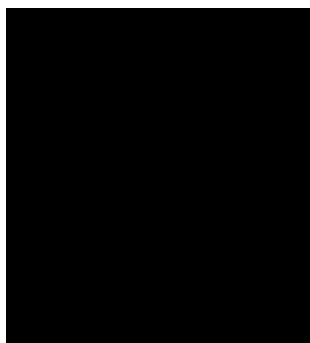




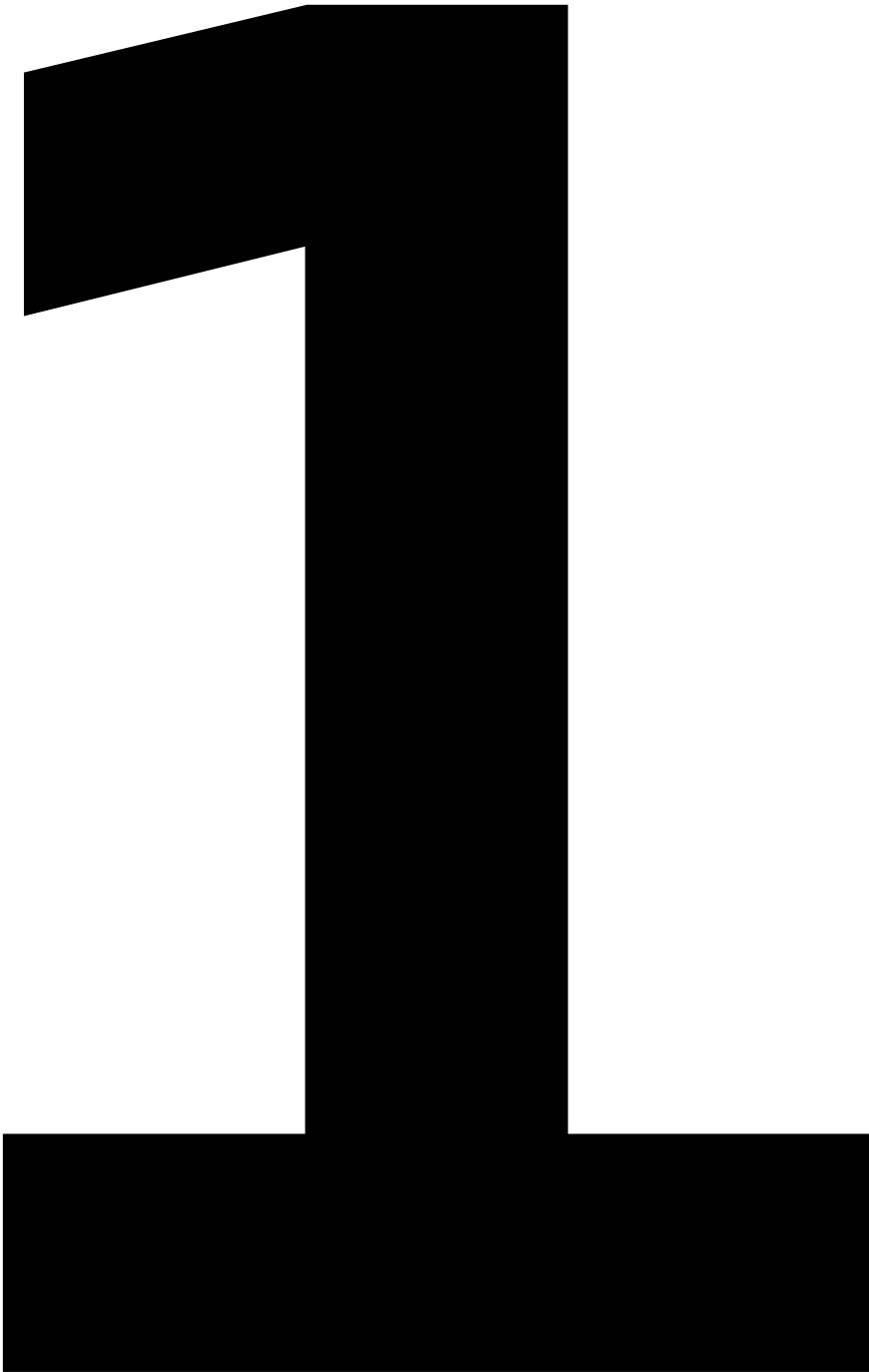
**5**













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**B**





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**C**



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**M**





**sa**







**J**













**e**







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**sa**



**J**







**e**





**n**

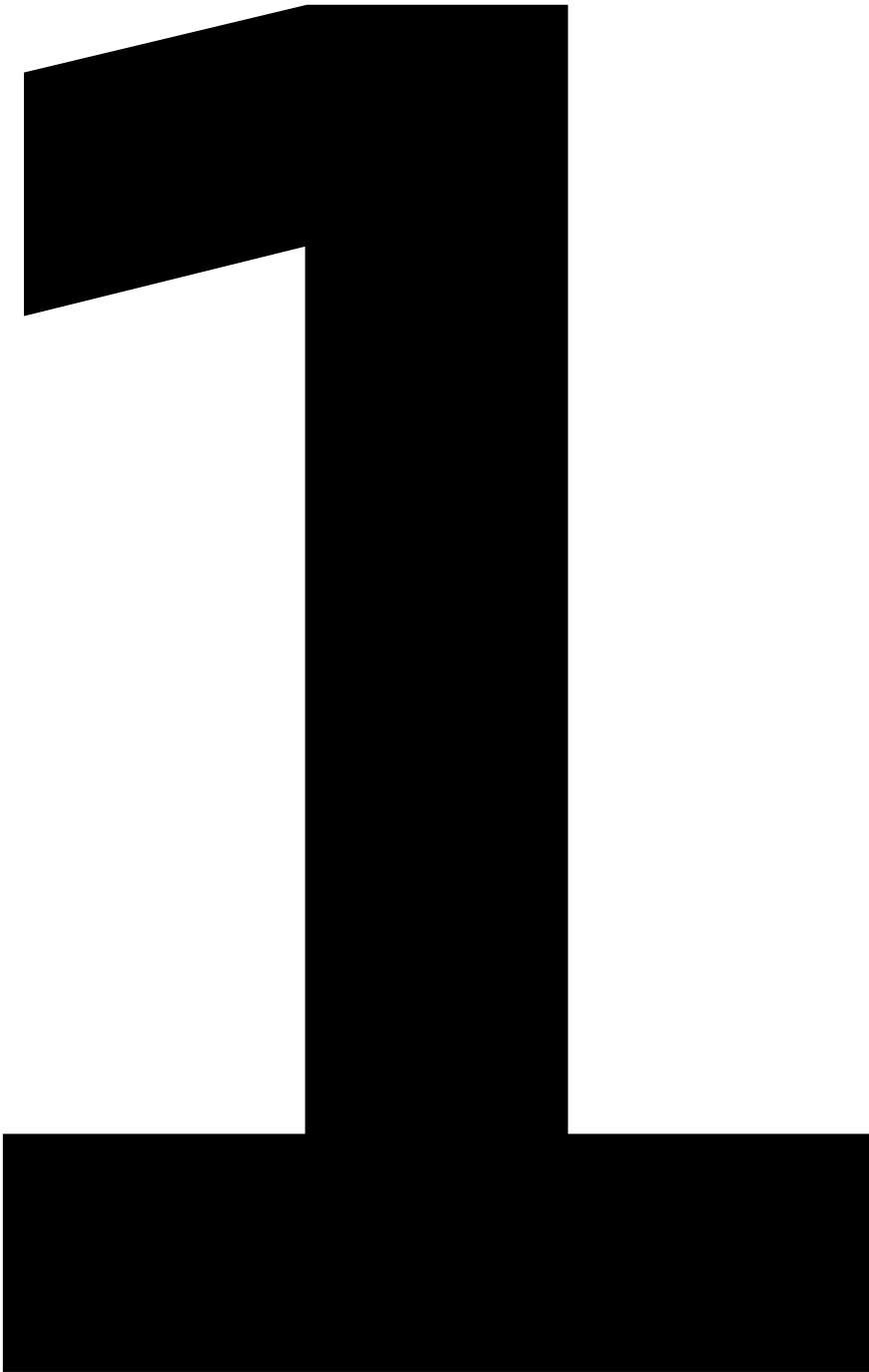


**sa**



**m**



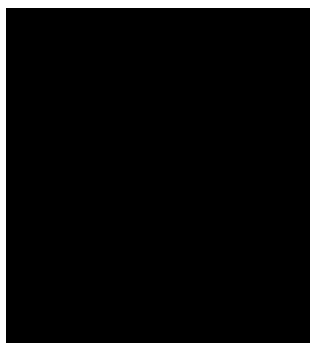






6







6



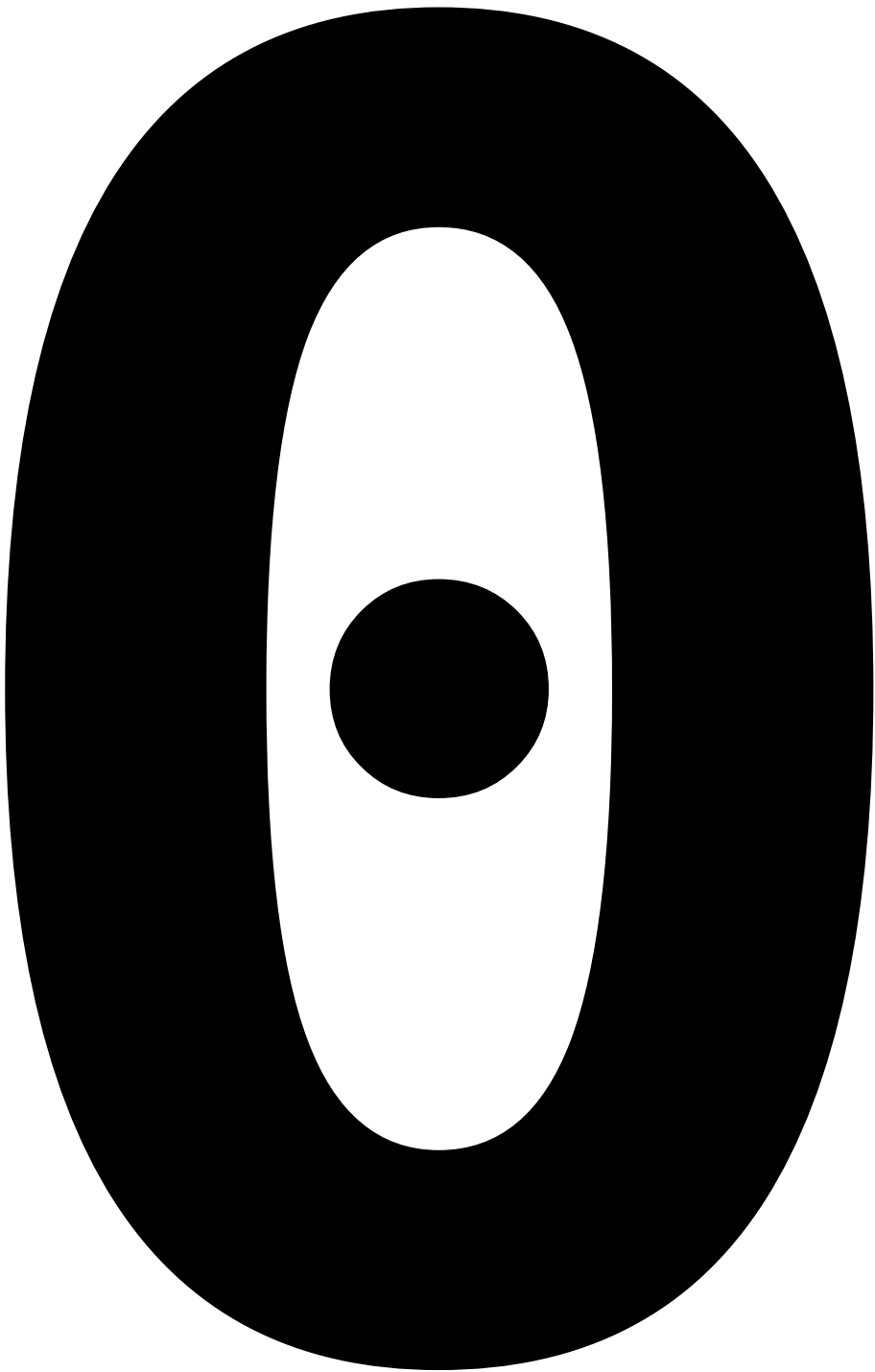




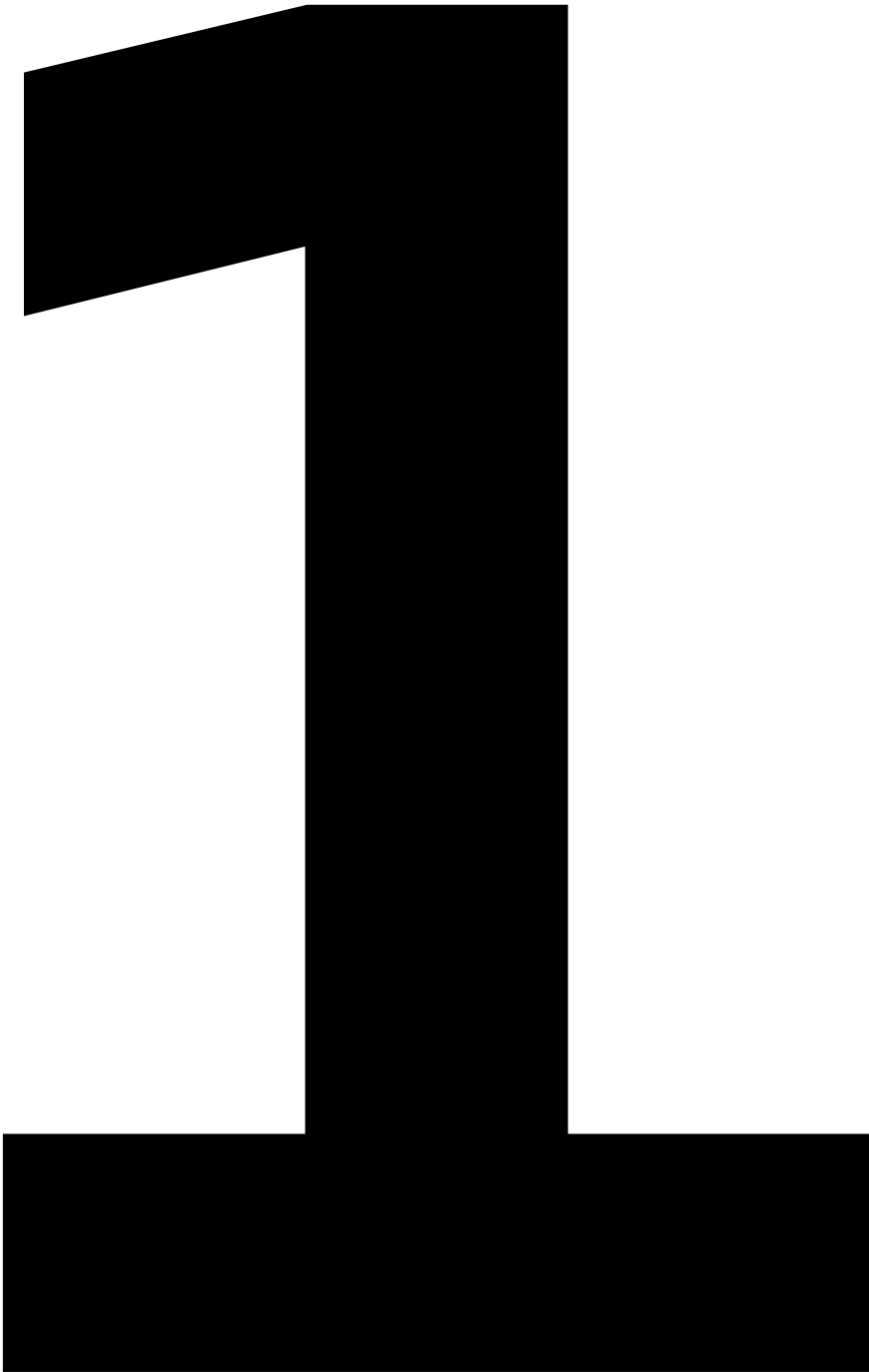


2











**3**











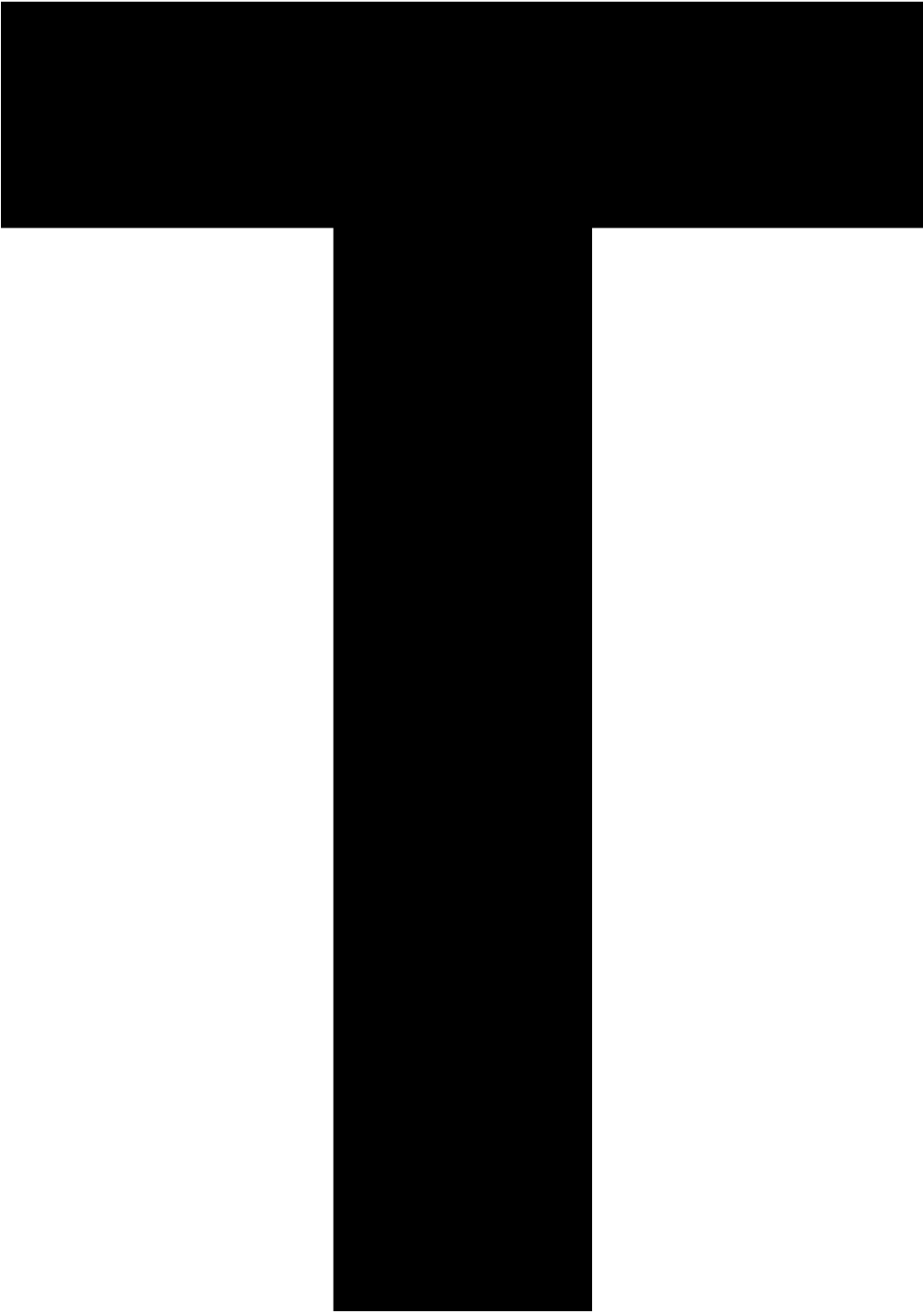




**N**









2







**h**







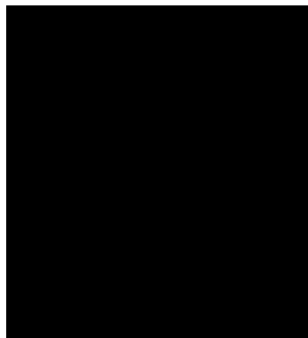
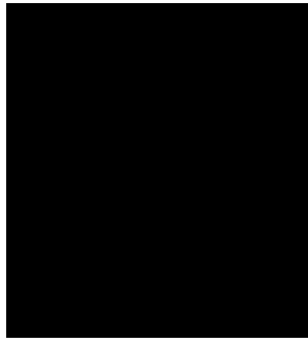






