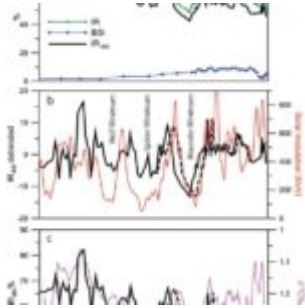
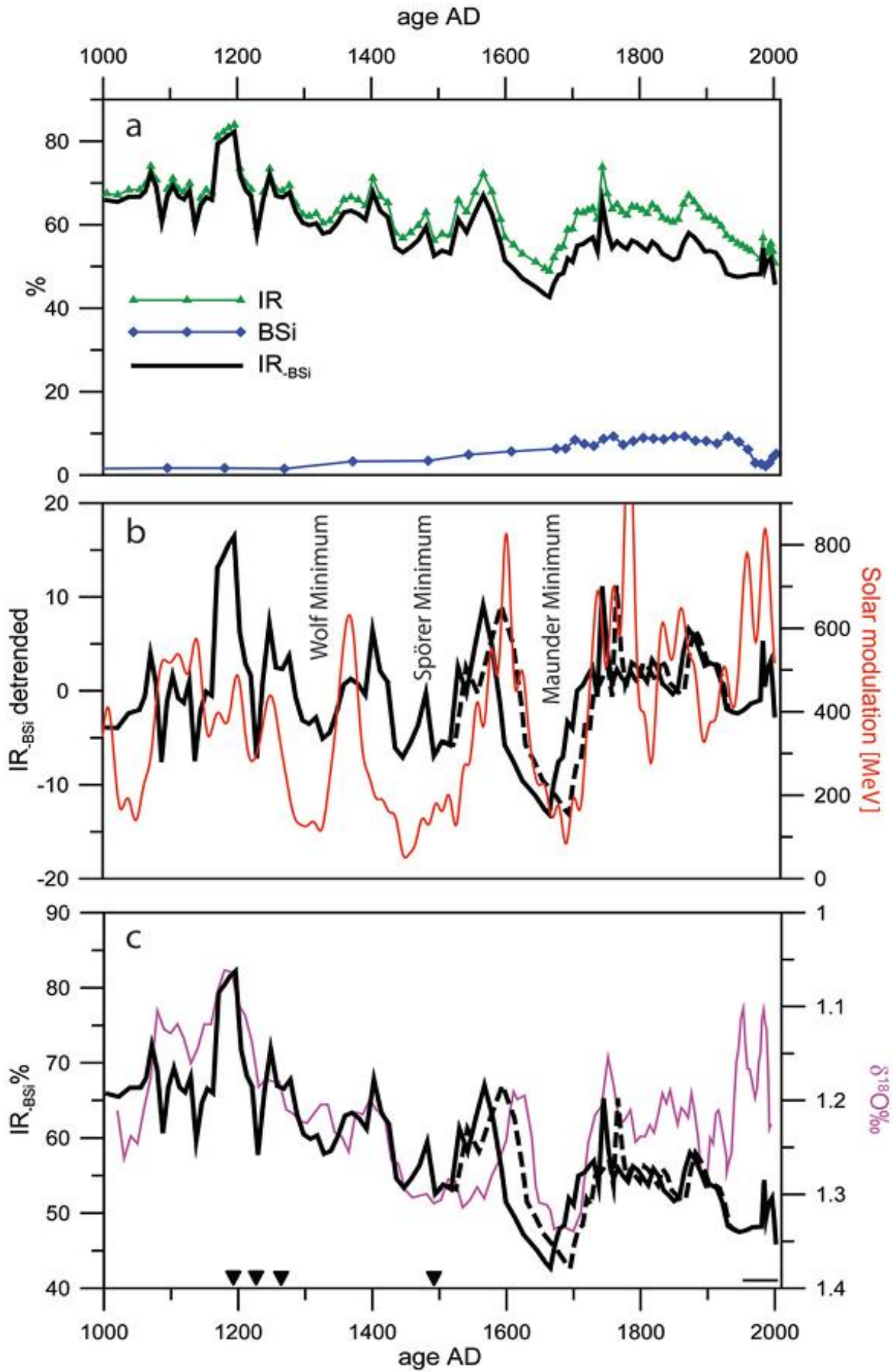


Neue Studie zeigt: Klima reagiert auf kurz- und langzeitliche Änderungen der Sonnenaktivität





IRBSi ist die Proxy für Niederschlag/Klimaänderung und zeigt eine gute Übereinstimmung mit der Sonnenaktivität. Der Vergleich zwischen den Graphen der IR-BSi und der Sonnenzyklen zeigt eine gute Übereinstimmung zwischen dem

Prozentsatz mineralischer bodenfremder Materialien und Sonnenzyklen, rekonstruiert auf Basis von Änderungen der C14-Konzentrationen in Makrofossilien. Eine gute Übereinstimmung zeigt sich auch zwischen der Konzentration von O18 in Mikroorganismen in der Norwegischen See und dem Index IR-BSi.

Solarer Antrieb des Klimas während des letzten Jahrtausends aus See-Sedimenten in Nordschweden

[Original: [Solar forcing of climate during the last millennium recorded in lake sediments from northern Sweden](#)]

U Kokfelt University of Copenhagen, Denmark

R Muscheler Lund University, Sweden

Abstract

Wir berichten von einer Aufzeichnung in Sedimenten eines kleinen Sees in dem subarktischen Feuchtgebiet Stordalen im nördlichsten Schweden, die die letzten 1000 Jahre abdeckt. Es stellte sich heraus, dass Variationen im Gehalt anorganischer Materialien den rekonstruierten Variationen der Sonne zwischen dem 13. und dem 18 Jahrhundert folgten. Perioden mit geringer Sonnenaktivität sind verbunden mit Minima im anorganischen Material und umgekehrt. Ein Vergleich zwischen den Sonnenfleckenzyklen und einer langen Messreihe sommerlicher Niederschläge zeigt eine weitere

**Beziehung zwischen dem 11-jährigen
Sonnenszyklus und der Variabilität
sommerlicher Niederschläge seit etwa
1960. Solare Minima stehen während
dieser Periode in Zusammenhang mit
Minima sommerlicher Niederschläge,
während die sommerliche
Niederschlagsmenge in Perioden mit
höherer Sonnenaktivität zunimmt.
Unsere Ergebnisse zeigen, dass das
Klima sowohl auf die 11-jährigen als
auch auf langzeitliche Änderungen der
Sonnenaktivität und besonders deren
Minima reagiert, was zu trockenen
Bedingungen mit entsprechend
geringerem Abfluss führt.**

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**Man erinnere sich, dass eine im
vorigen Jahr veröffentlichte Studie im
Journal Astronomy & Astrophysics
zeigt, dass sich die Sonnenaktivität
zum Ende des 20. Jahrhunderts nahe den
höchsten Niveaus der vergangenen 11500**

Jahre befunden hatte.