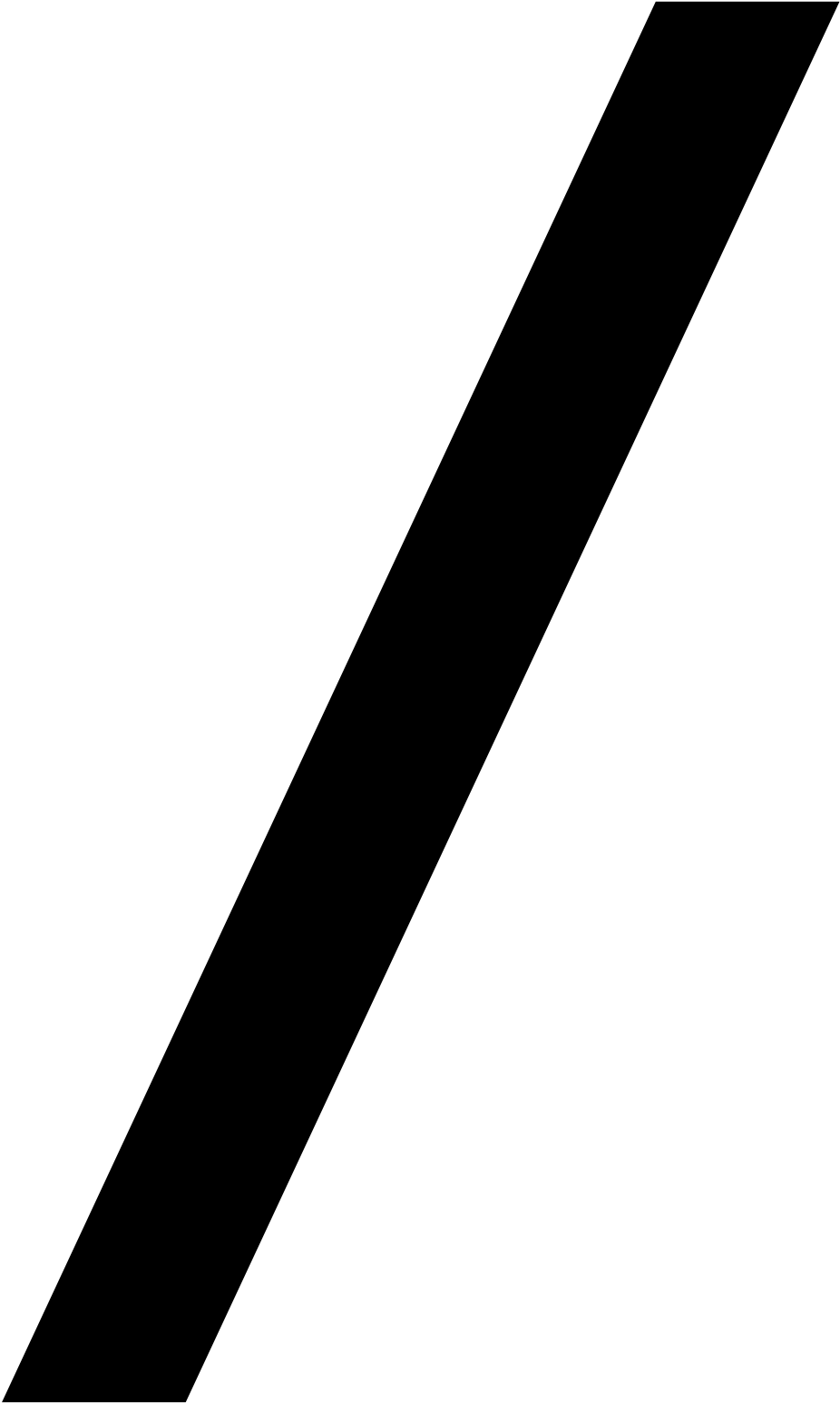
**o**



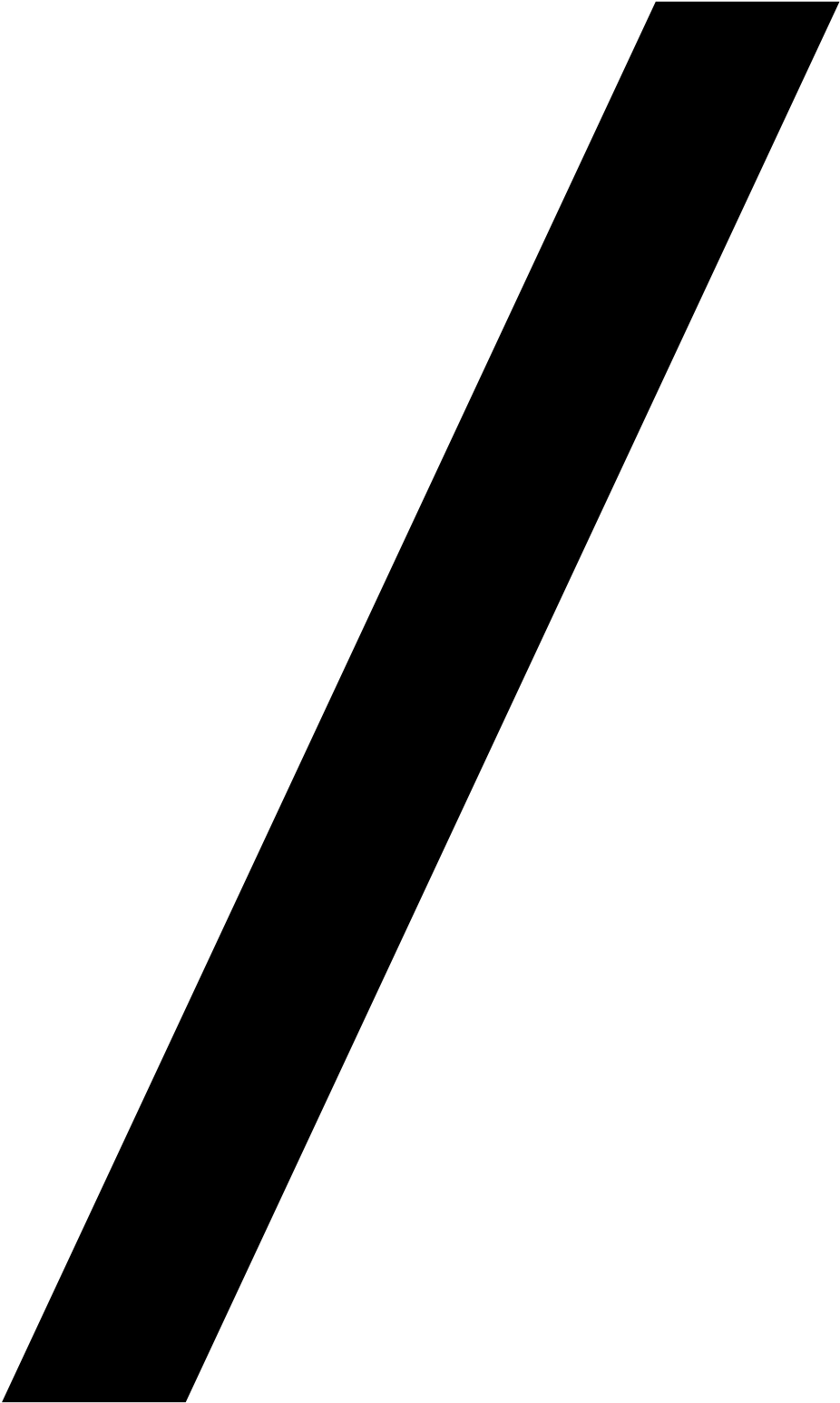


















**sa**





**Q**











**J**







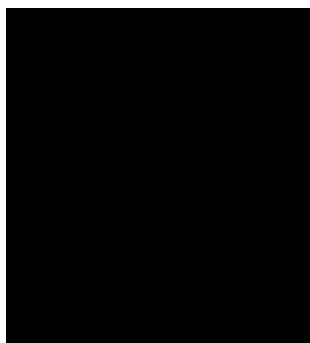


**Q**



**Y**













**S**



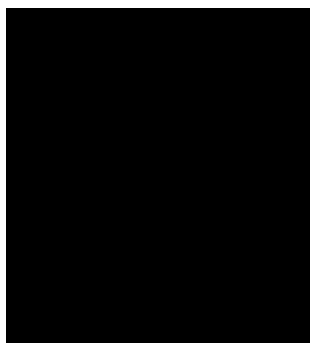
**n**



**sa**













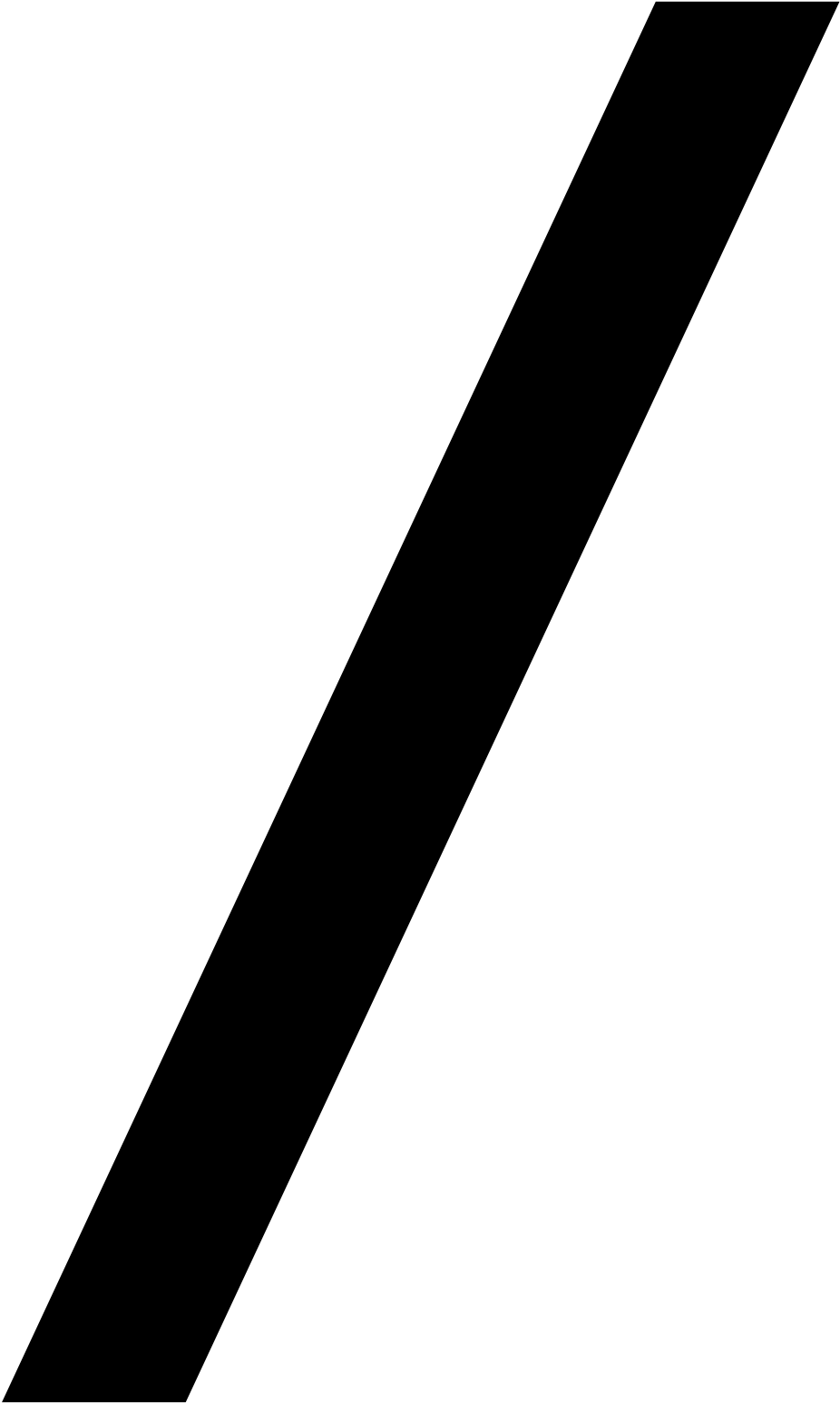




**Q**









**C**







**n**









**e**



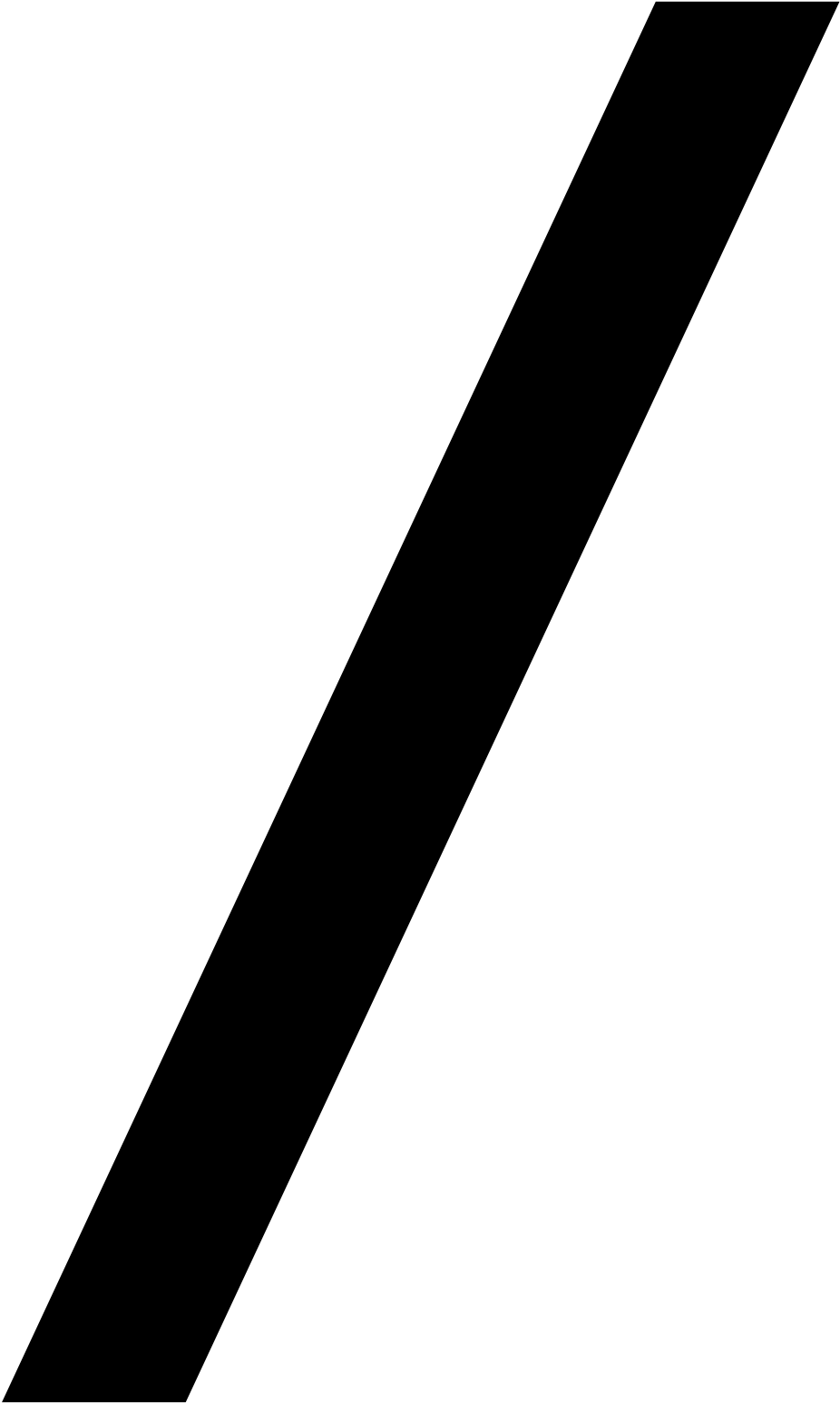
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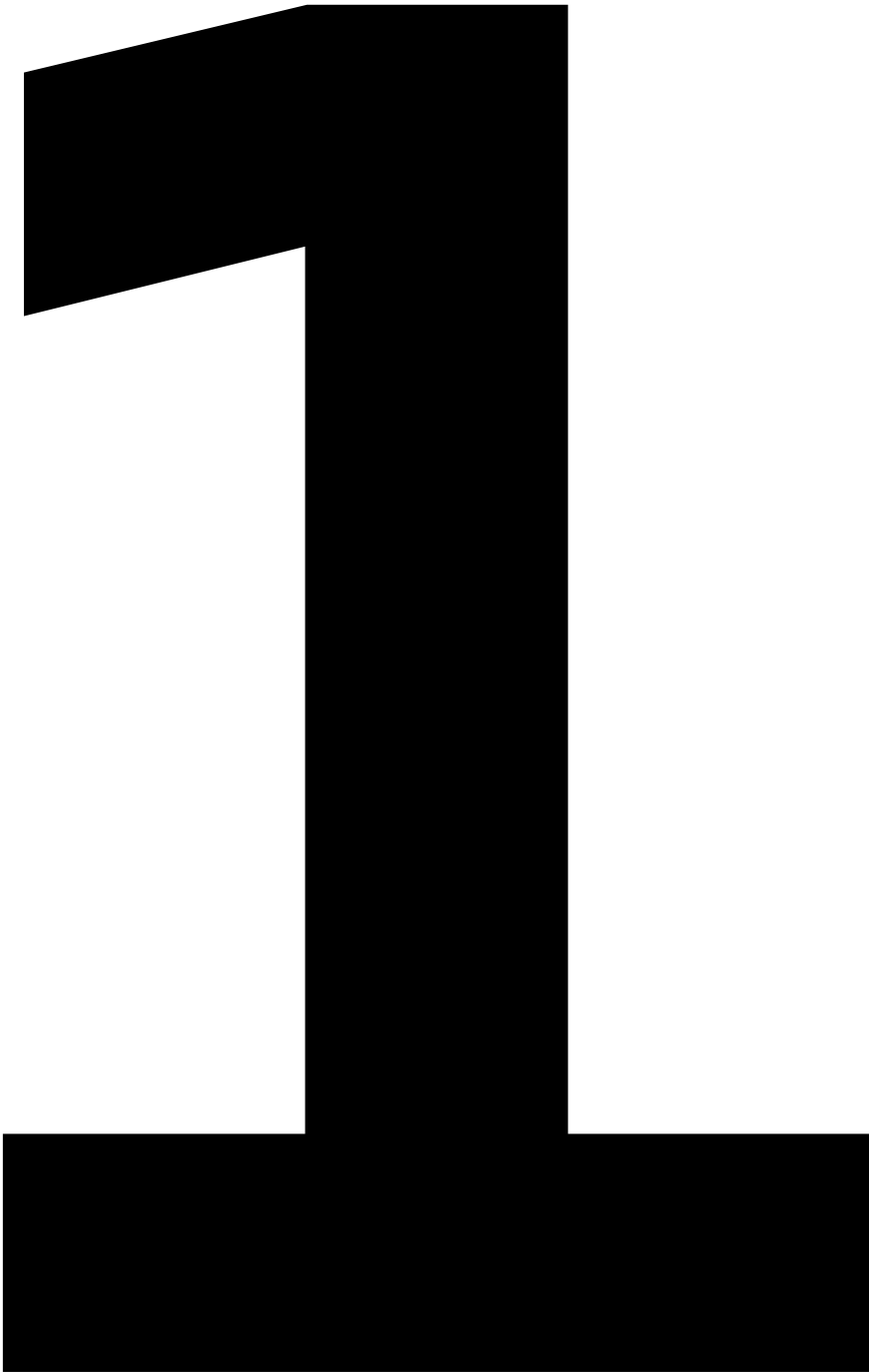


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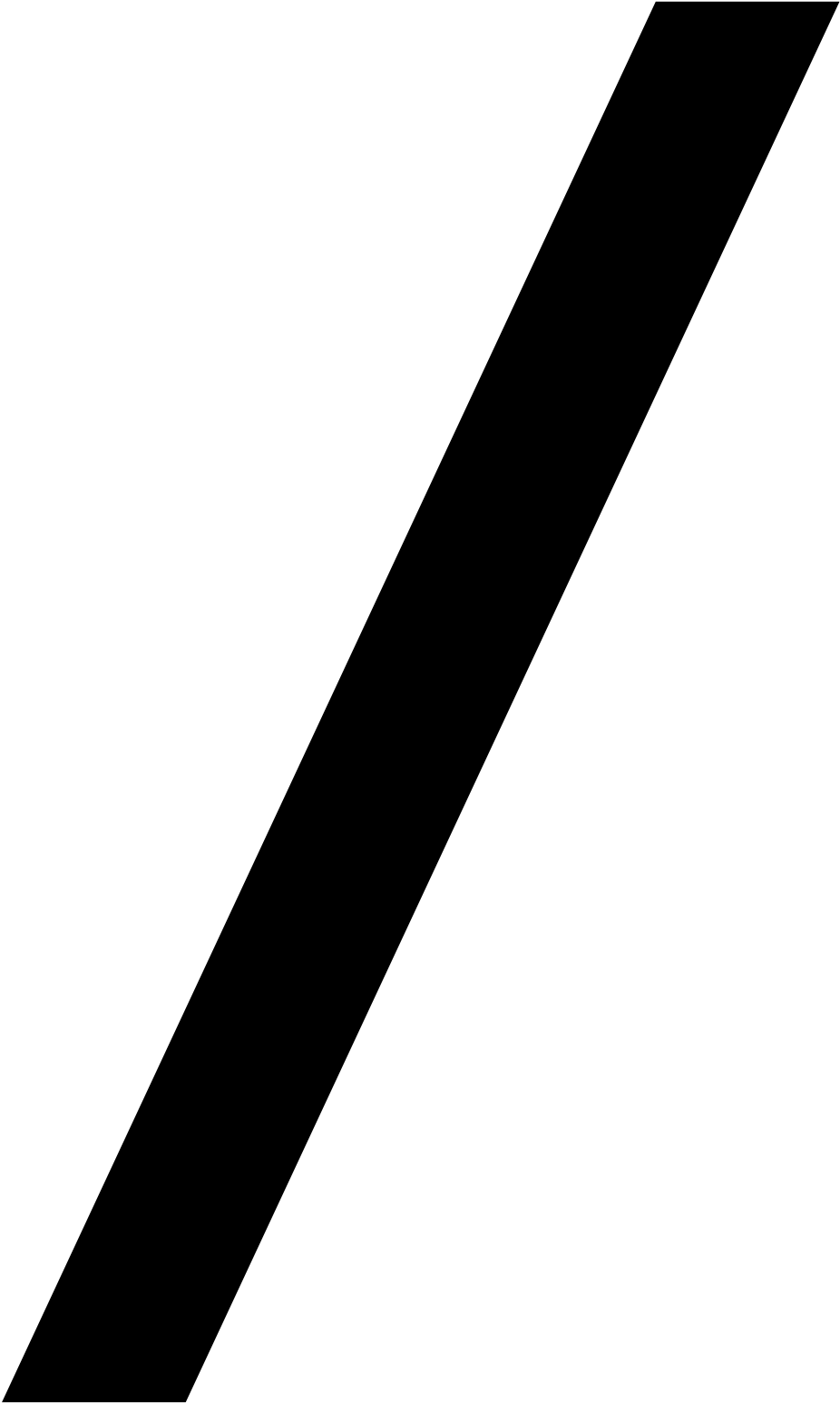
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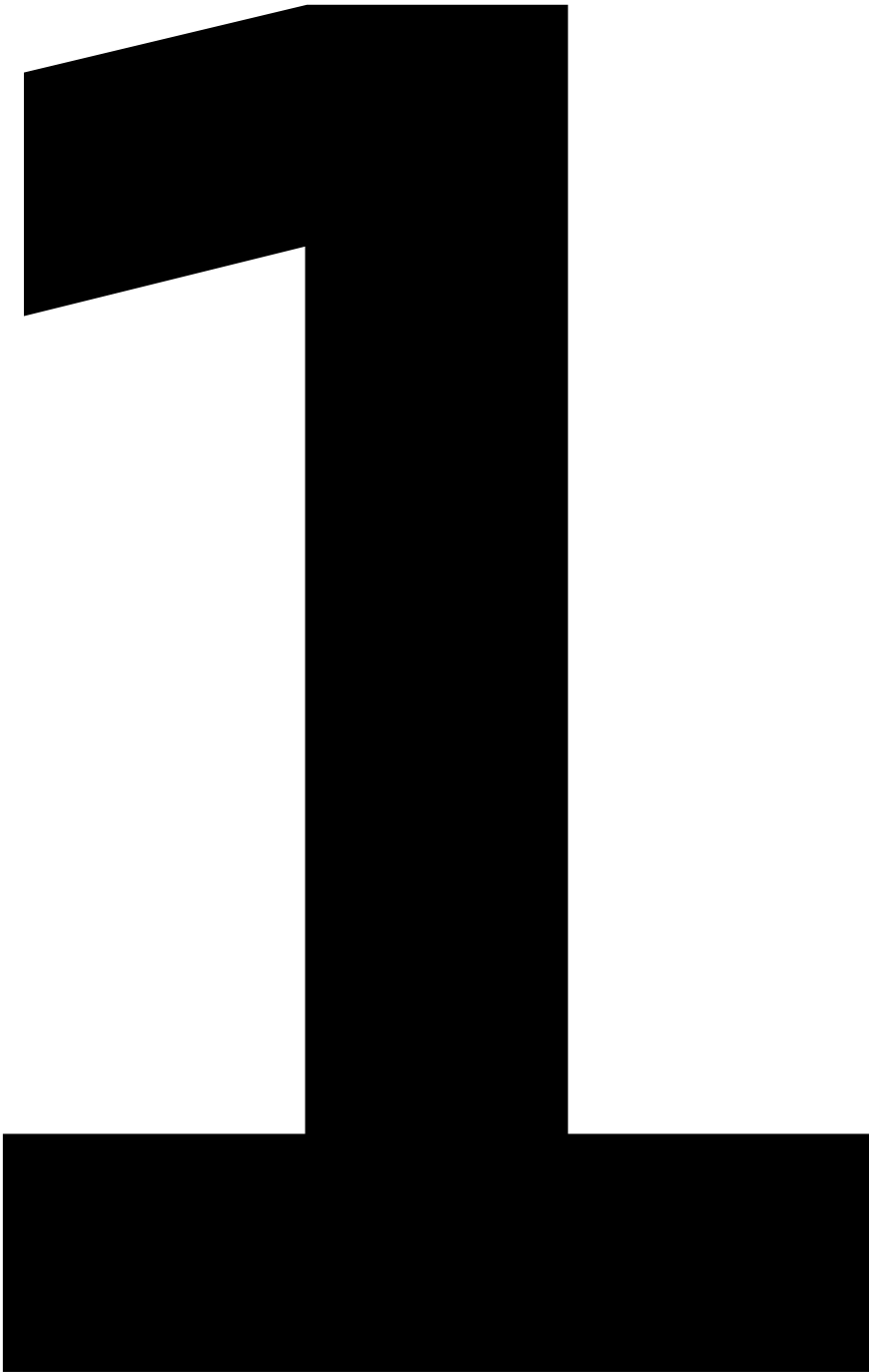




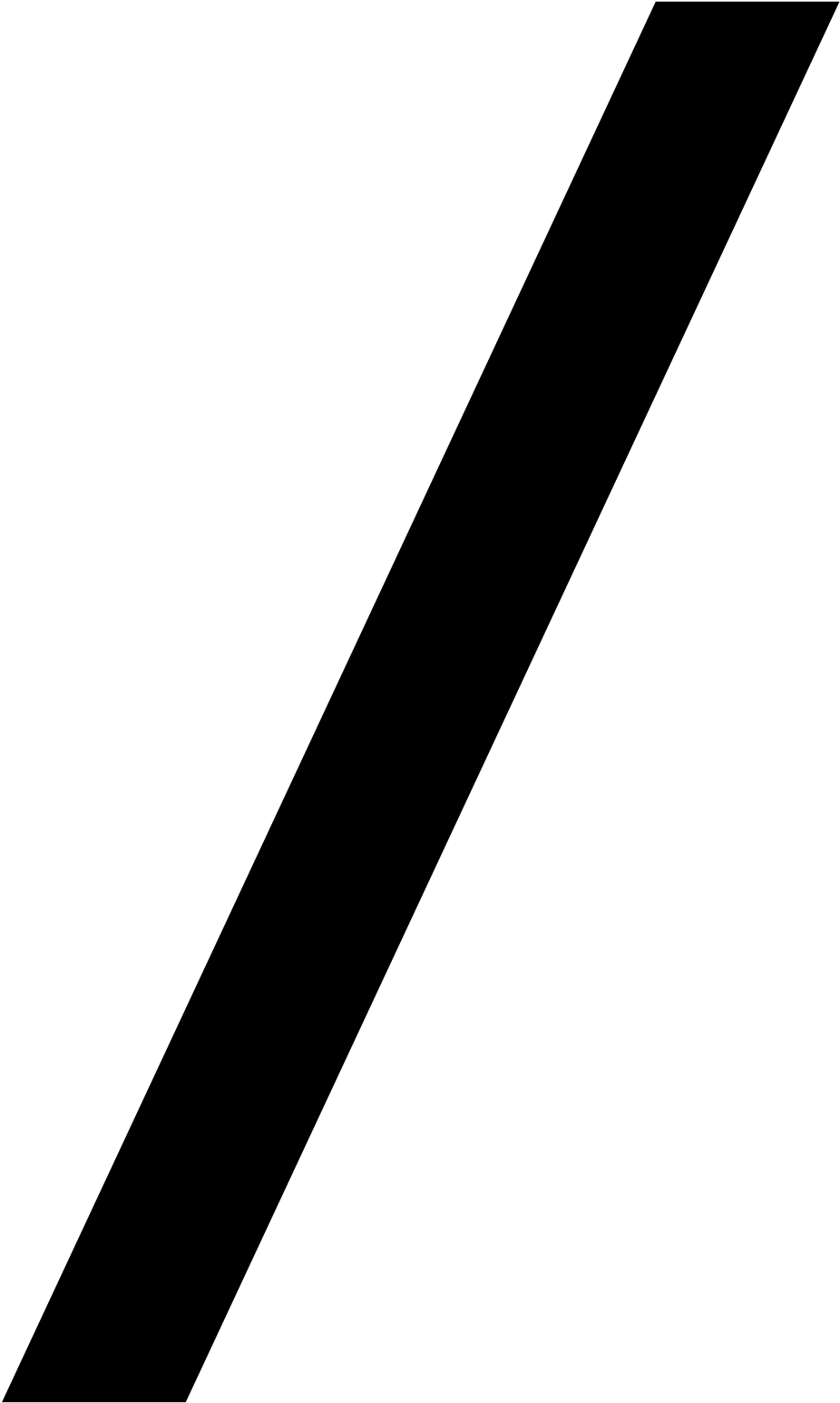




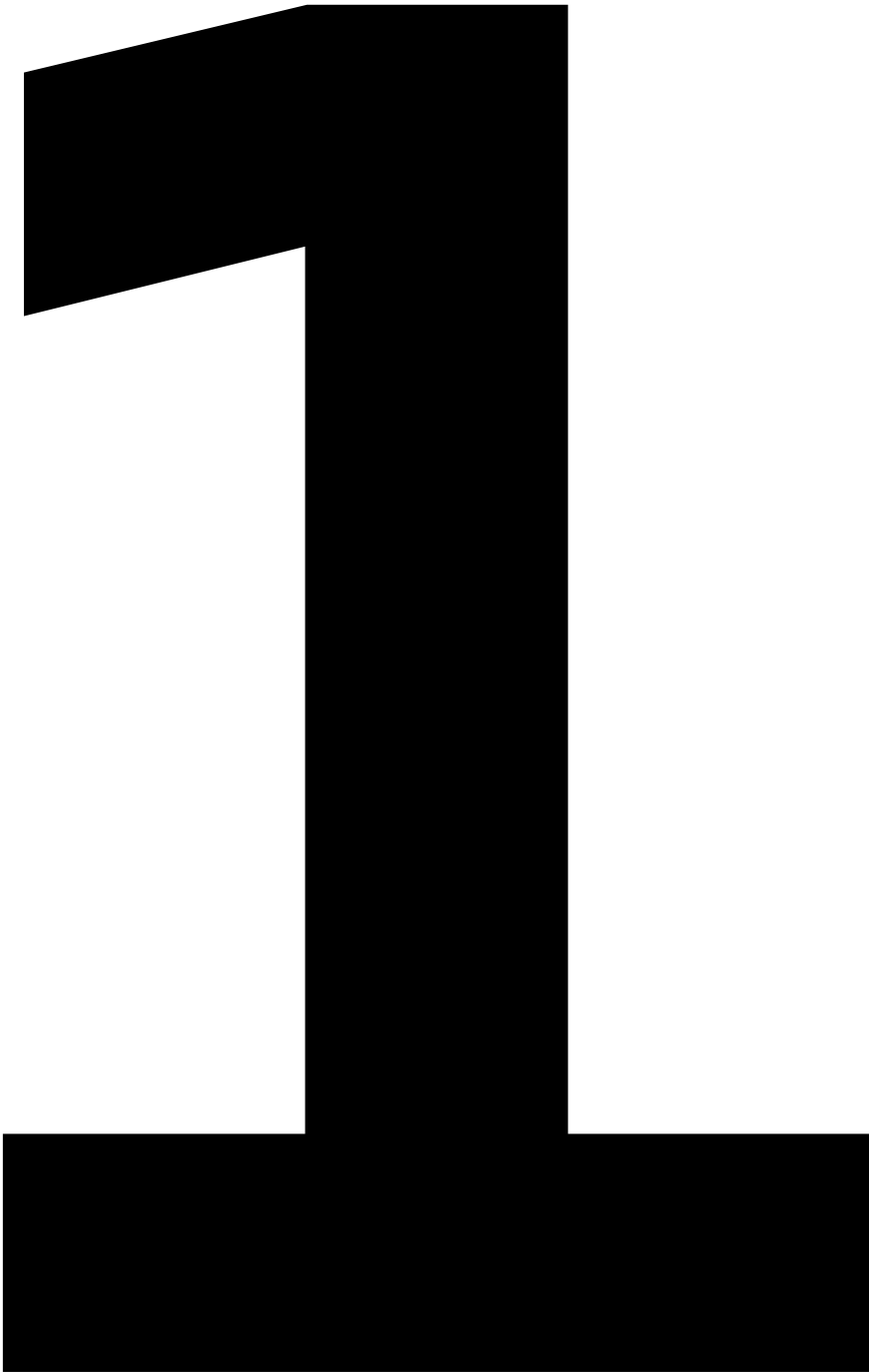










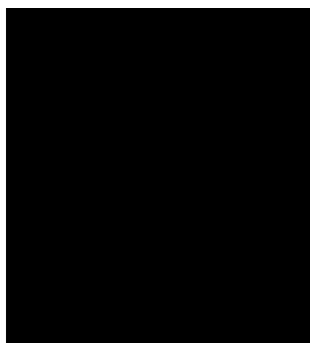






**3**











**u**





**J**



**J**













**sa**



**10**



**Q**



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**e**





**n**

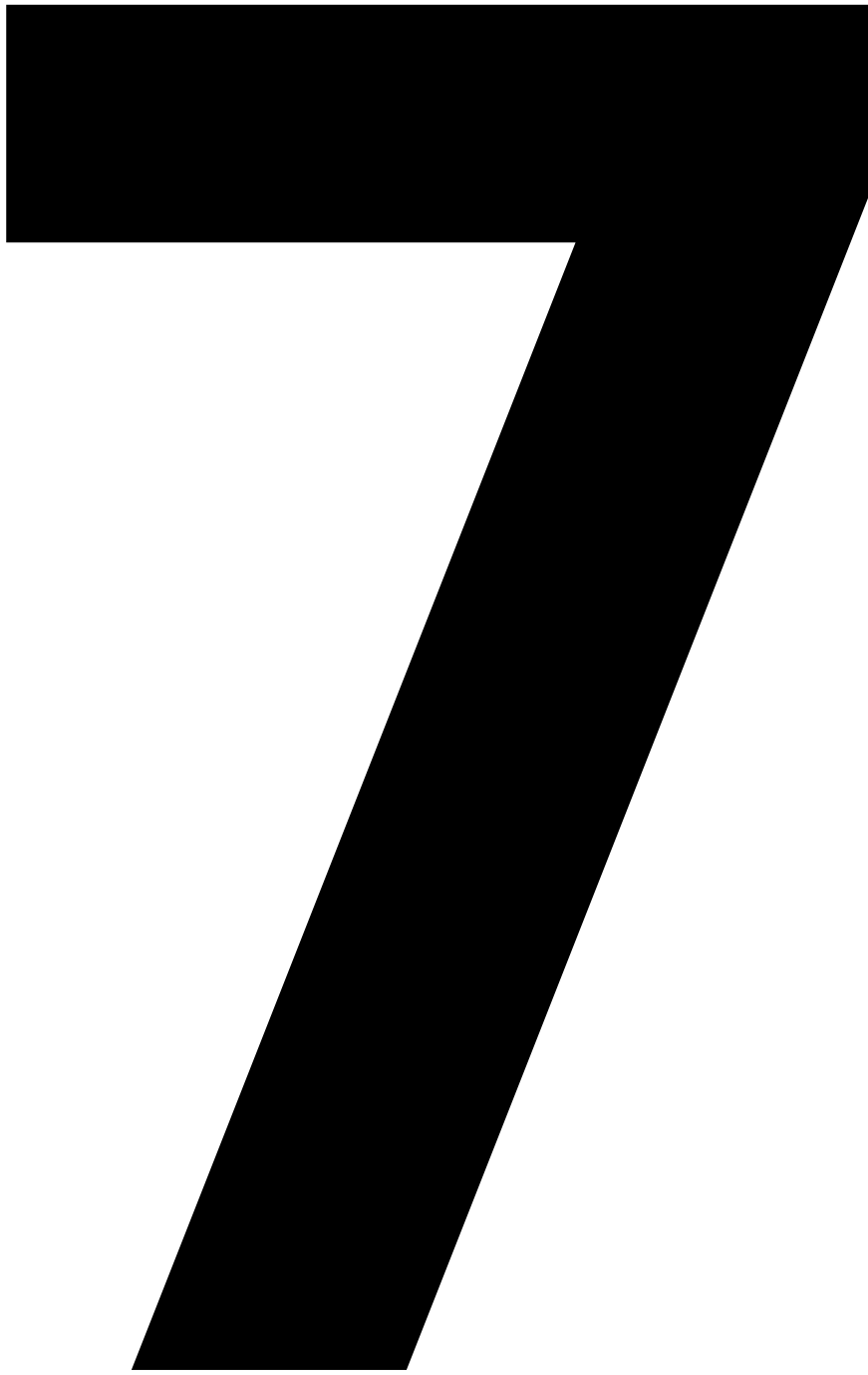


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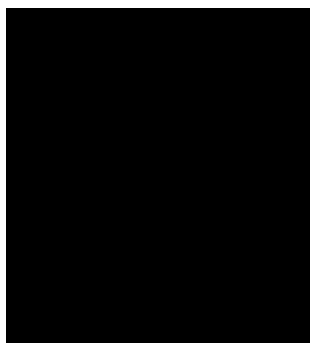
**m**







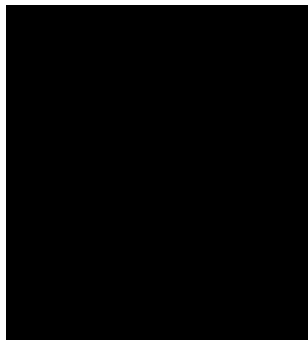






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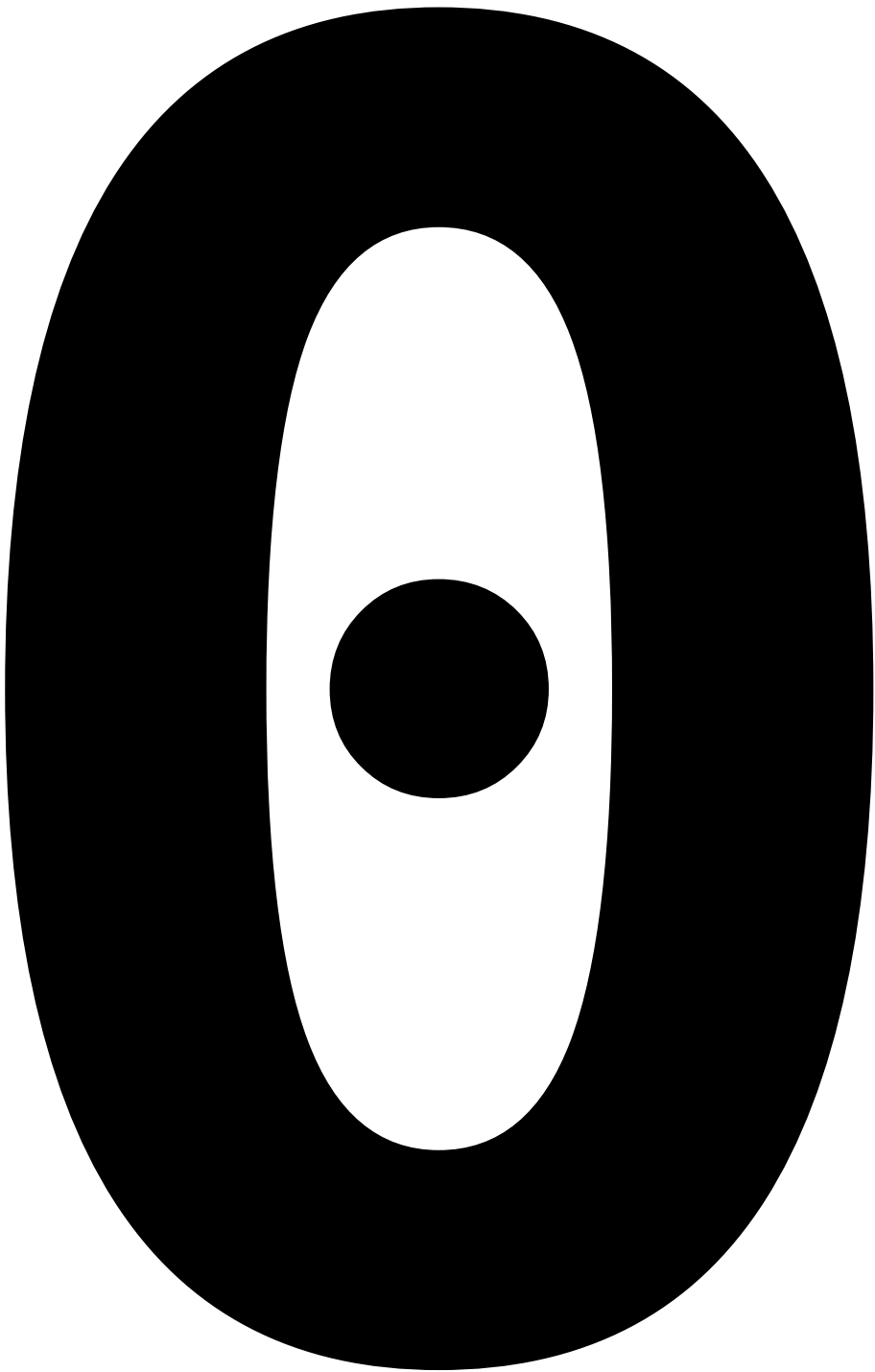