Die von einem Forscher am Max-Planck-Institute in *Astronomy & Astrophysics* veröffentlichte Studie rekonstruiert die Sonnenaktivität während des Holozäns und zeigt, dass sich die Sonnenaktivität zum Ende des 20. Jahrhunderts nahe den höchsten Niveaus der vergangenen 11500 Jahre befunden hatte. Die Rekonstruktion erstreckt sich über die letzten 2500 Jahre, und die Studie zeigt einen ‚Hockeyschläger‘ der Sonnenaktivität nach dem Ende der kleinen Eiszeit im 19. Jahrhundert.

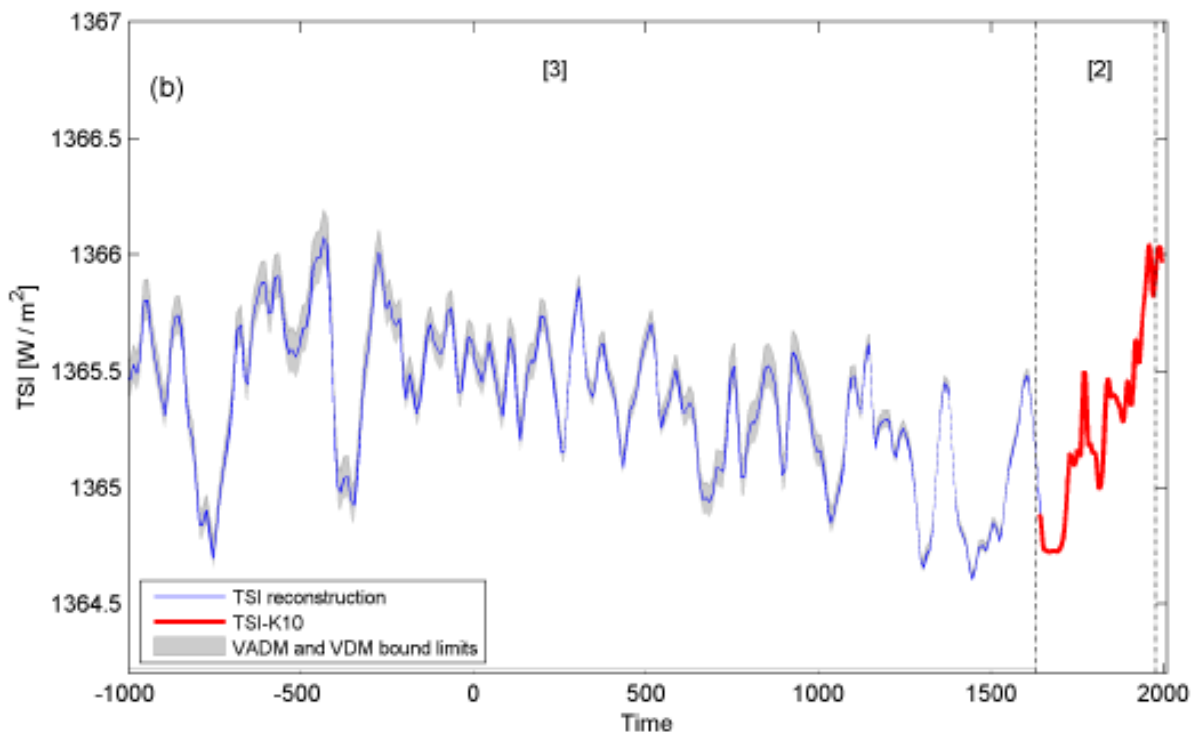
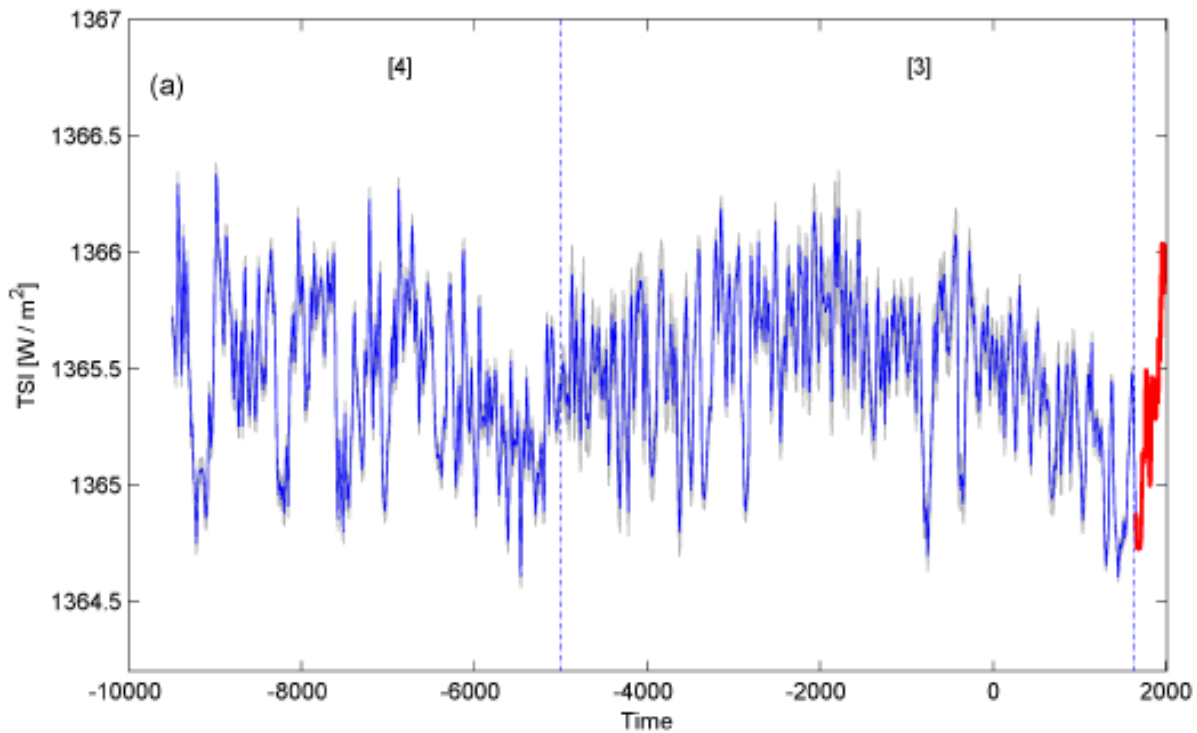