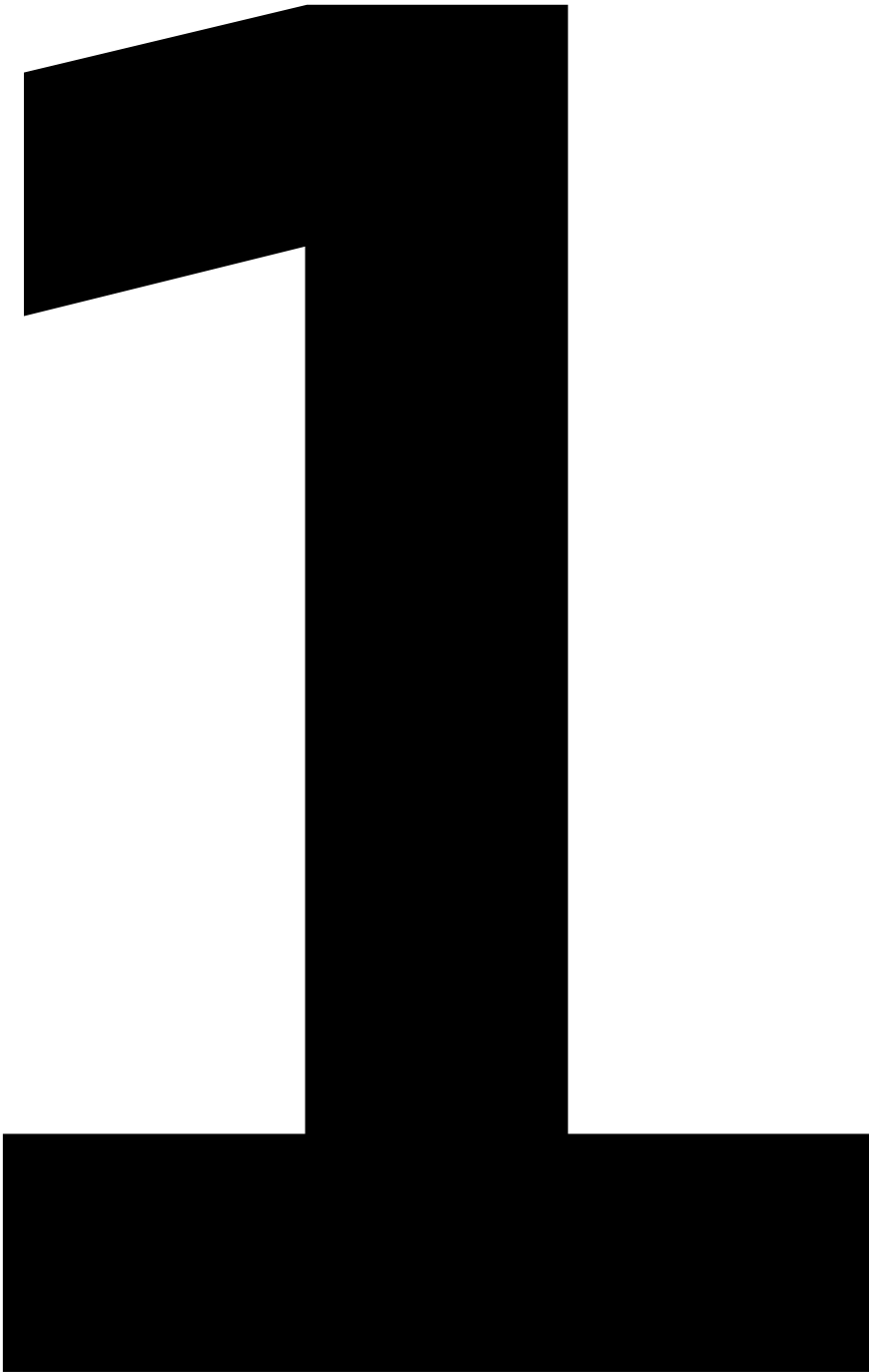
2













**3**





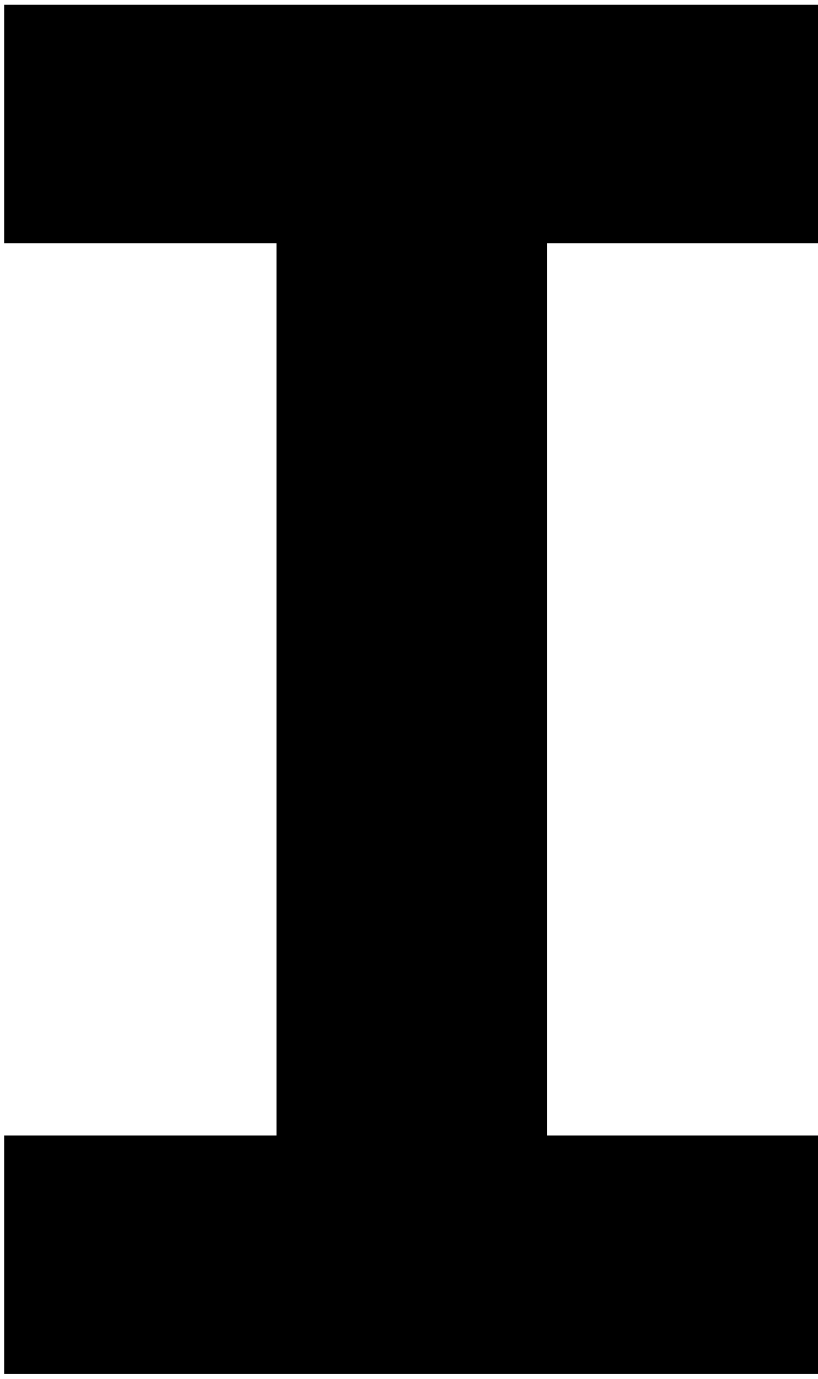






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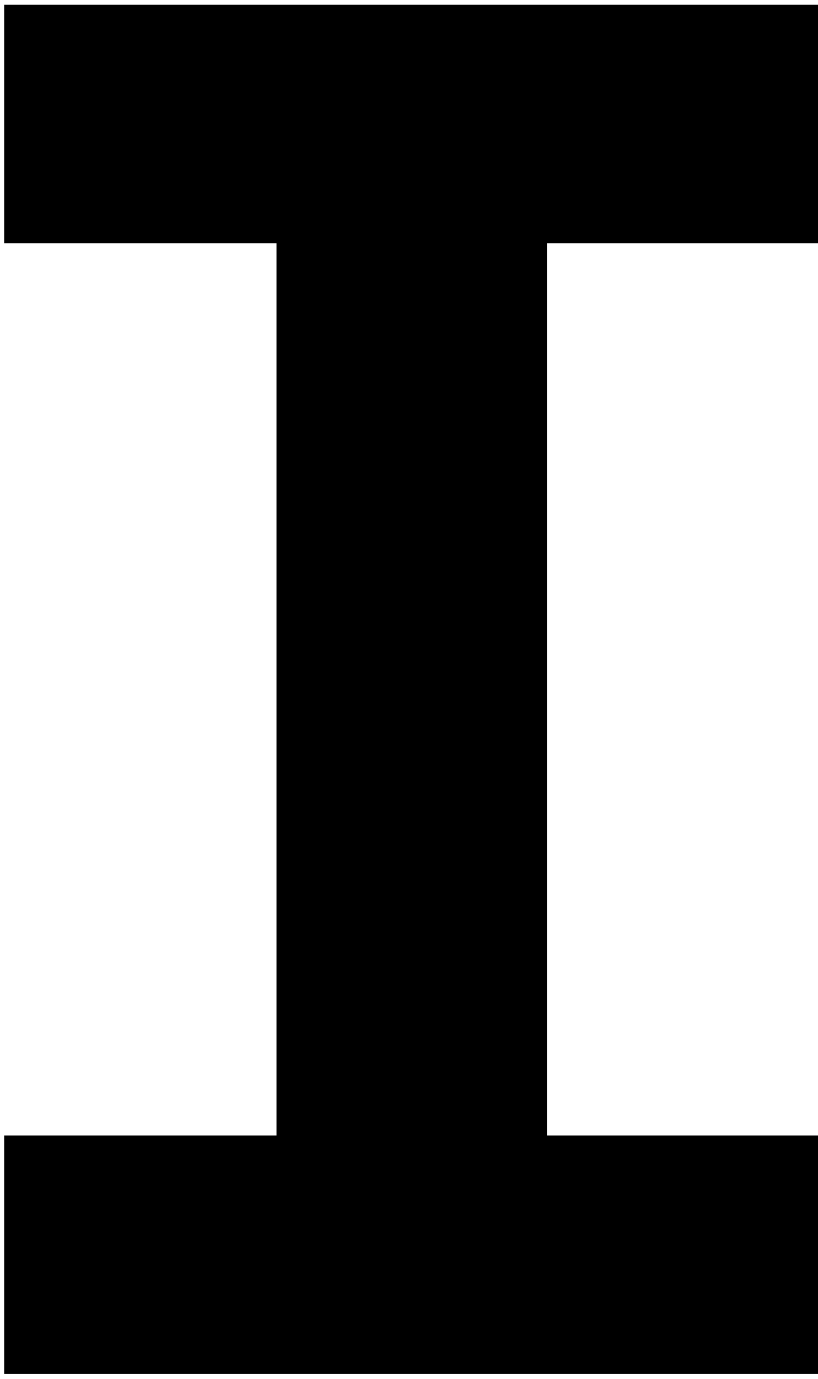






**K**













**h**







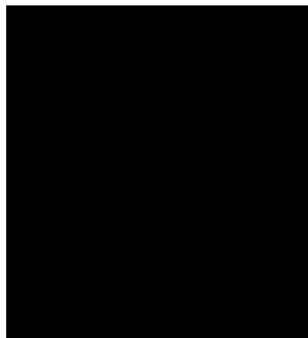
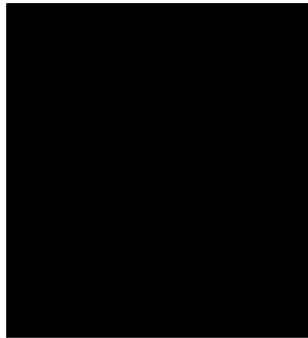




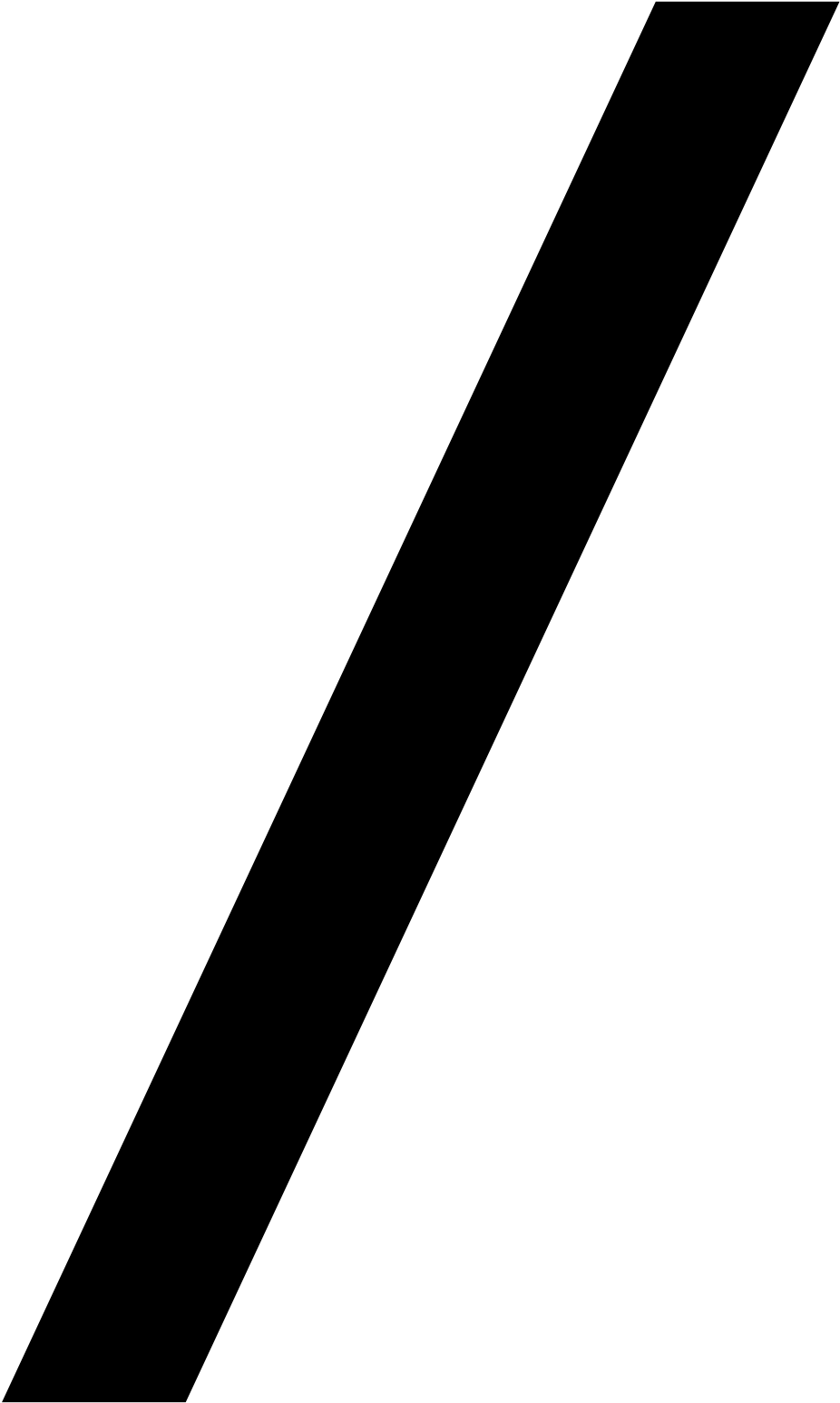


**o**

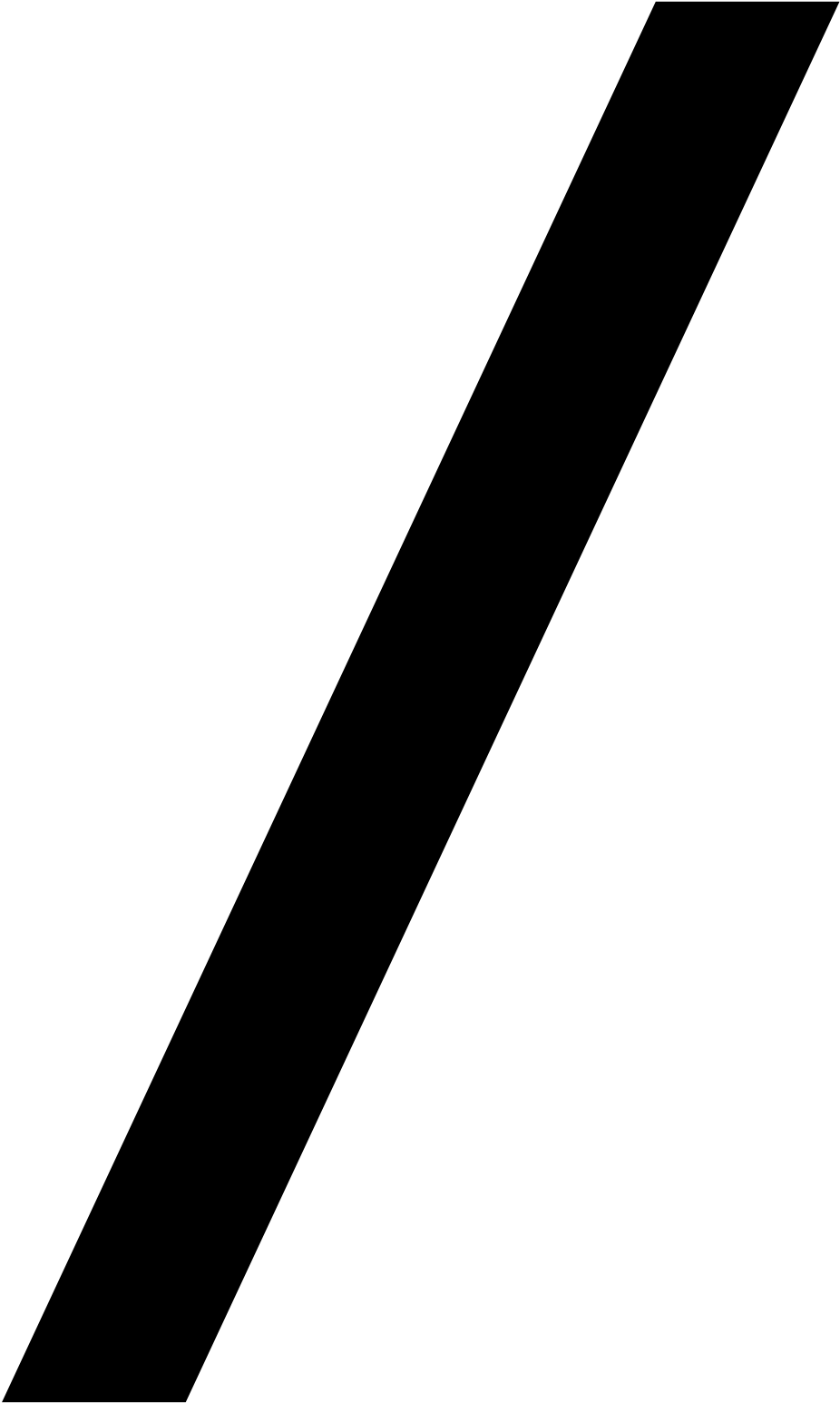














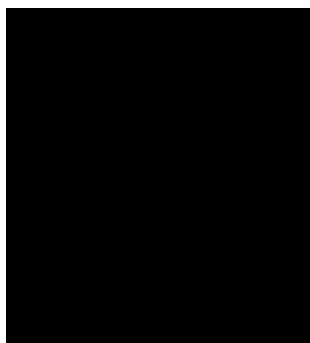


**Q**



**e**







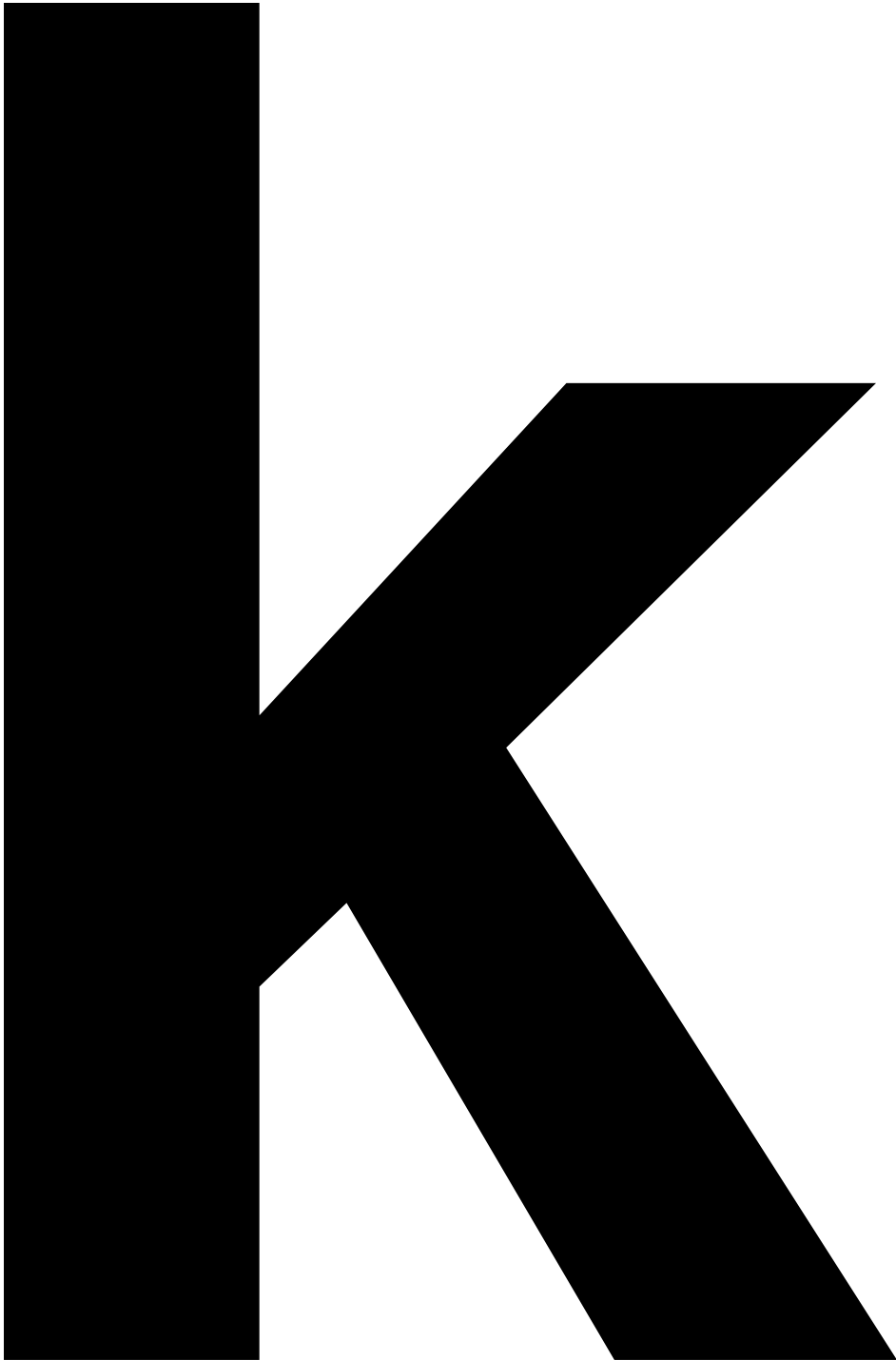
**w**



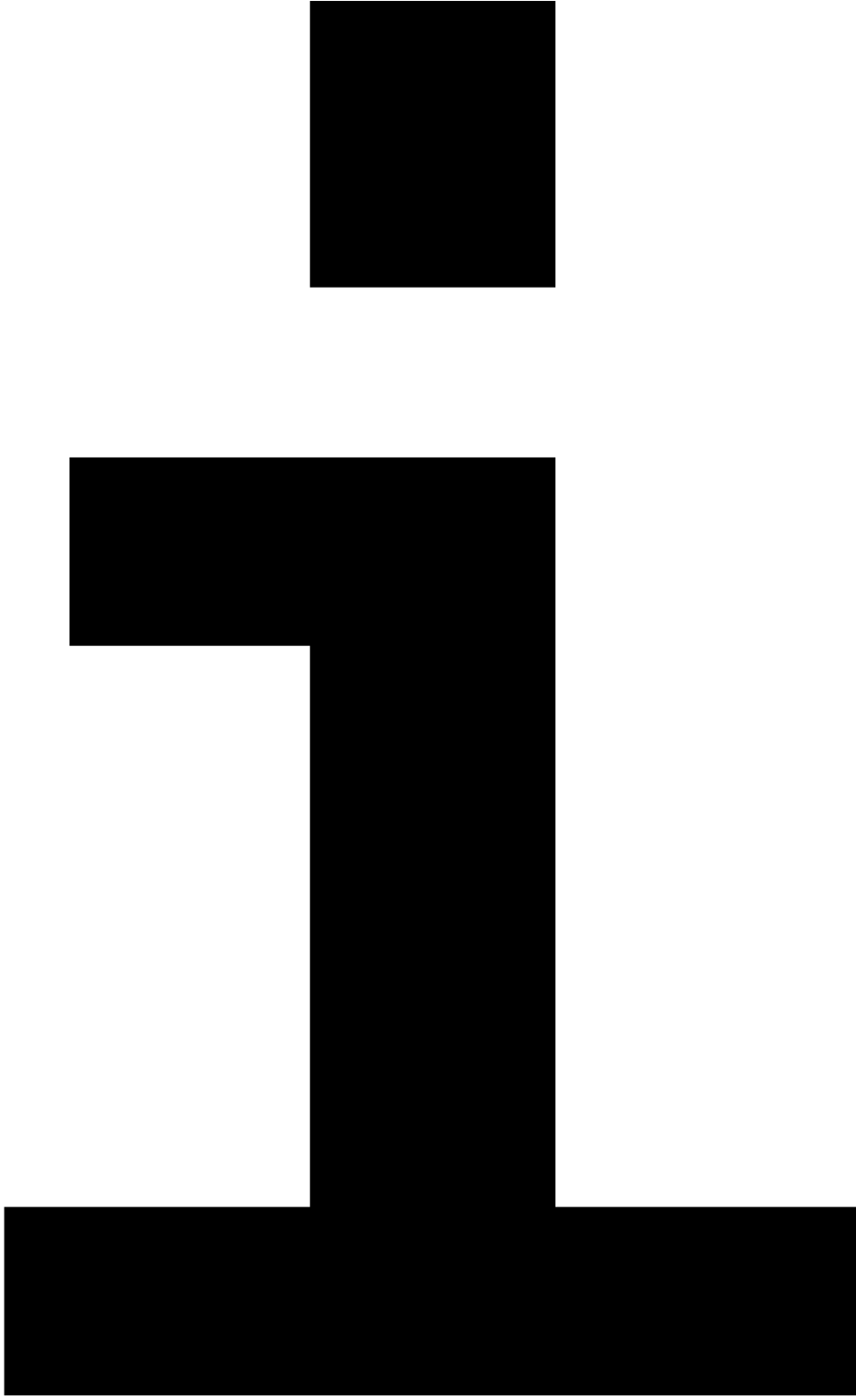














**o**





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**Q**



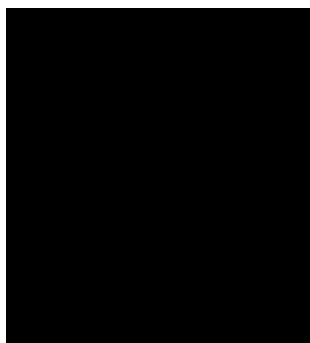




**sa**













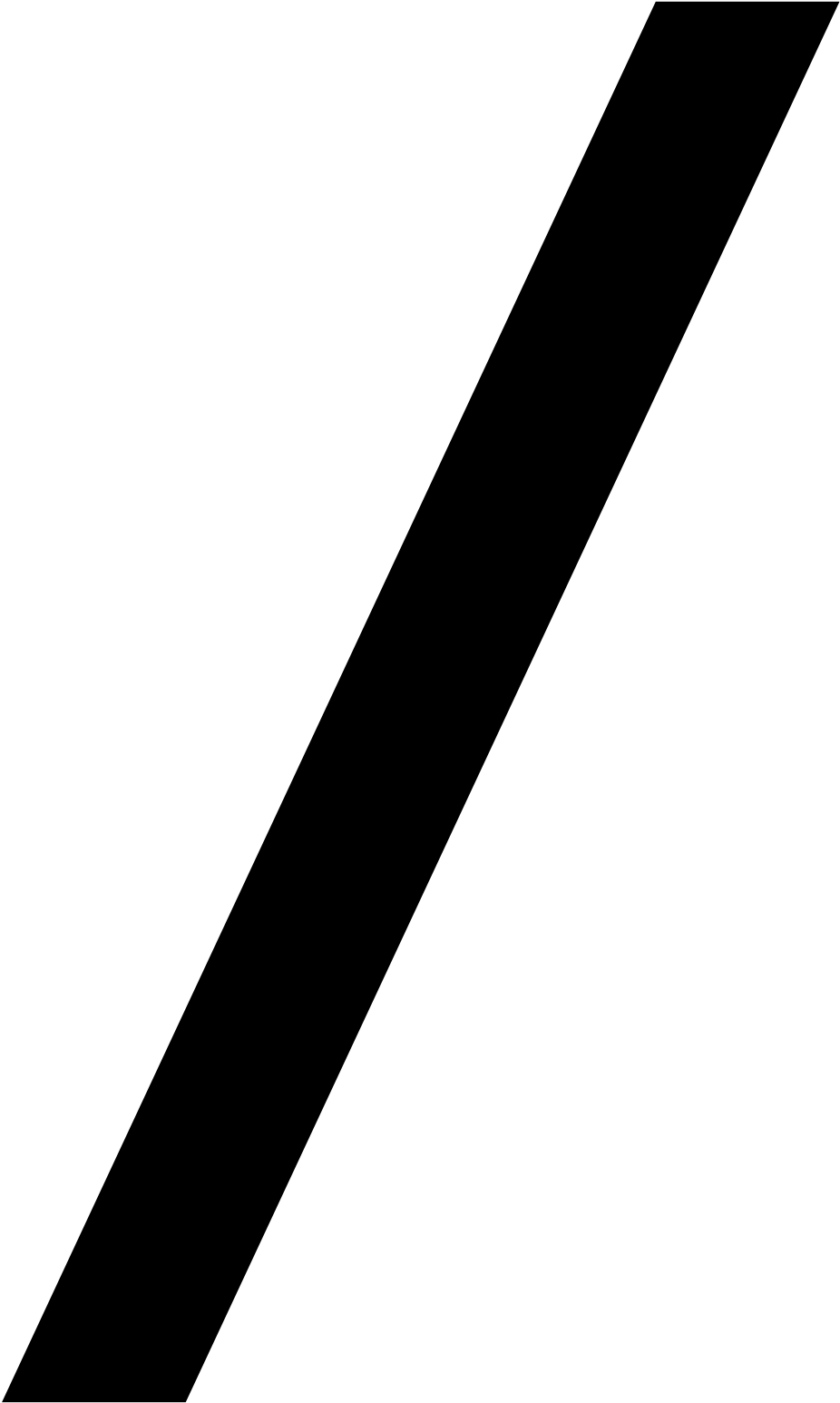




**Q**









**w**







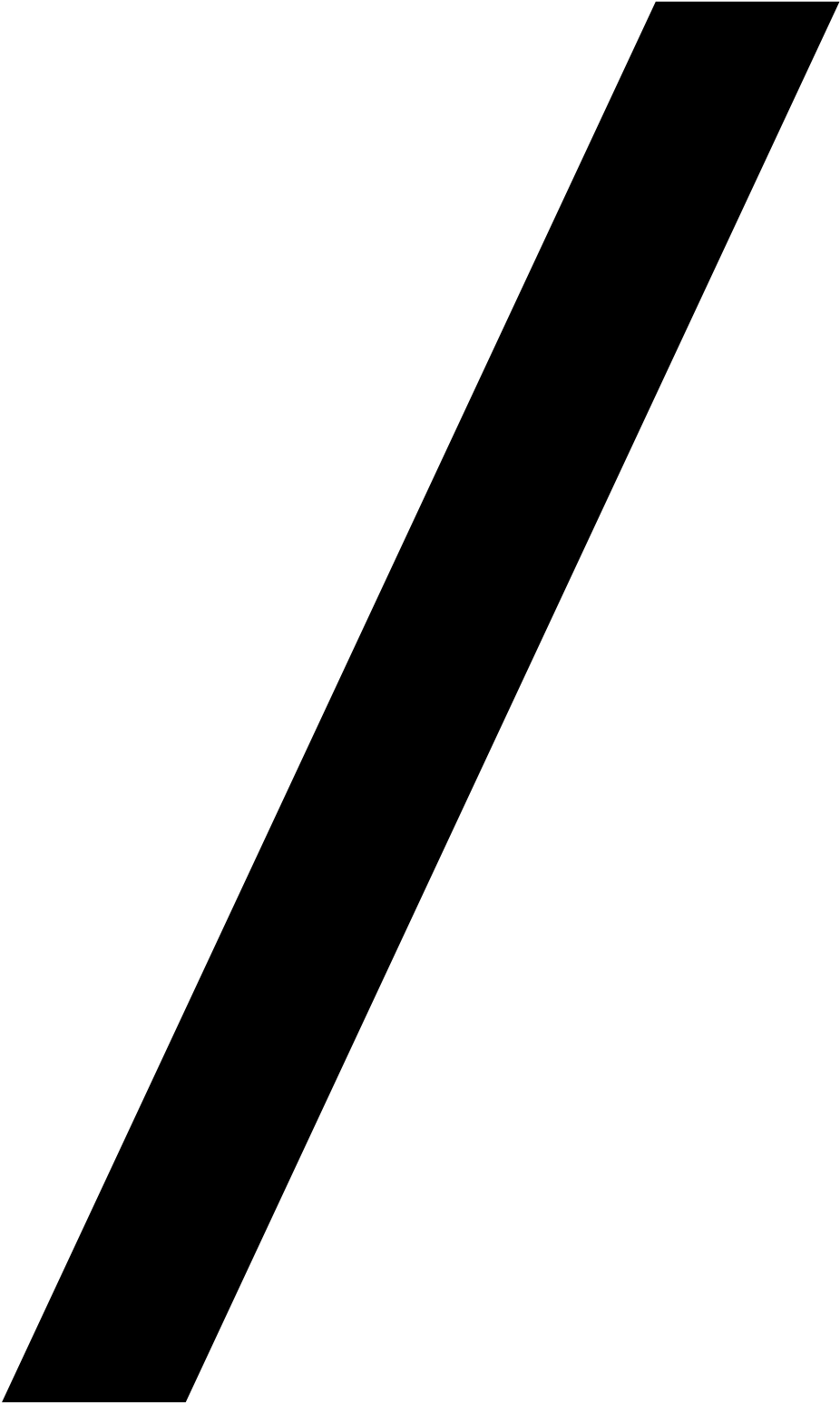














**K**









**h**

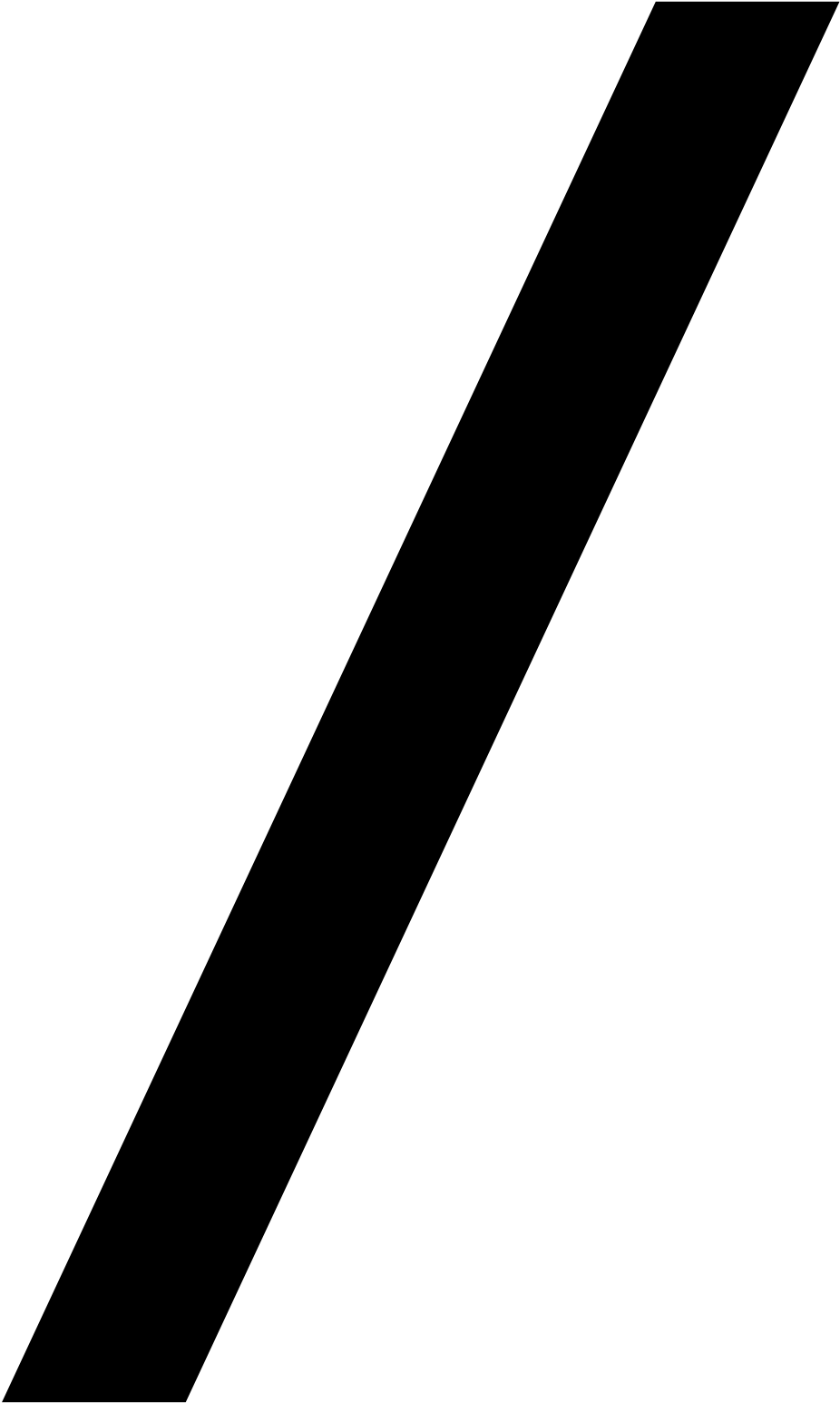


**J**



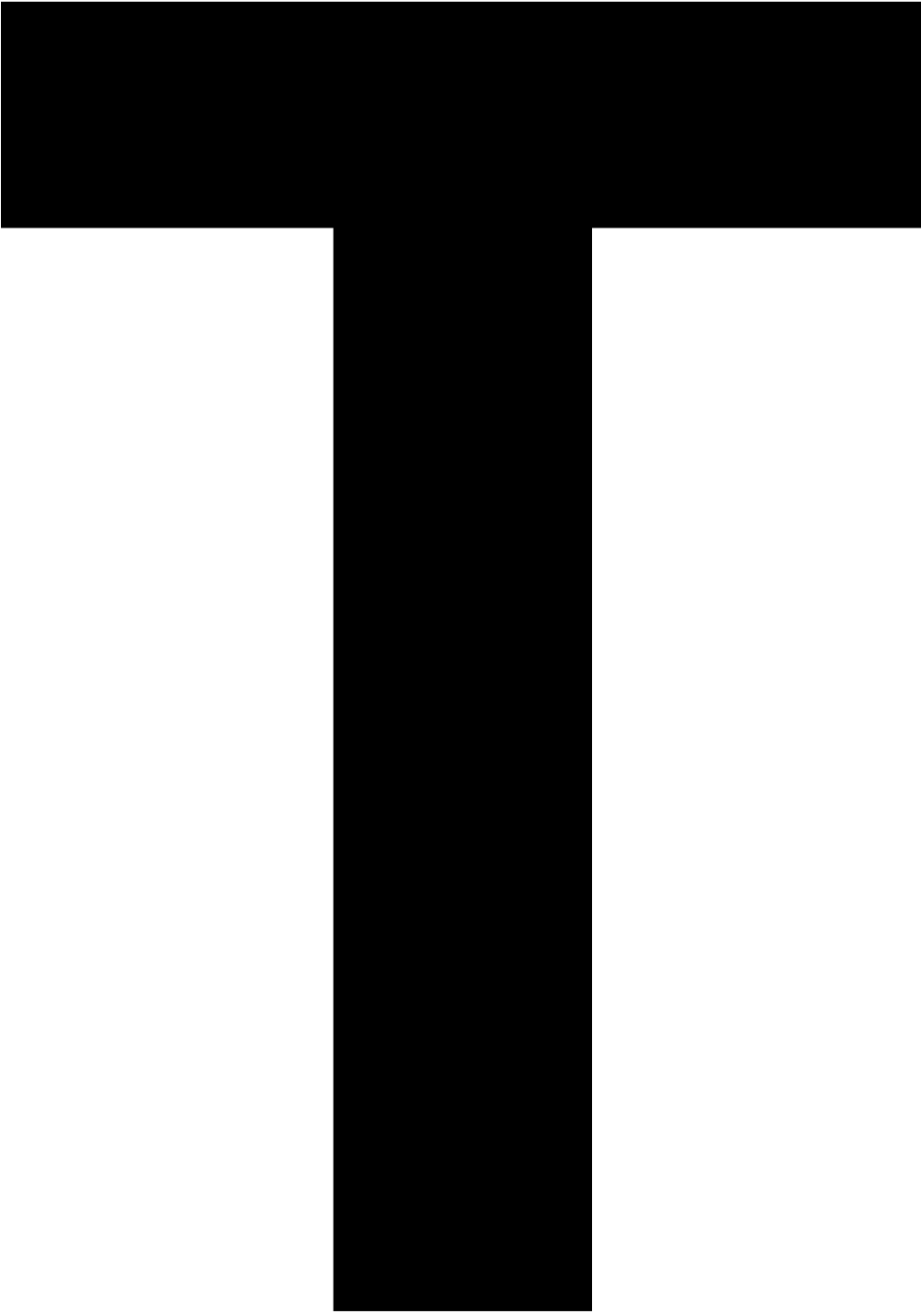
**e**













**sa**



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**J**



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**G**







**sa**



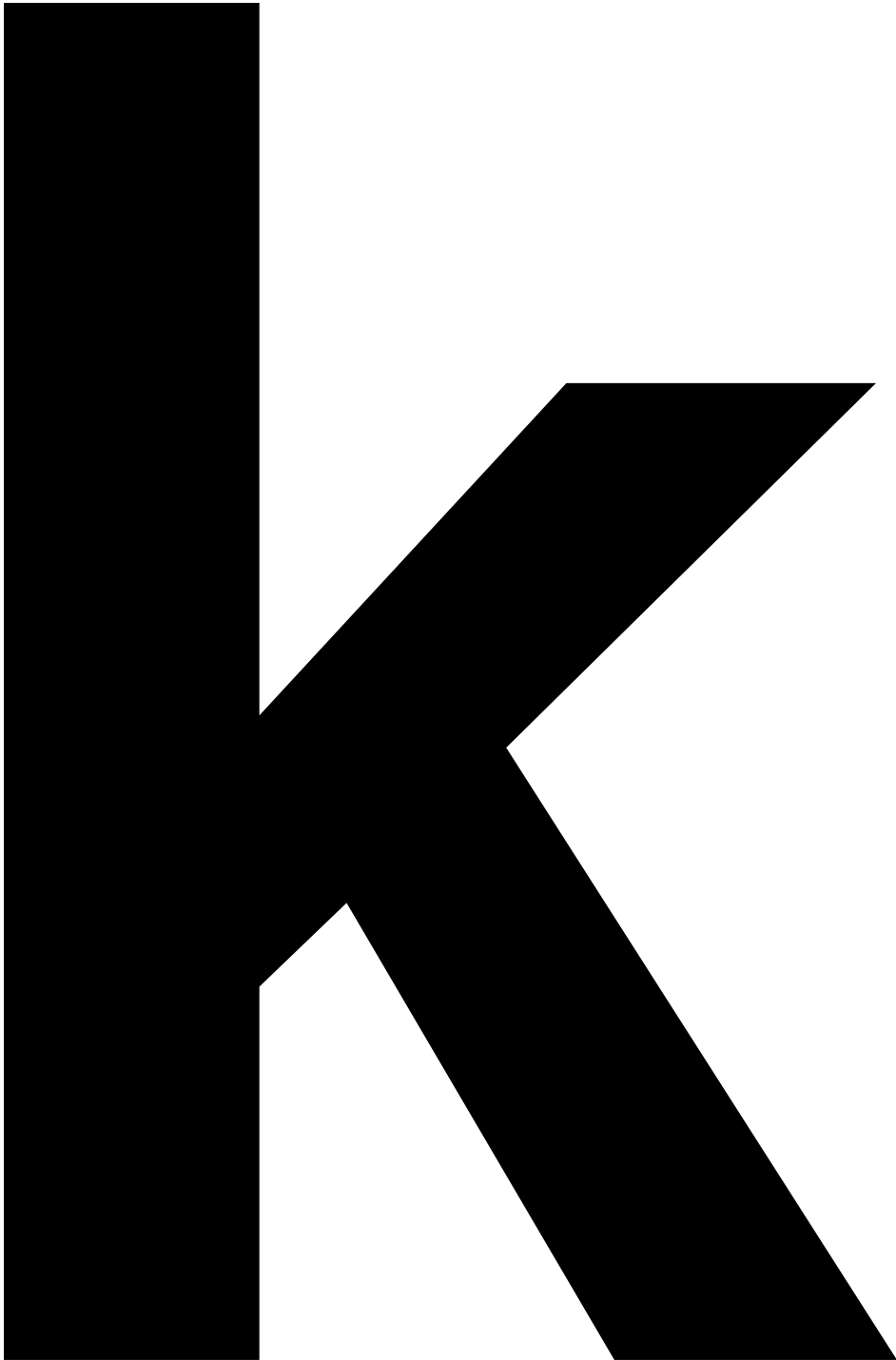














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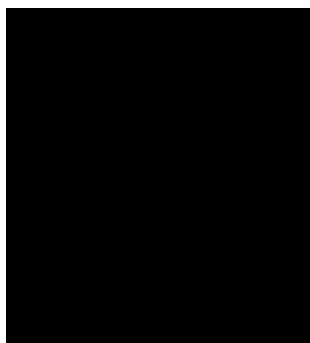