Bild 2: Nach der TSI gewichtete Rekonstruktion seit etwa 9500 vor Christus. Zur Verdeutlichung ist die Entwicklung seit 1000 vor Christus in

Karte (b) dargestellt. Das graue Band repräsentiert das Gebiet, das von den KN08-VADM und KC05-VDM-Rekonstruktionen begrenzt wird. Als Referenz repräsentiert die rote Linie die 10-jährig gemittelte Rekonstruktion von Krivova et al. (2010a).

Die Entwicklung der Solarstrahlung während des Holozäns

[Original: [Evolution of the solar irradiance during the Holocene](#)]

L. E. A. Vieira^{1,2}, S. K. Solanki^{1,3},
N. A. Krivova¹ and I. Usoskin⁴

Max-Planck-Institut für
Sonnensystemforschung, Max-Planck-Str.
2, 37191 Katlenburg-Lindau, Germany
Laboratoire de Physique et Chimie de
l'Environnement et de l'Espace
(LPC2E/CNRS), 3A, Avenue de la
Recherche, 45071 Orléans Cedex 2,
France

**School of Space Research, Kyung Hee
University, Yongin, Gyeonggi, 446-701,
Korea**

**Sodankylä Geophysical Observatory
(Oulu Unit), POB 3000, University of
Oulu, Finland**

Abstract

**Zusammenhang:
Langzeitliche
Aufzeichnungen des
solaren Strahlungs-
Outputs sind zum
Verständnis der
solaren**

**Variabilität und
des Klimas in der
Vergangenheit
unabdingbar.**

**Messungen der
Solarstrahlung
stehen jedoch nur
aus den letzten
drei Jahrzehnten
zur Verfügung, was
nach
Rekonstruktionen**