**m**

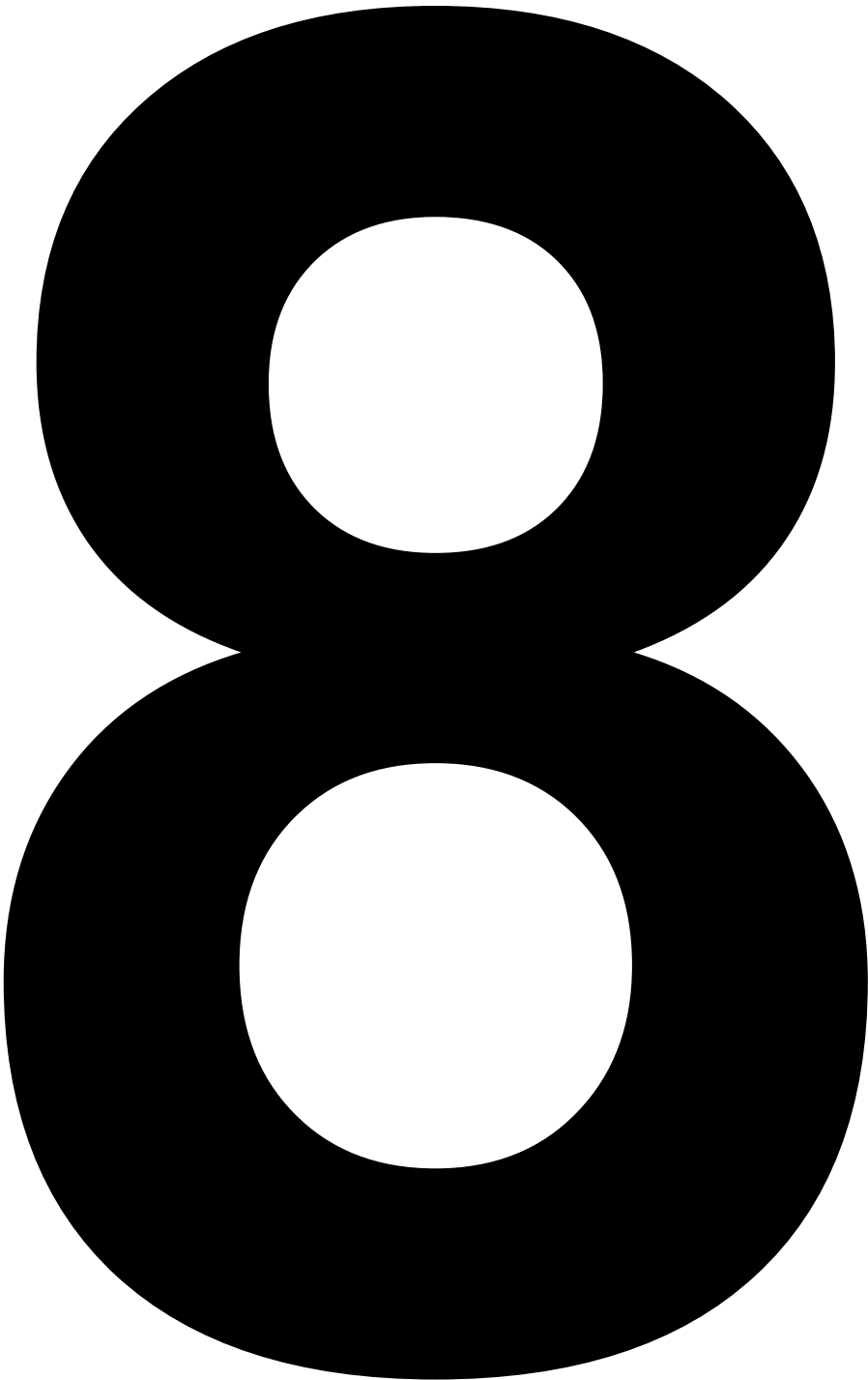


9



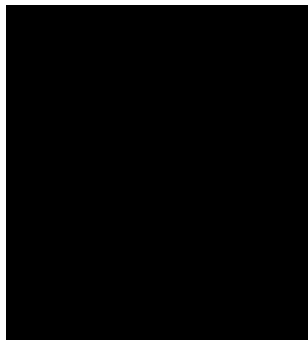








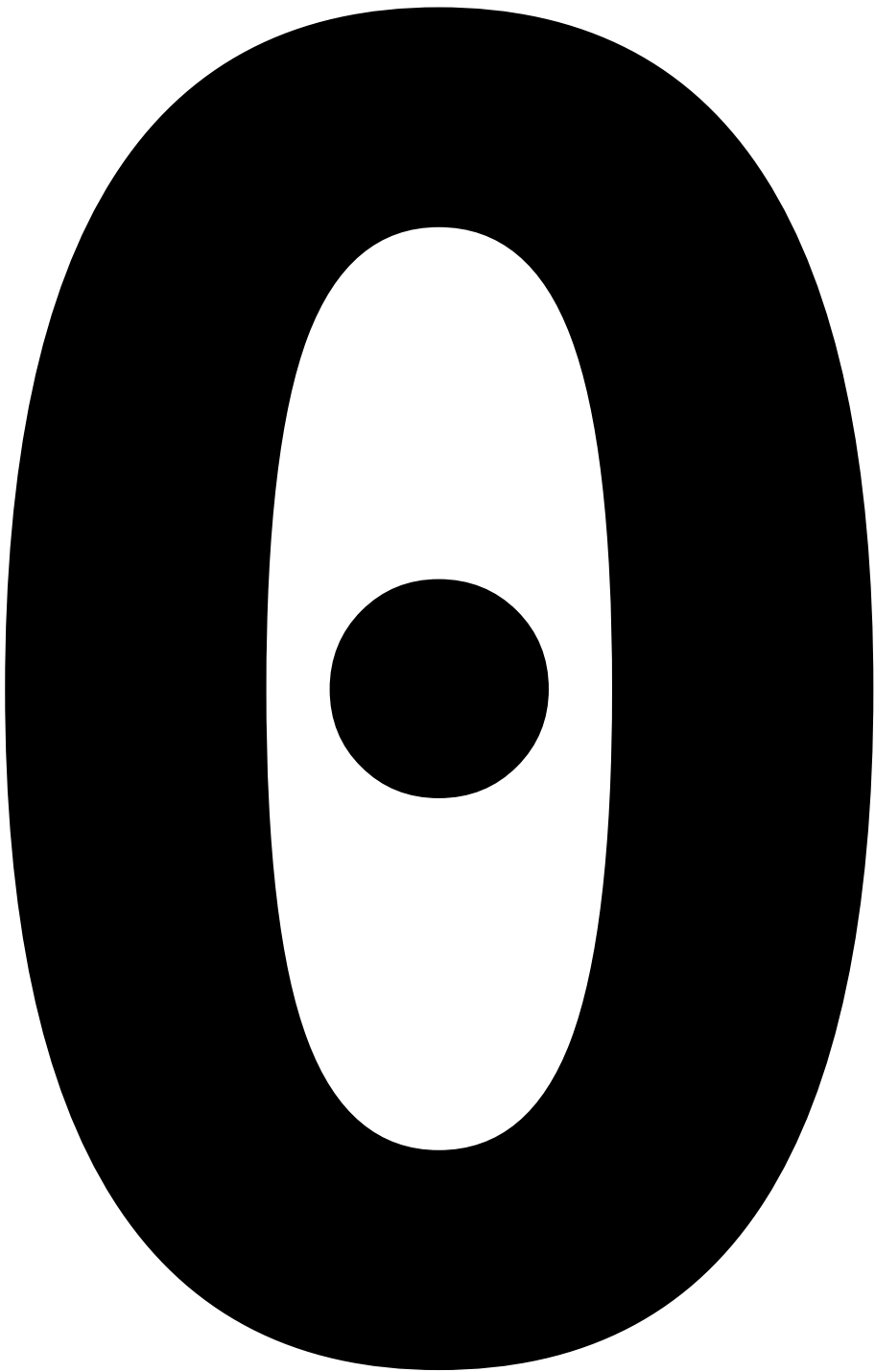




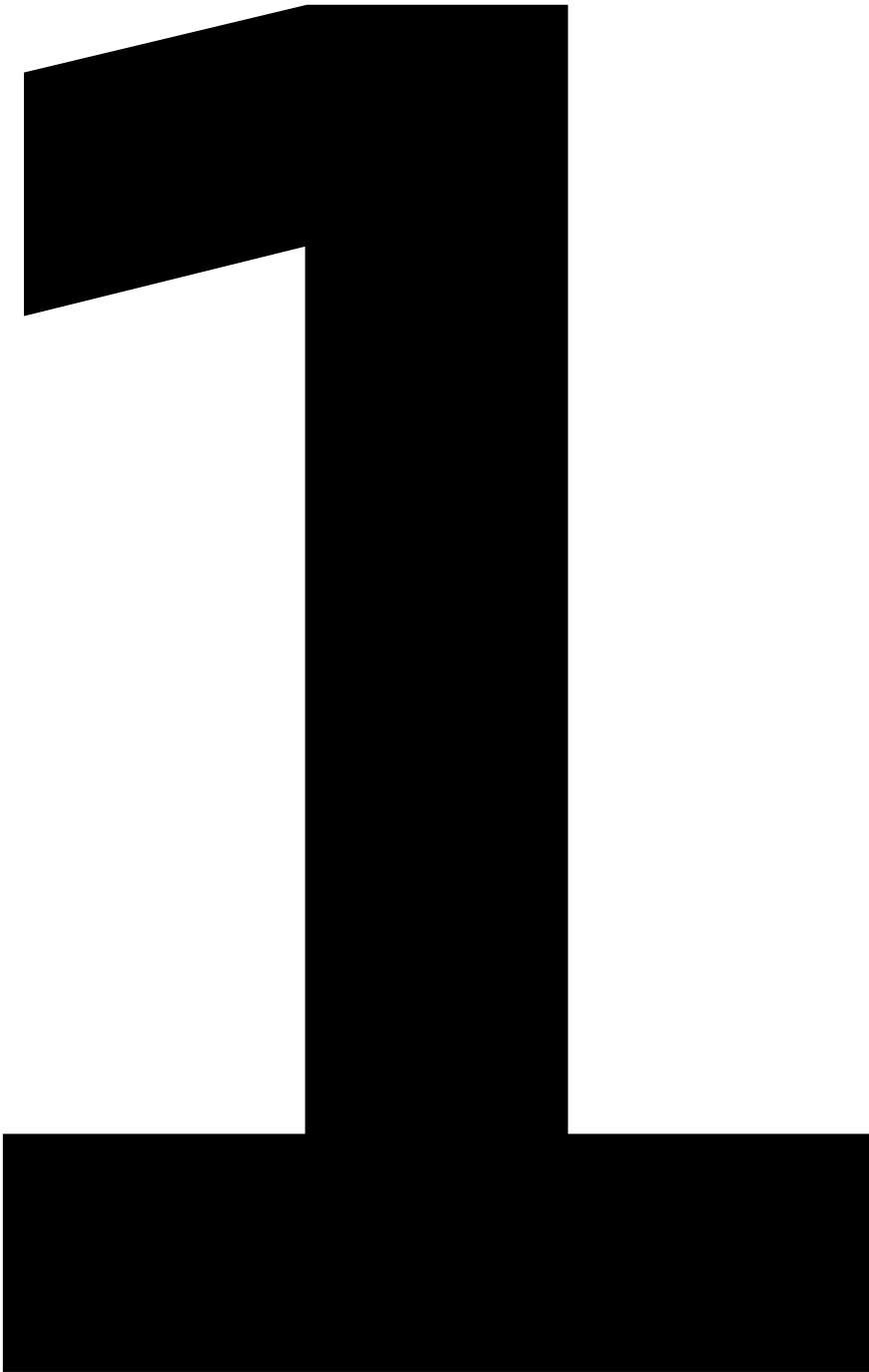


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**3**





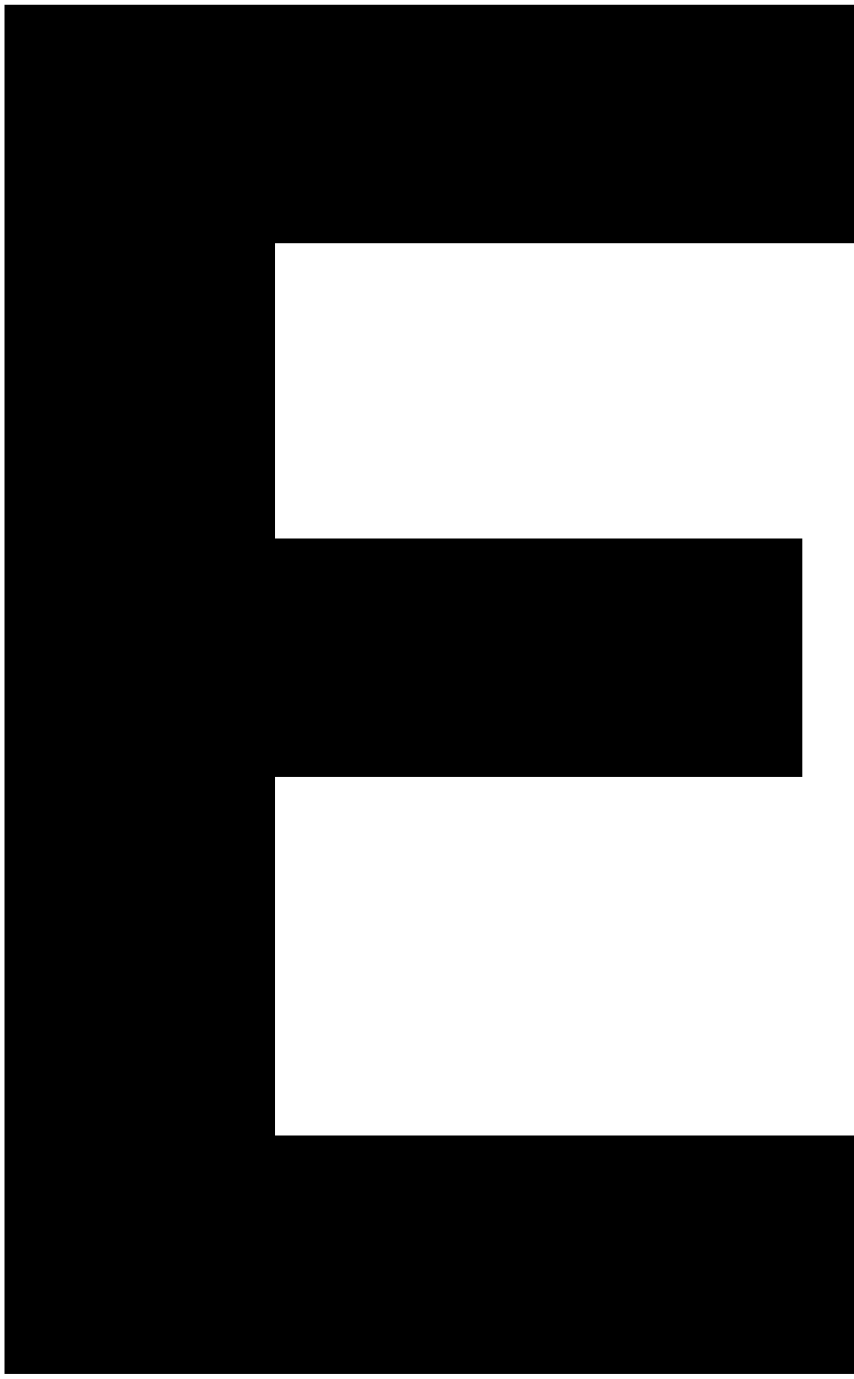




























**h**







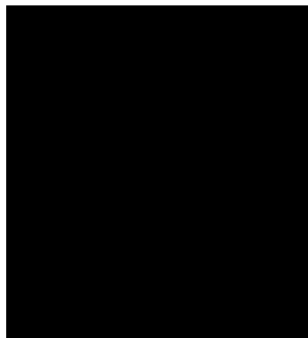
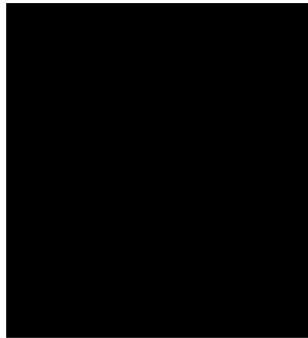




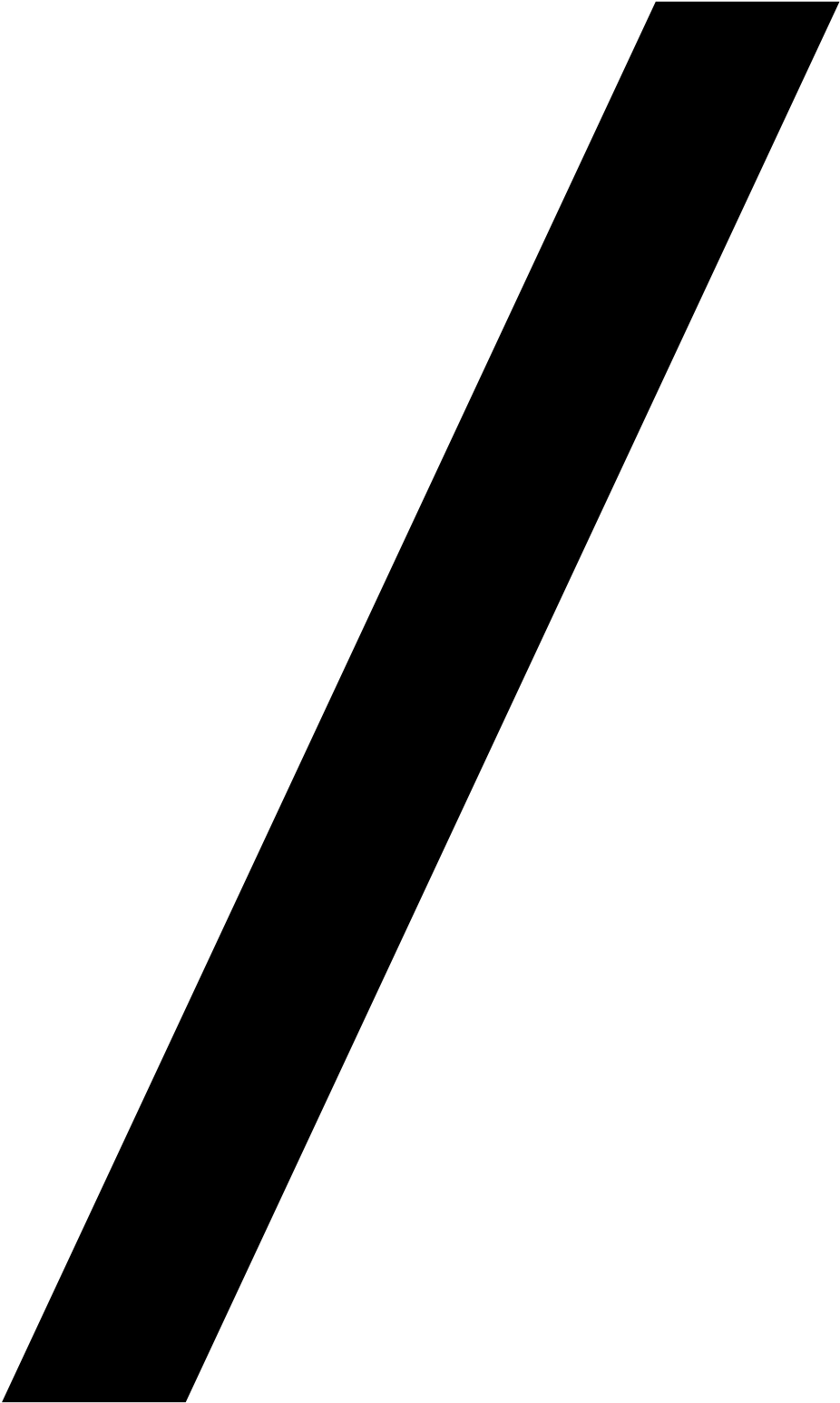
**o**



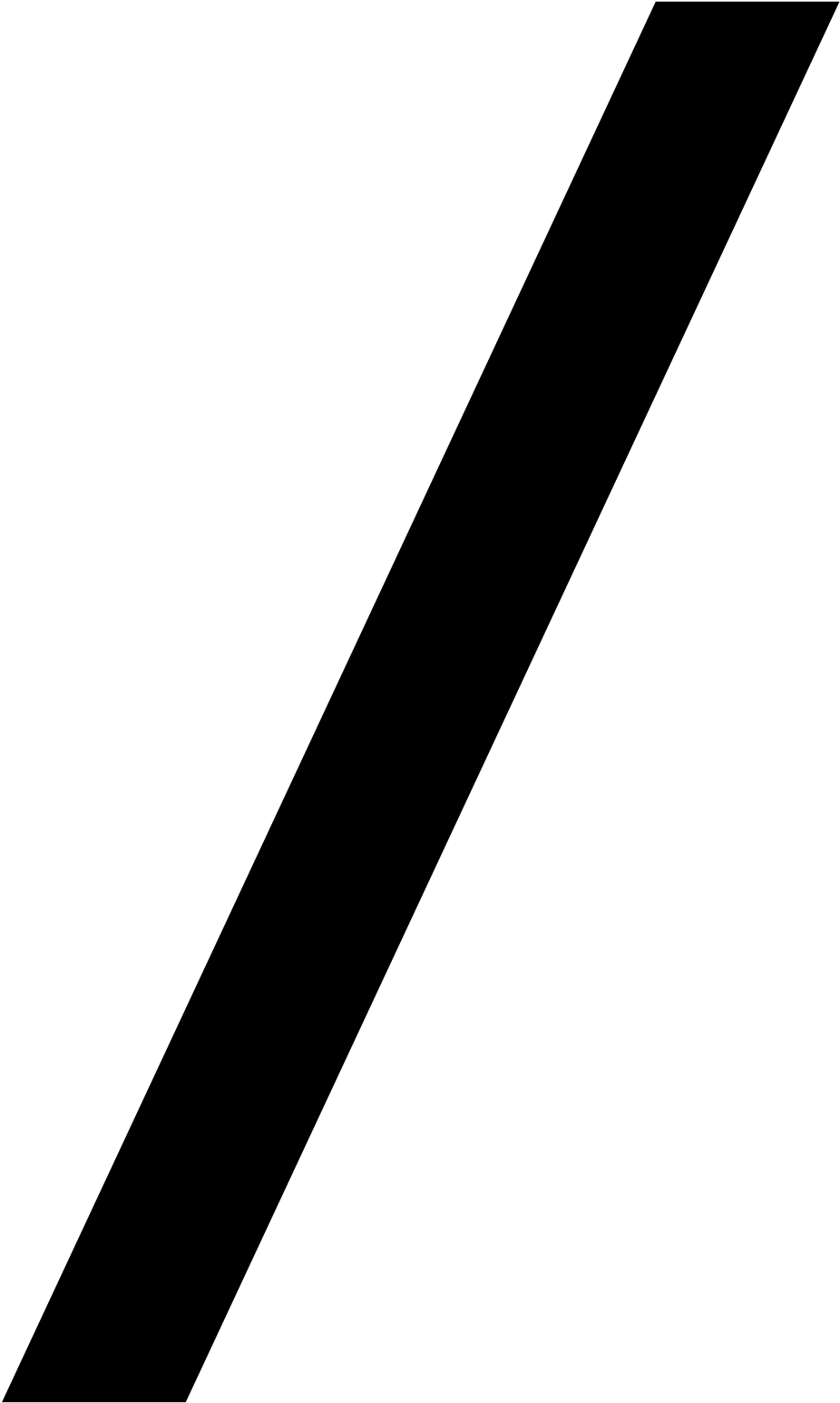














**w**



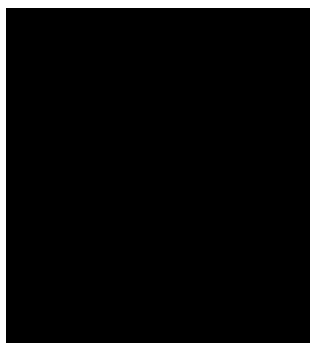


**w**



**w**







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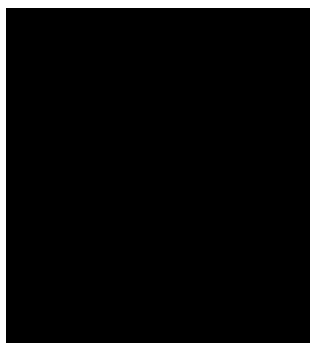