**dieser
Größenordnungen
ruft mit Hilfe von
geeigneten Modellen
über längere
Perioden.**

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**Rekonstruktion der
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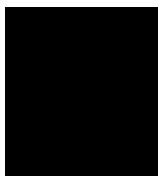
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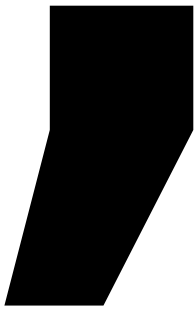
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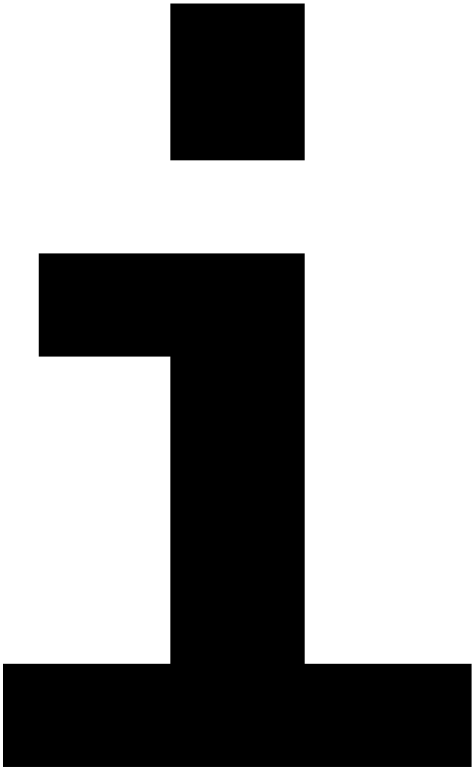
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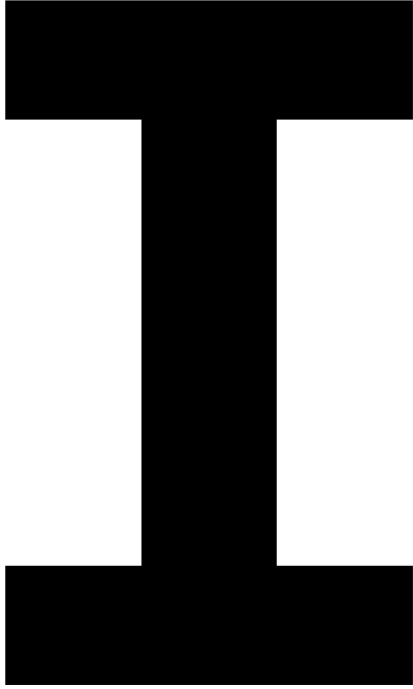
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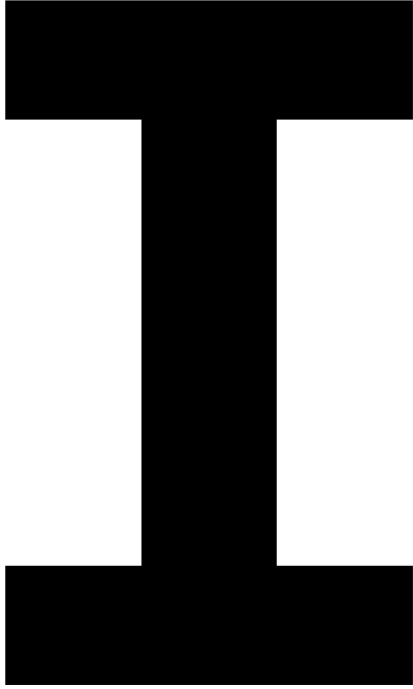
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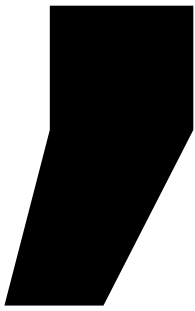
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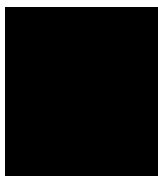
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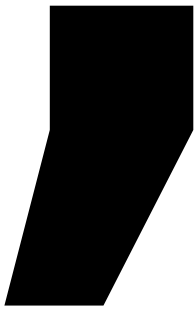
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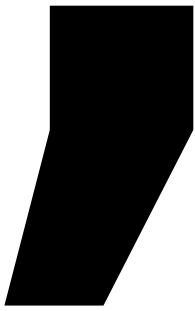
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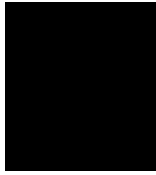
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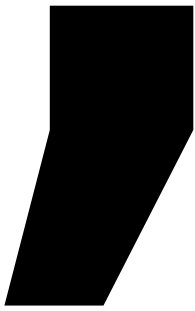
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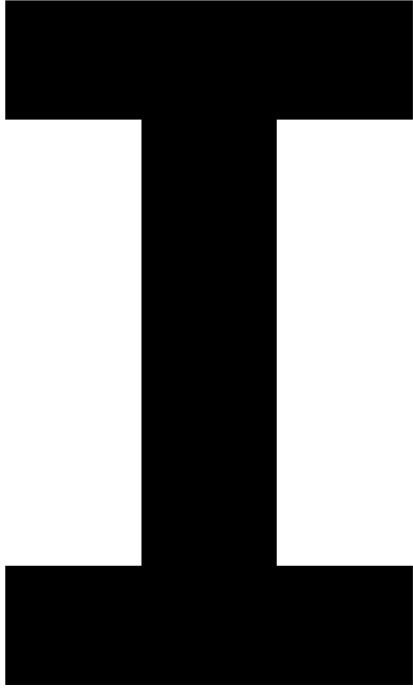
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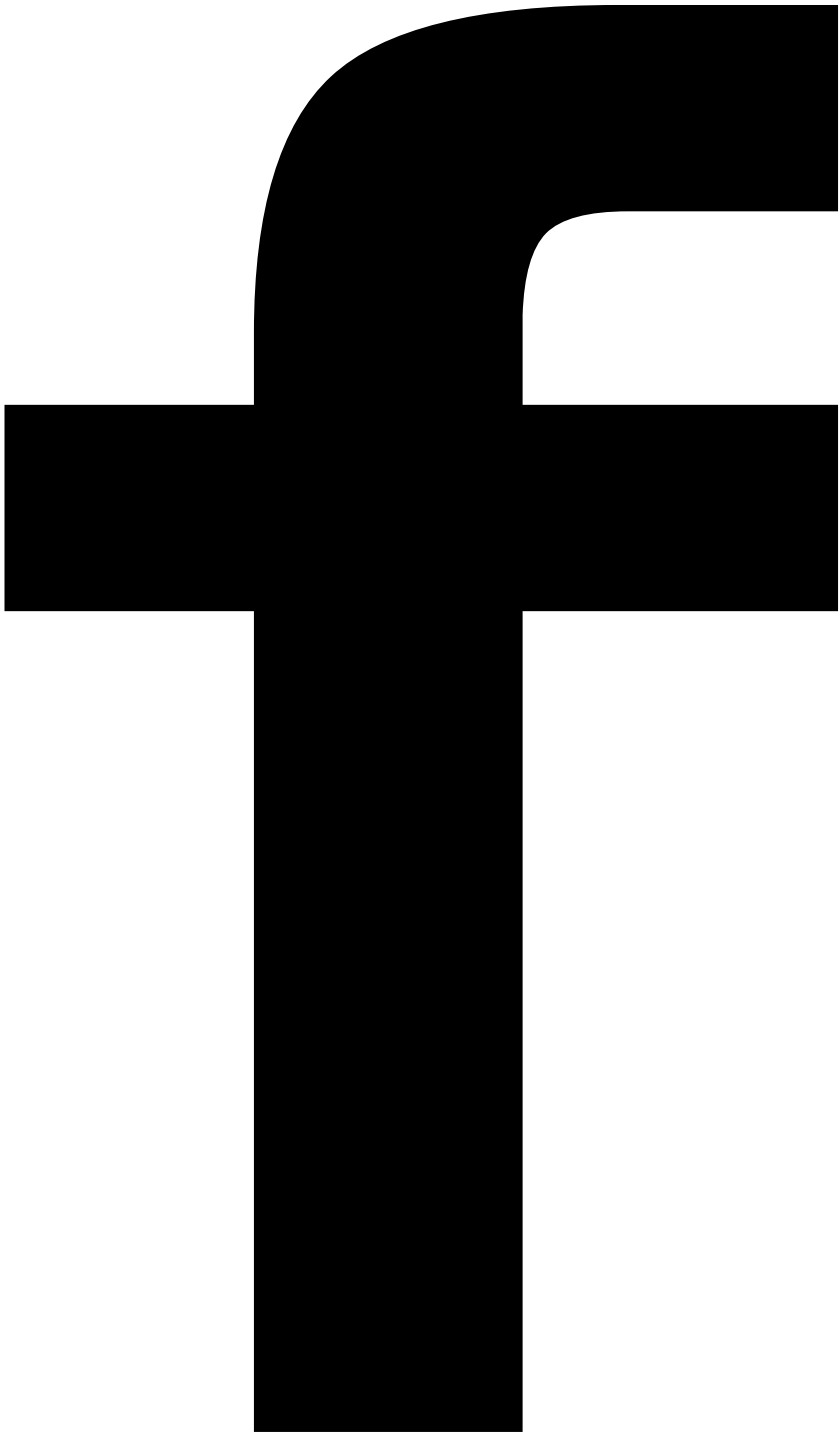
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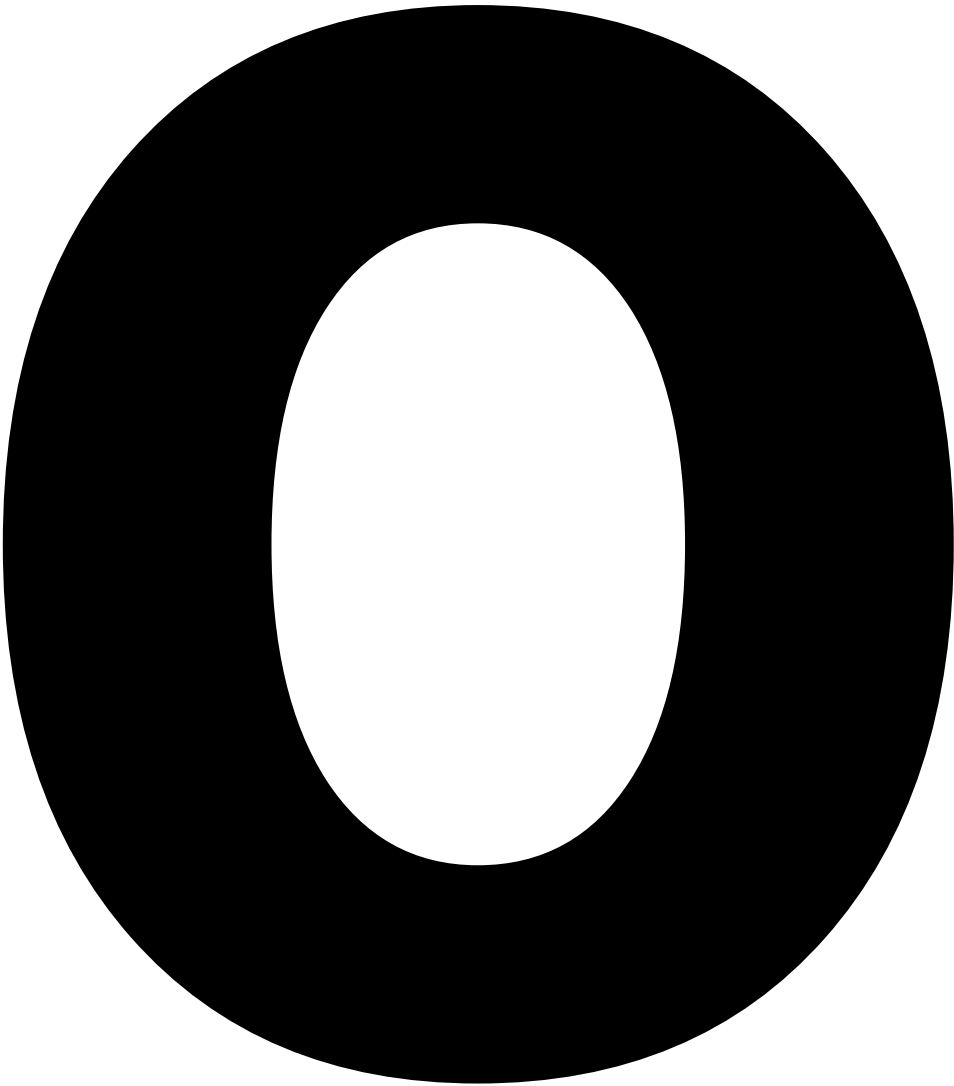
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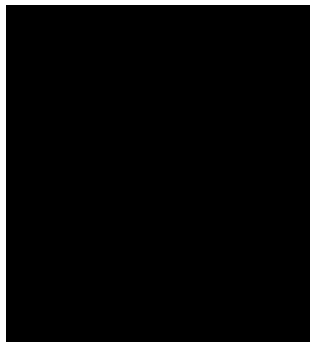
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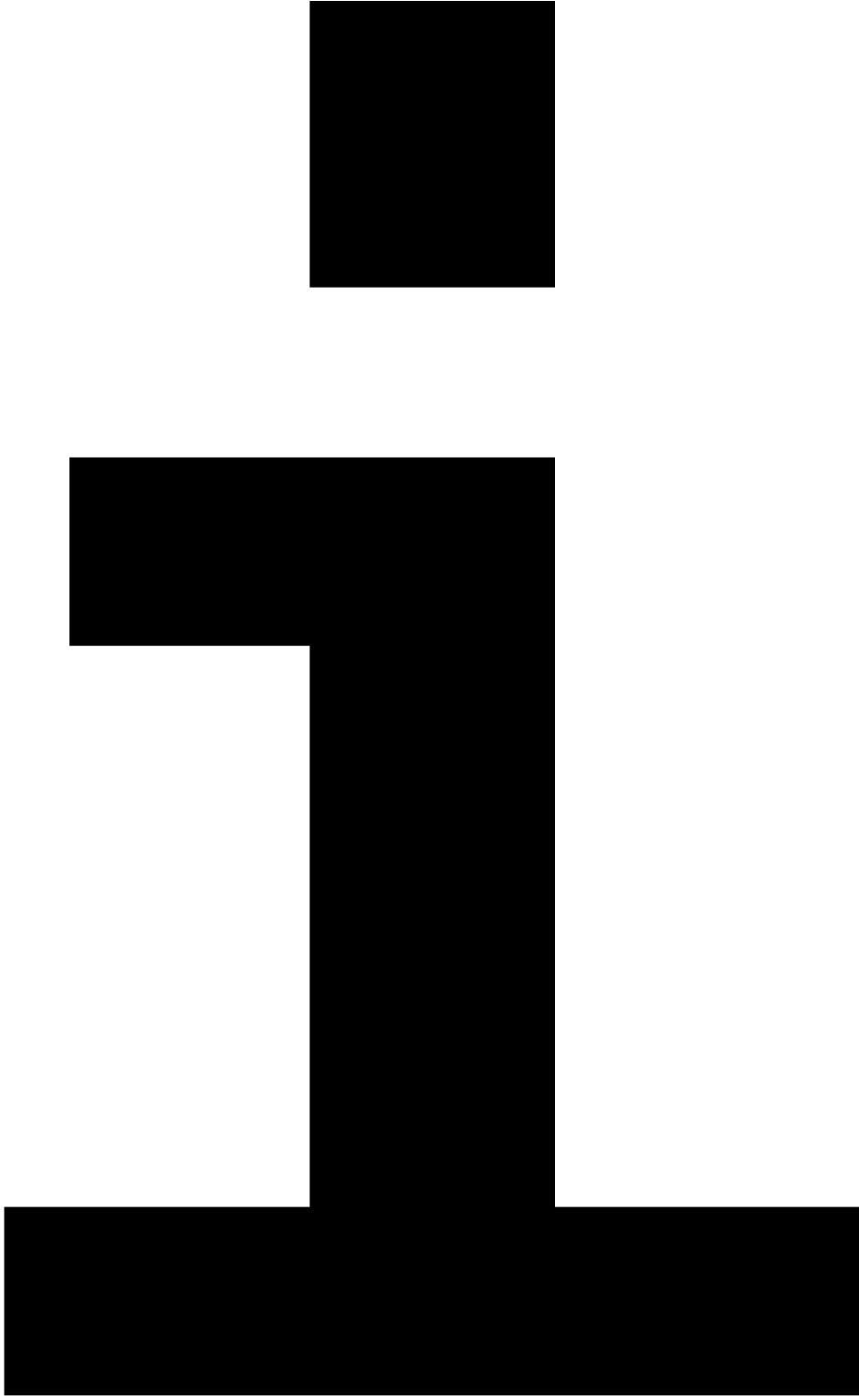
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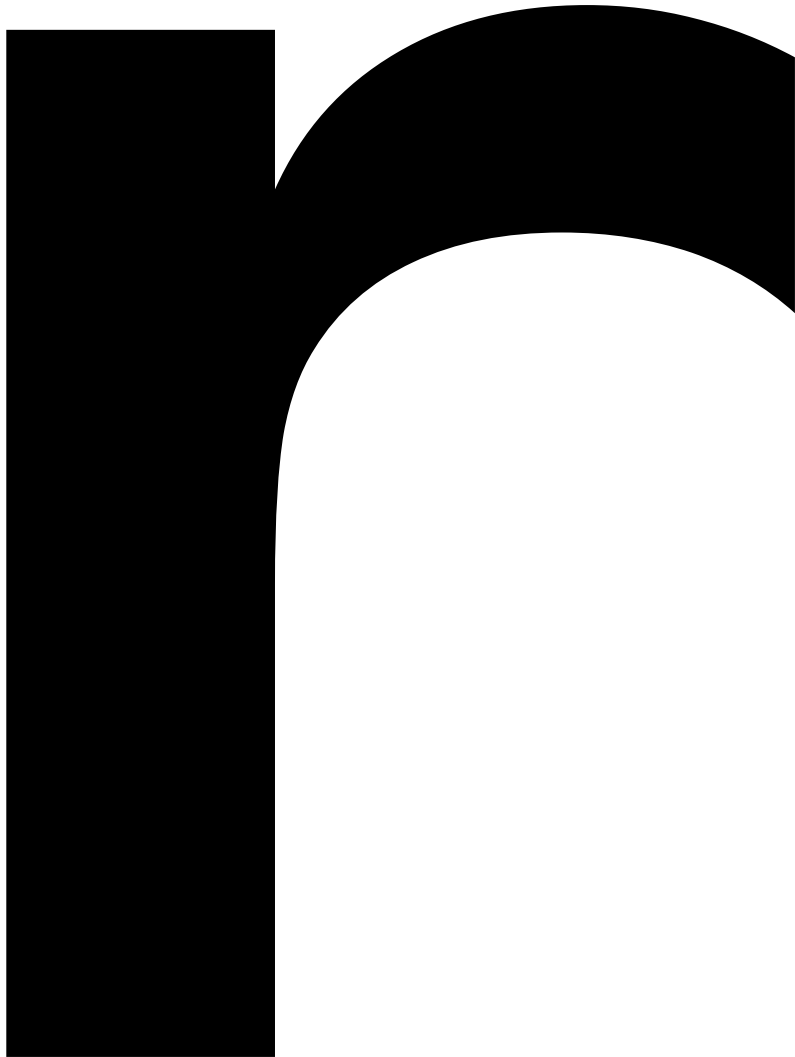