**e**



**J**







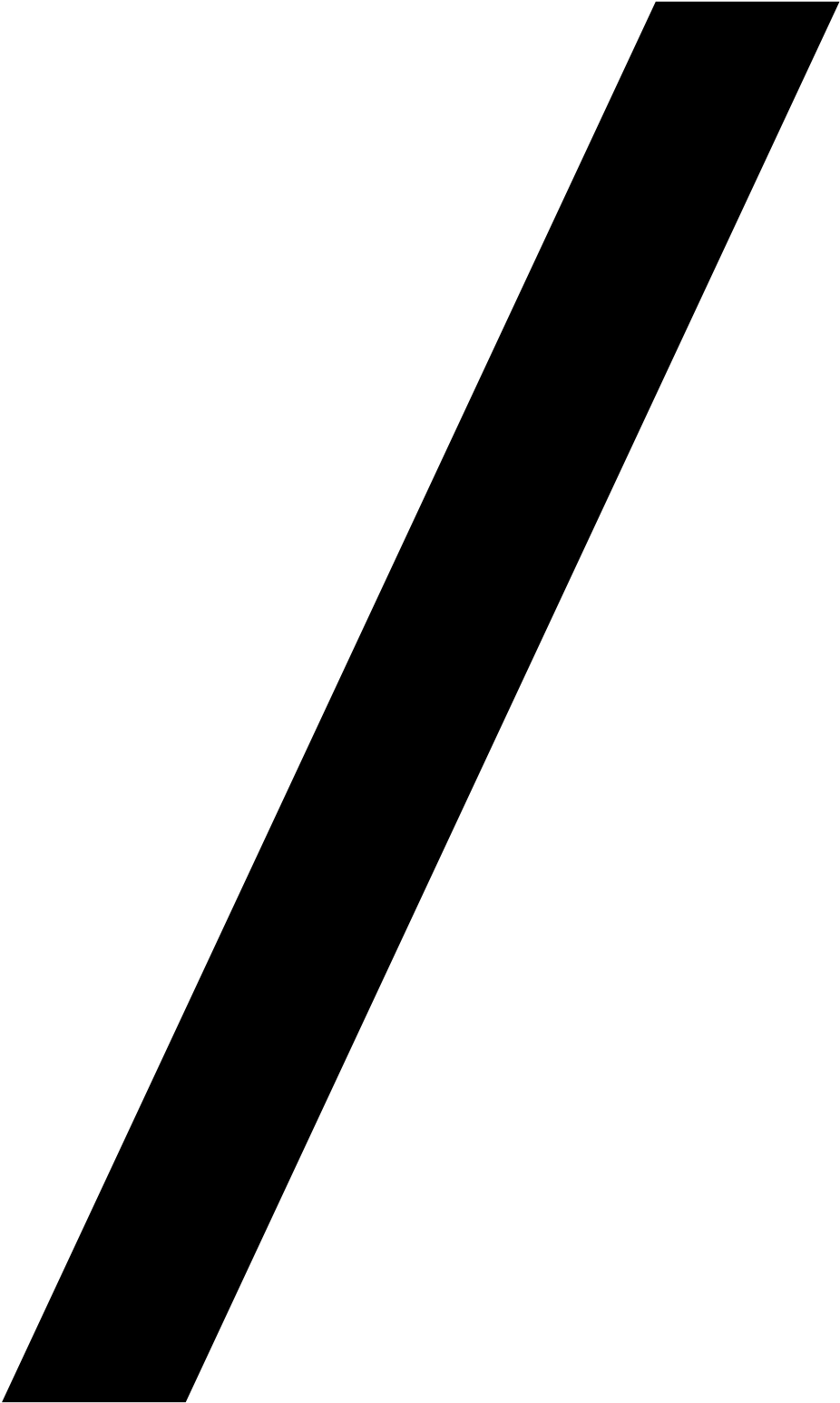
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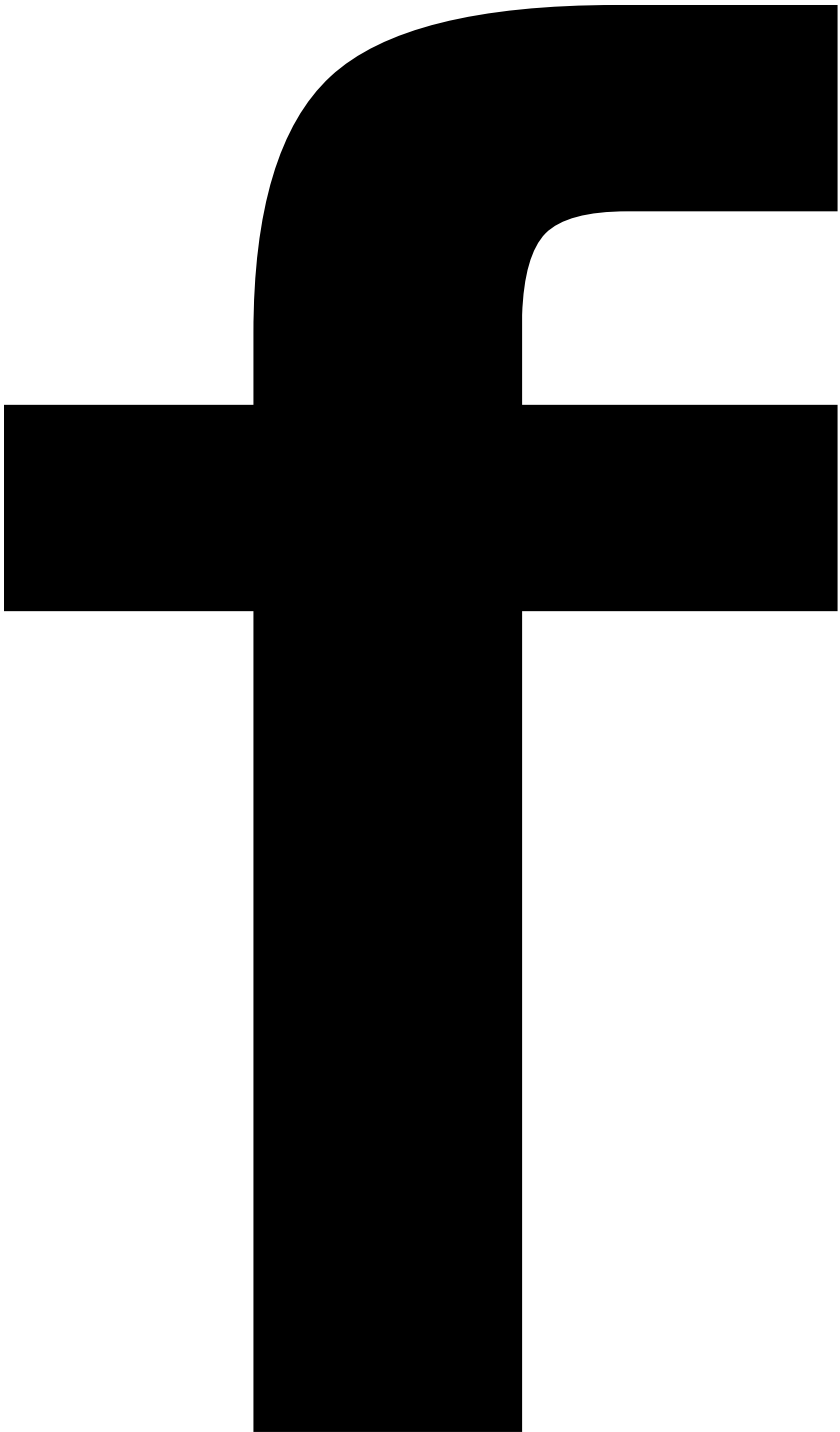
**h**



**sa**



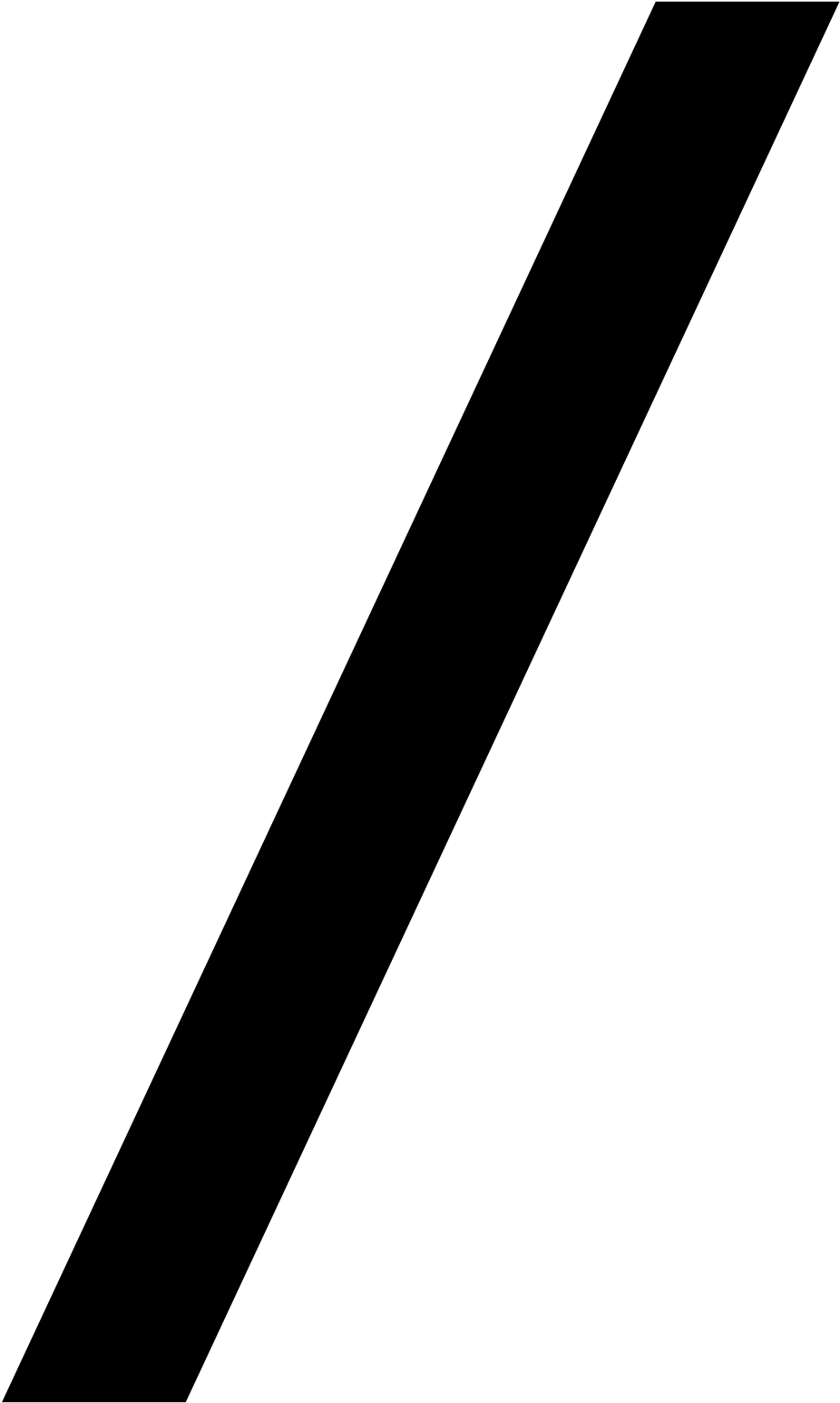














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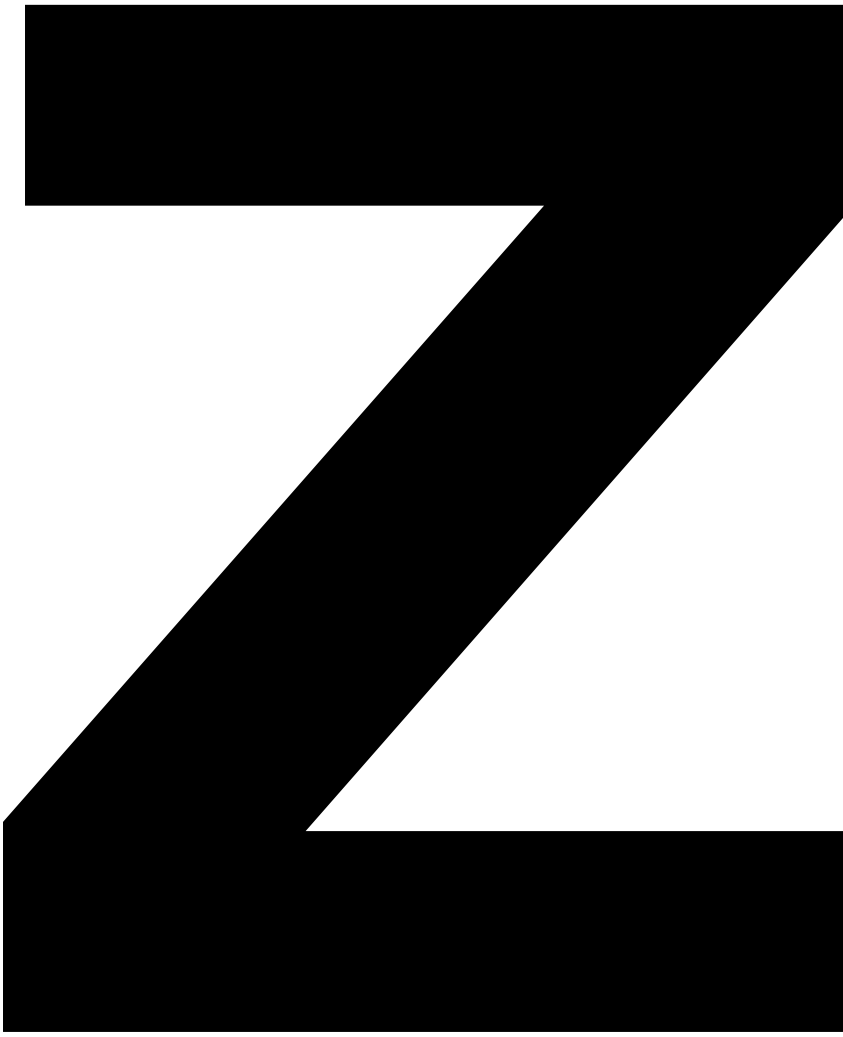


**Q**











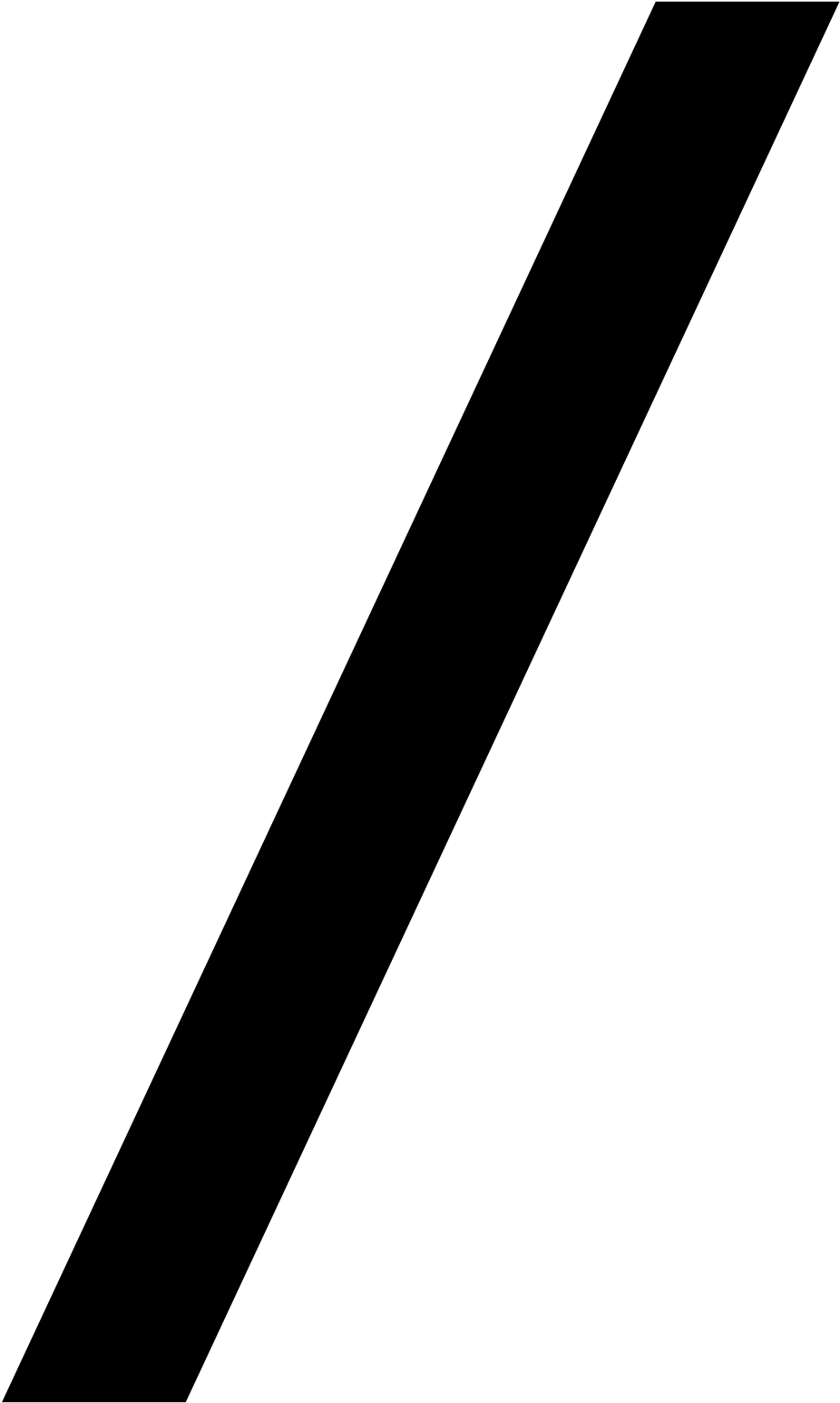






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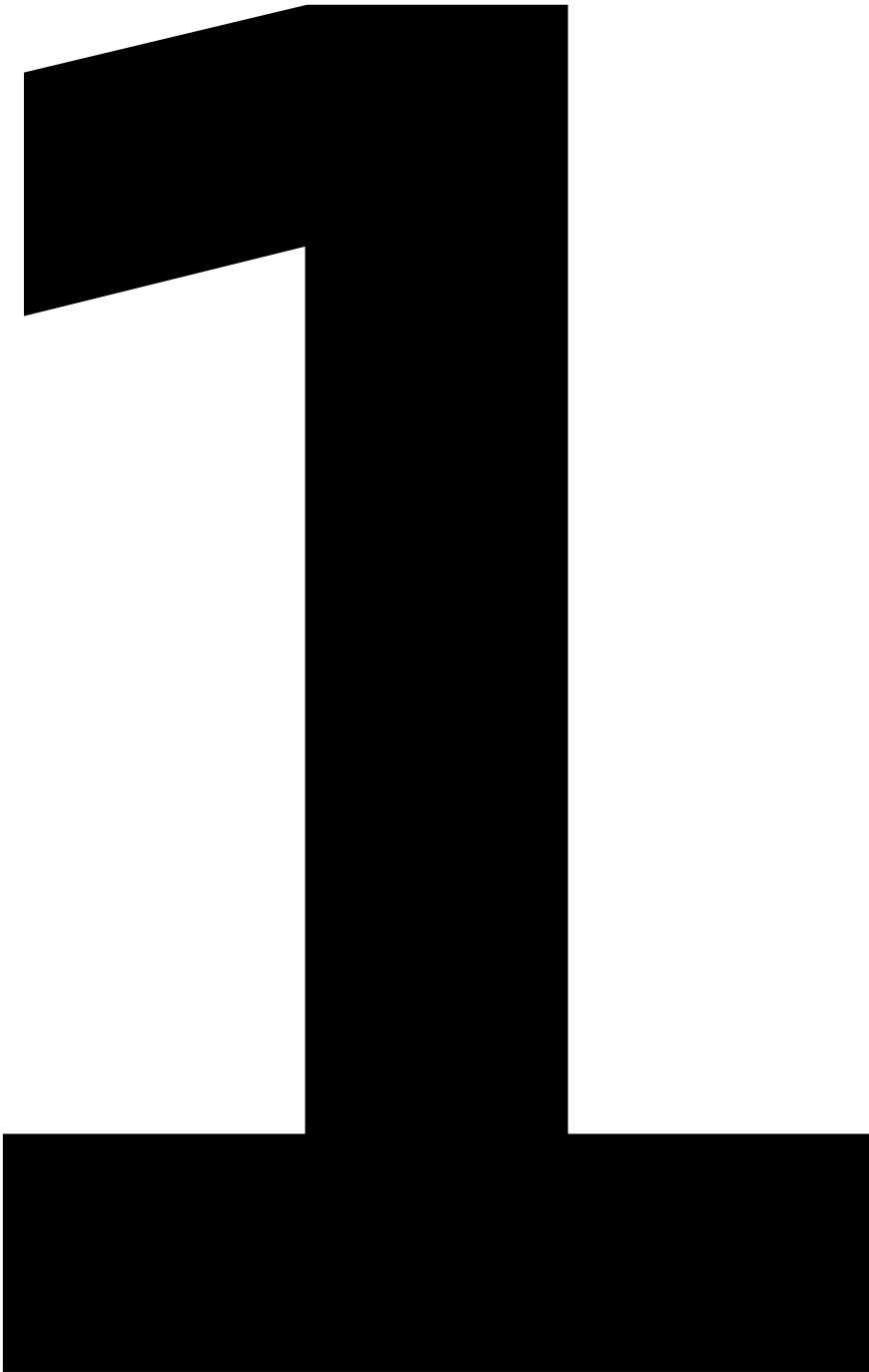