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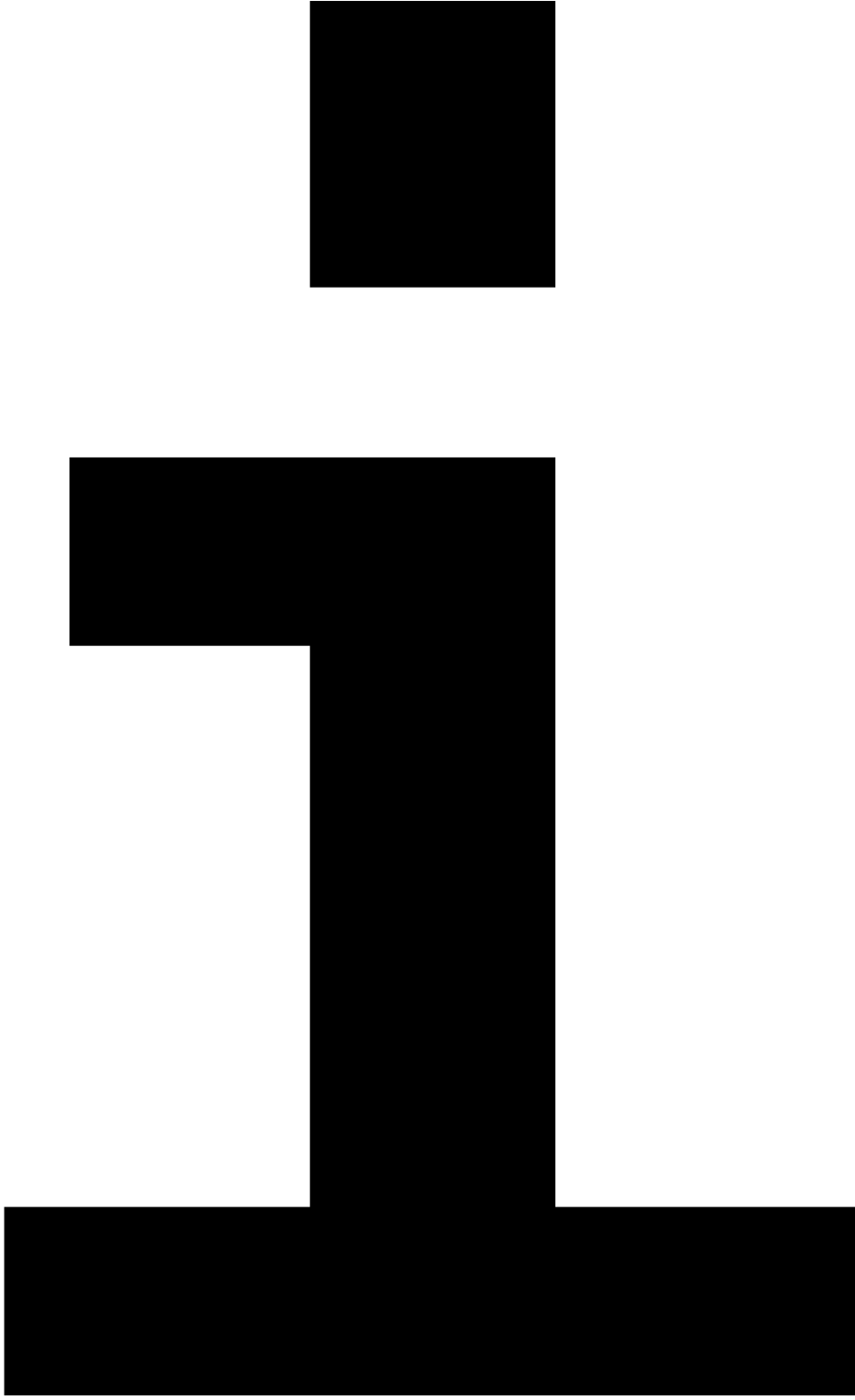
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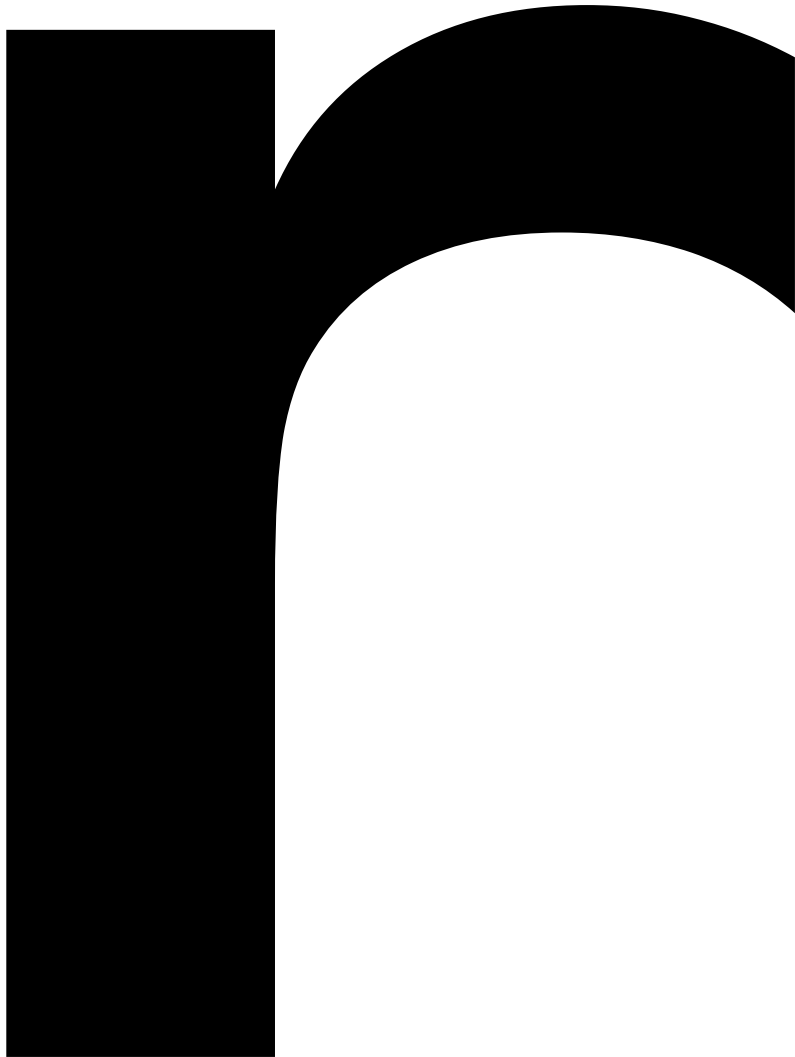