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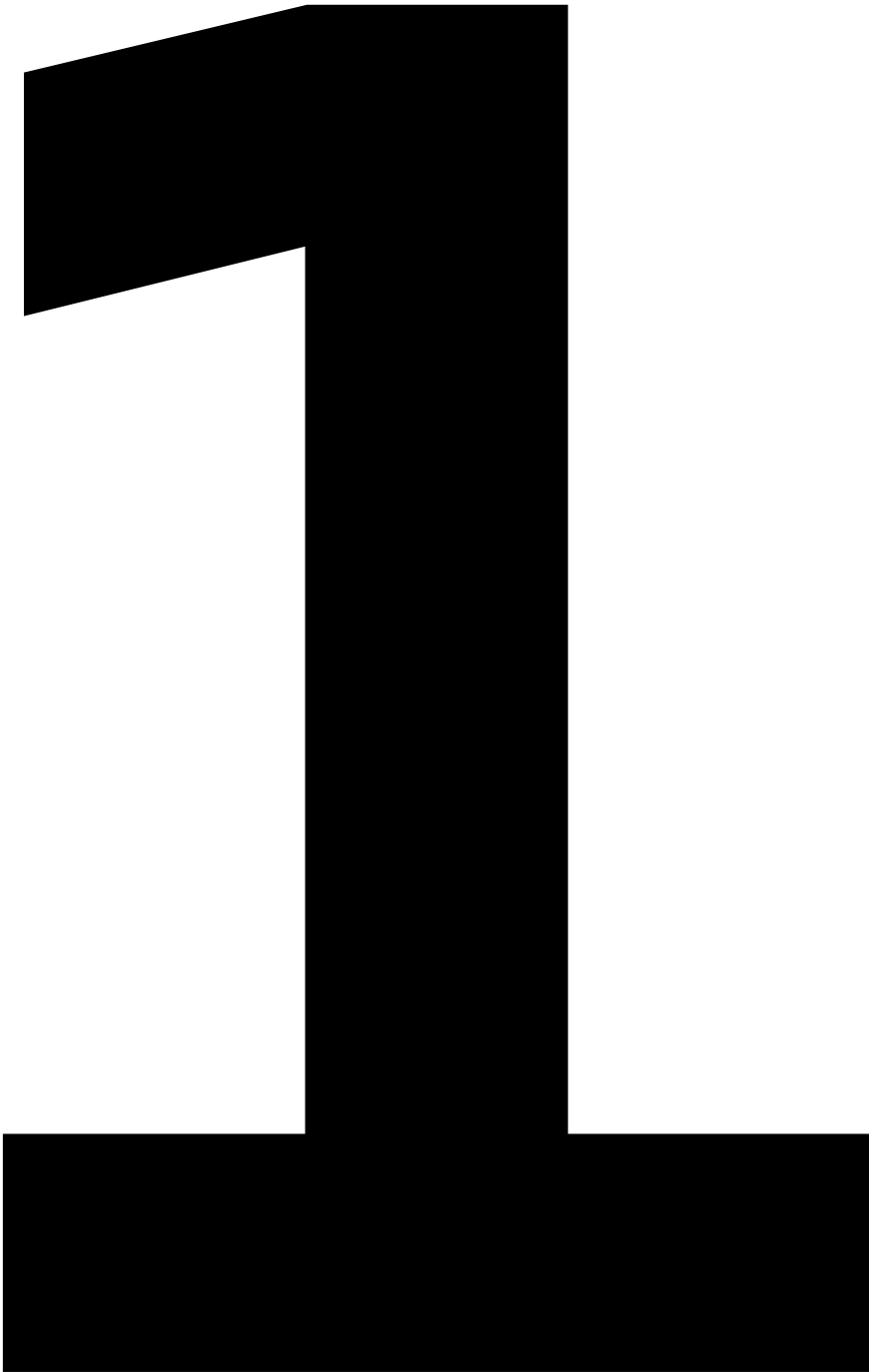




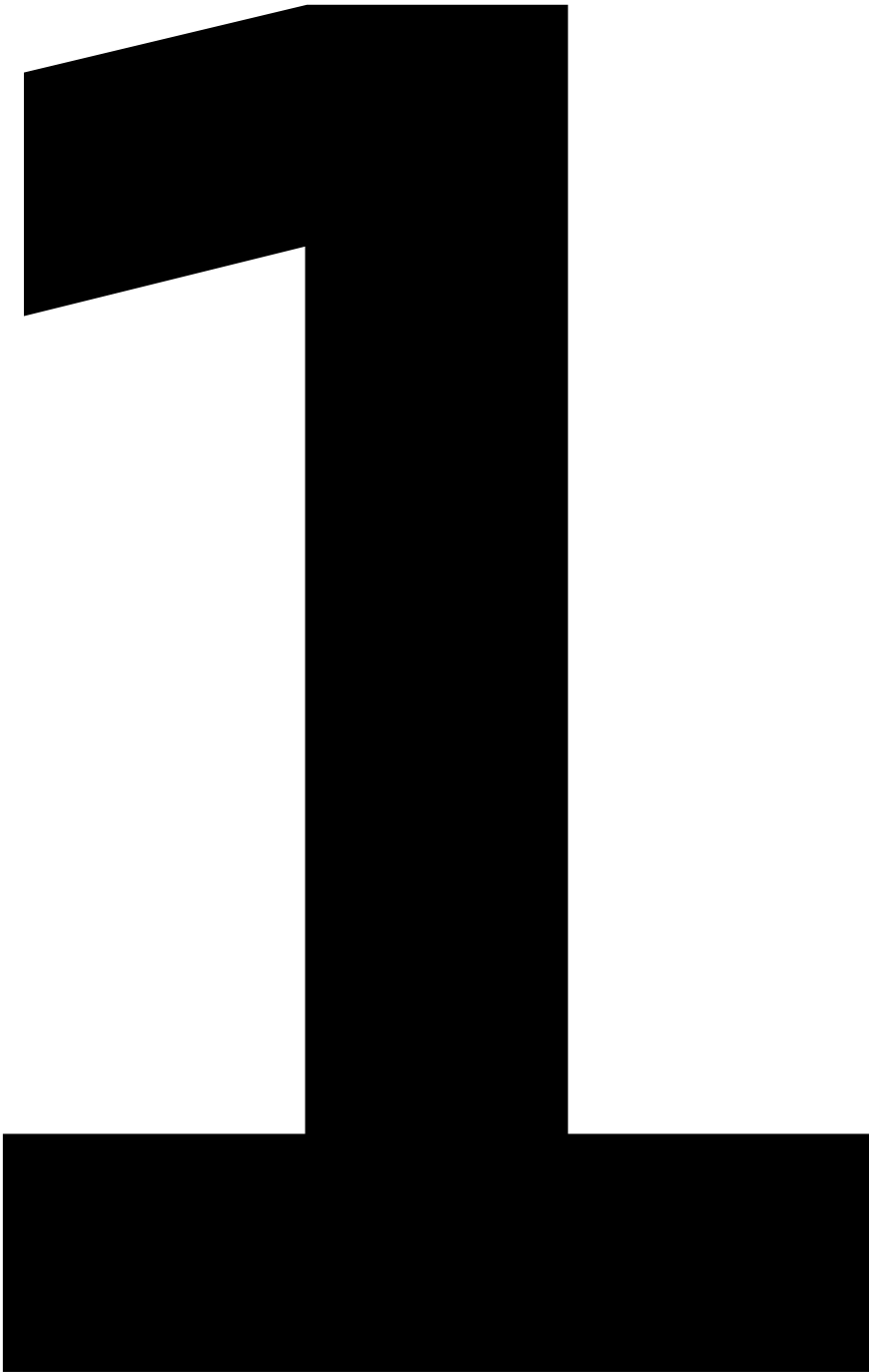
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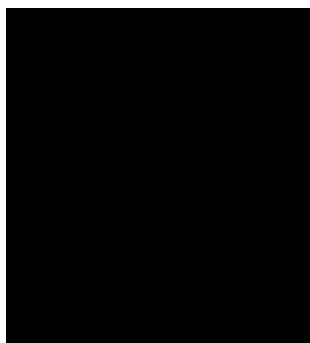






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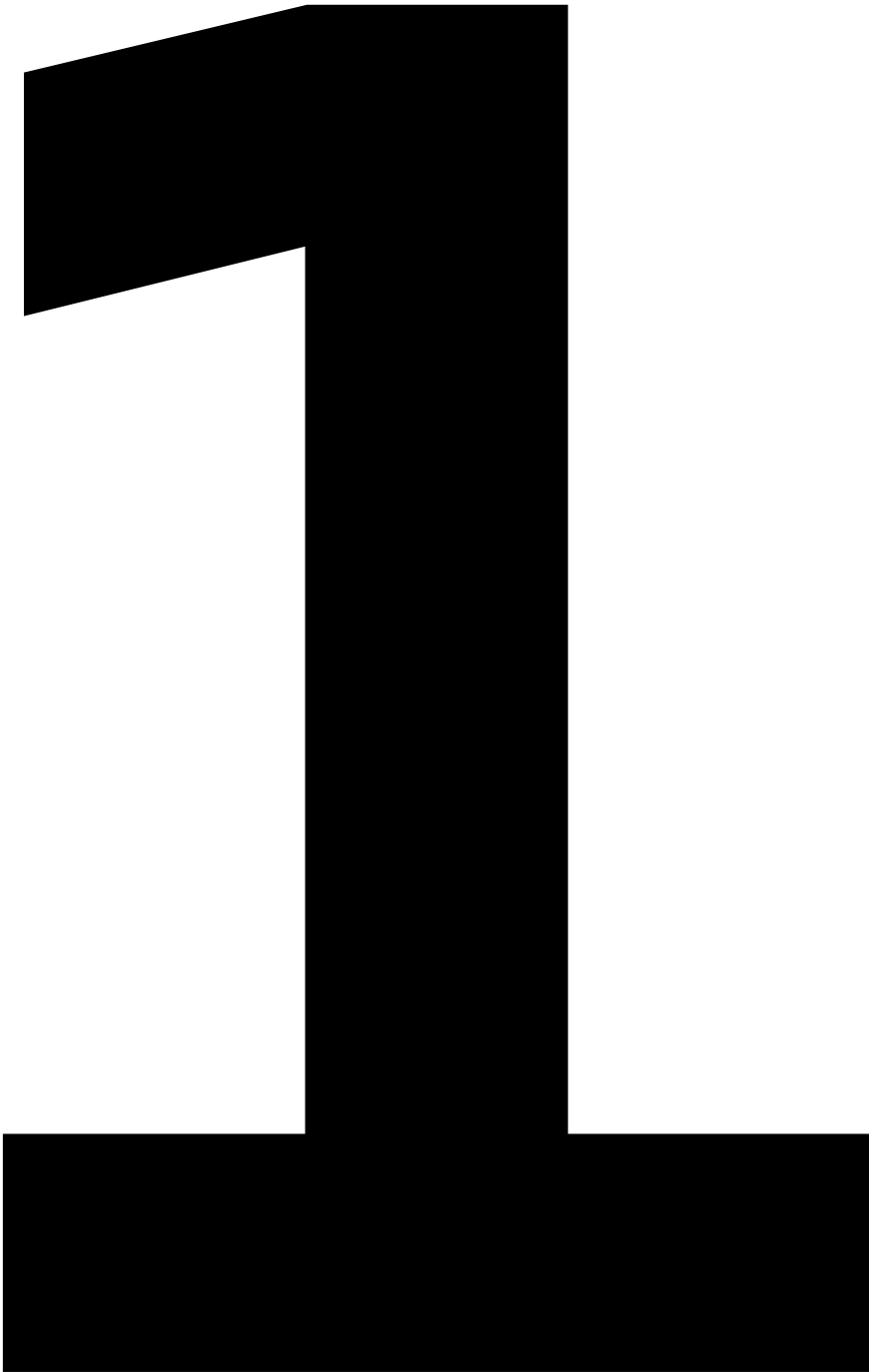
**sa**



**m**



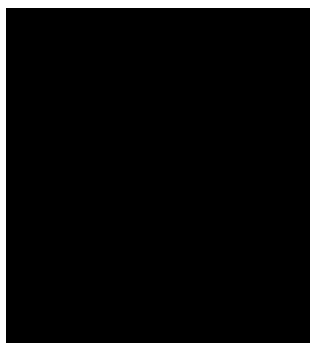




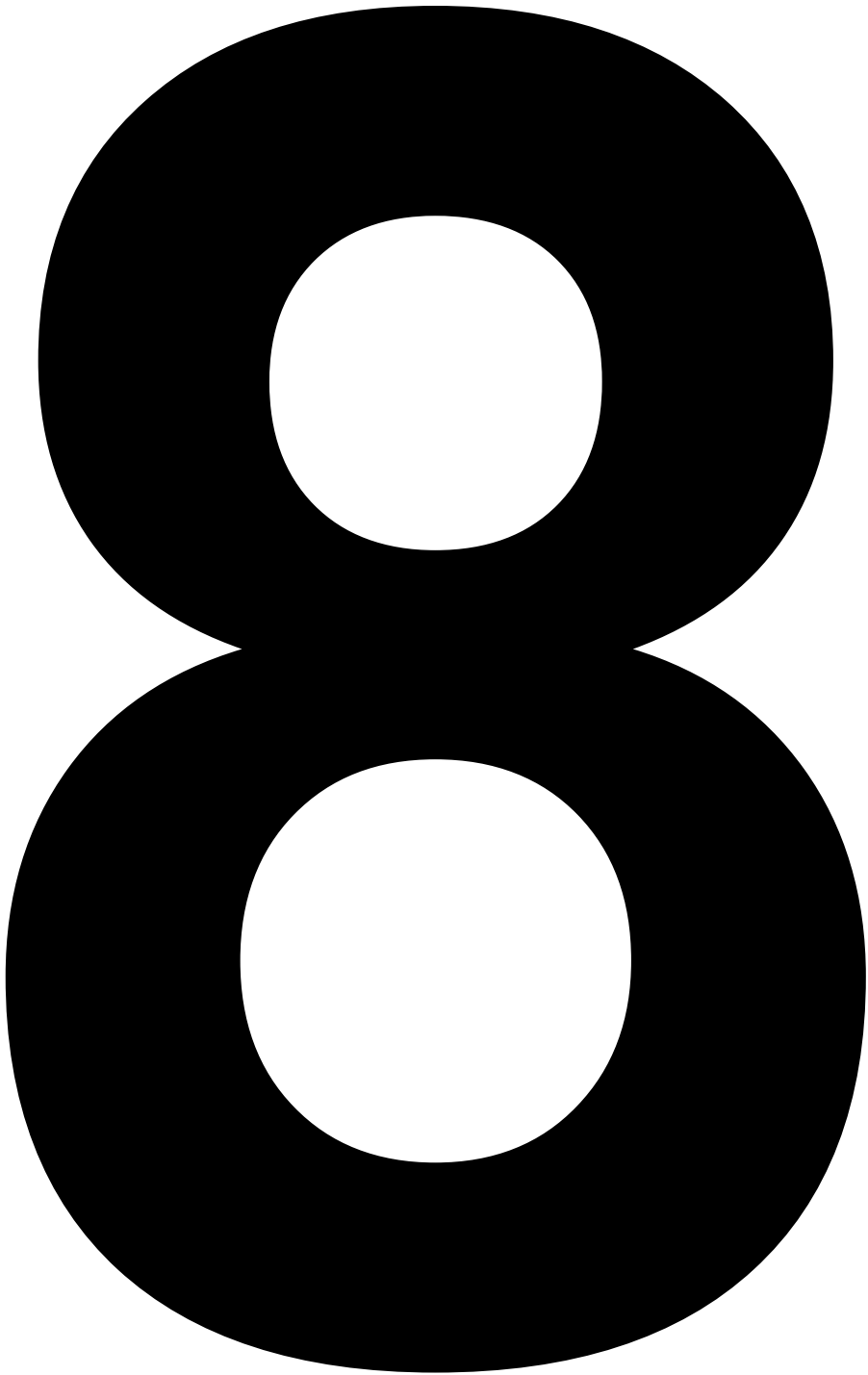


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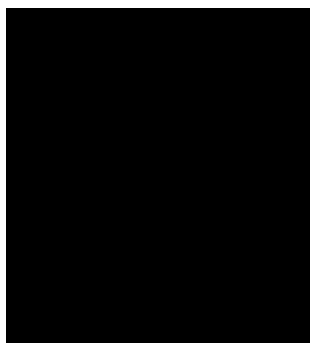












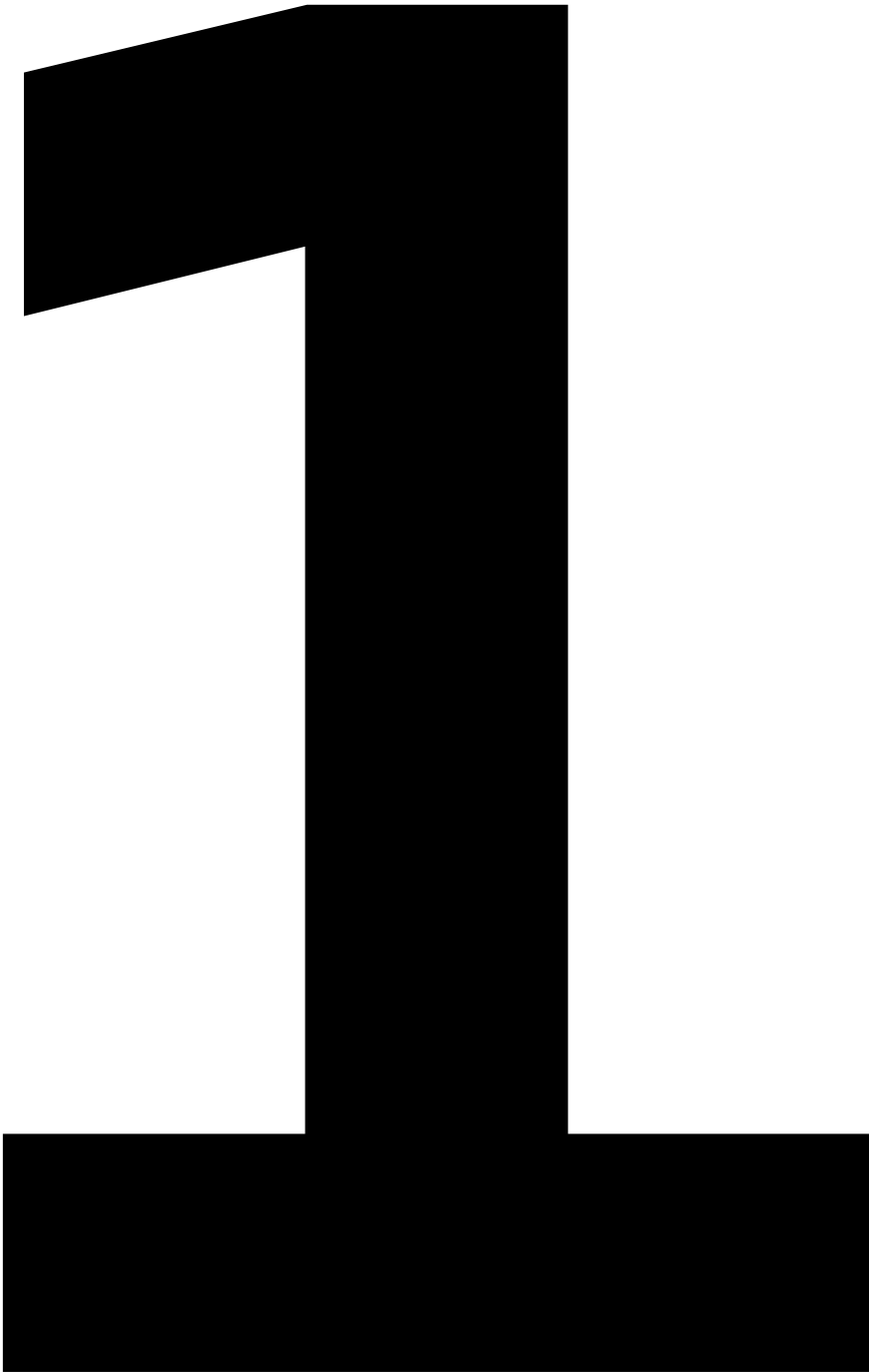


2













**3**