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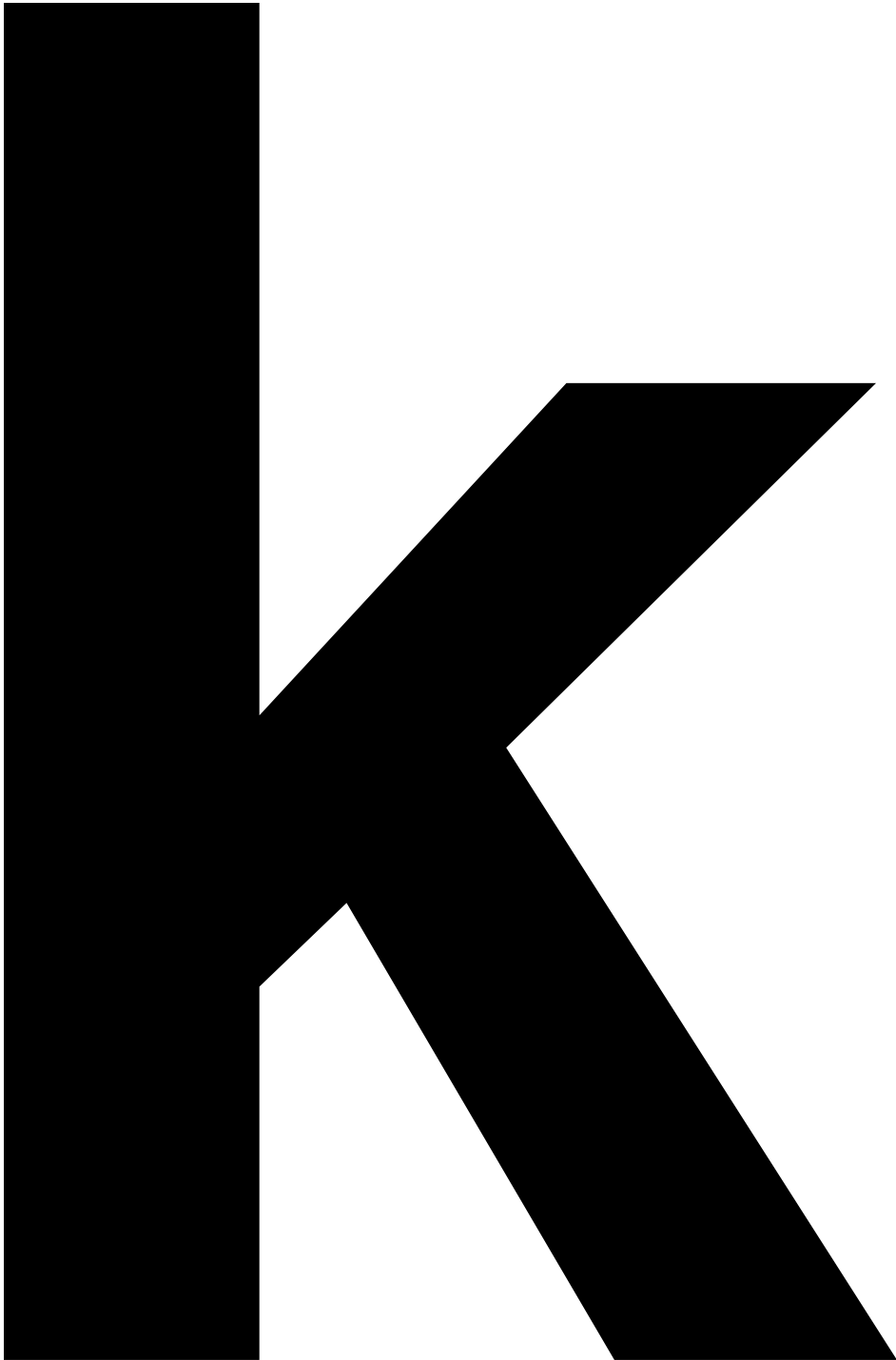
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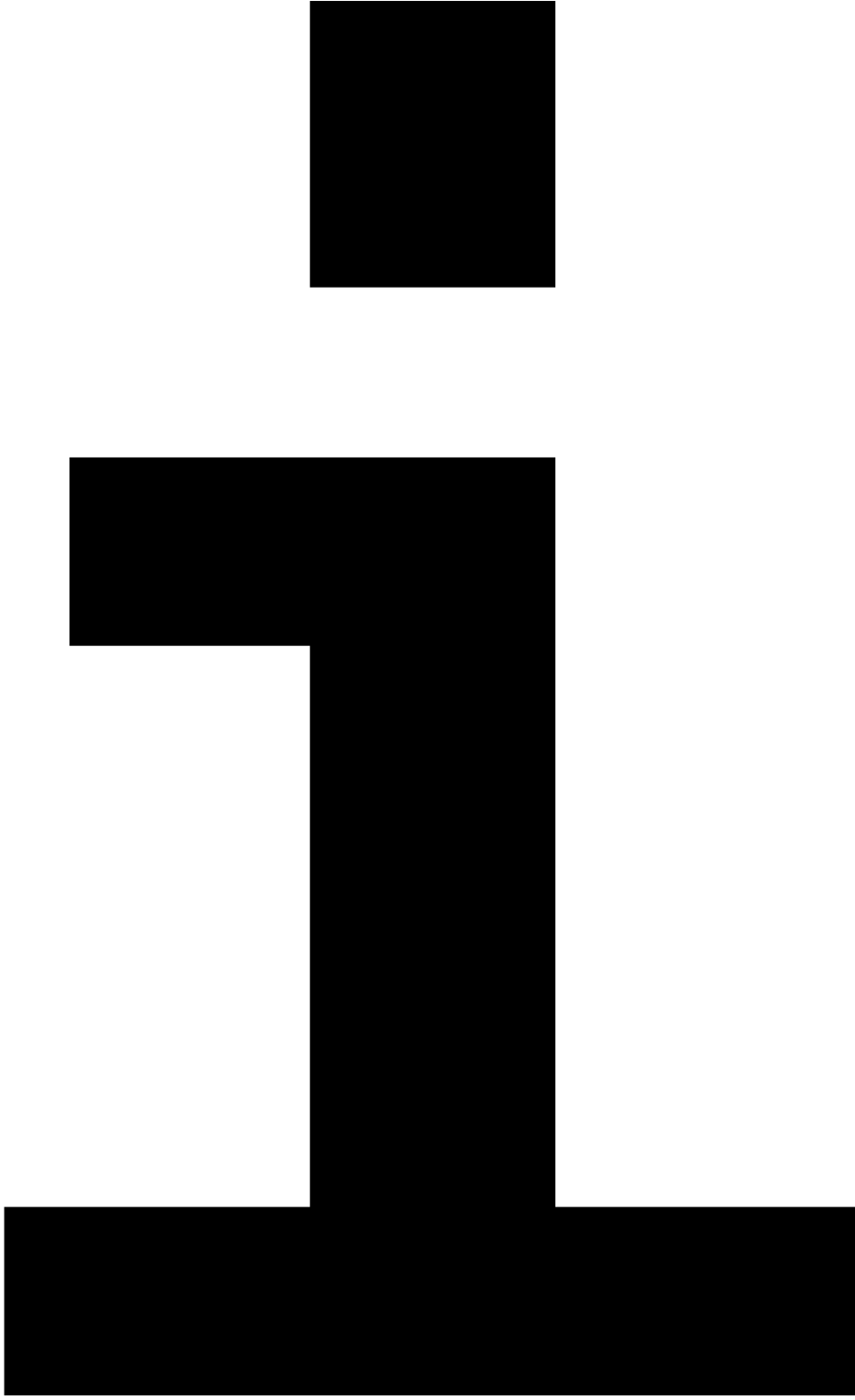
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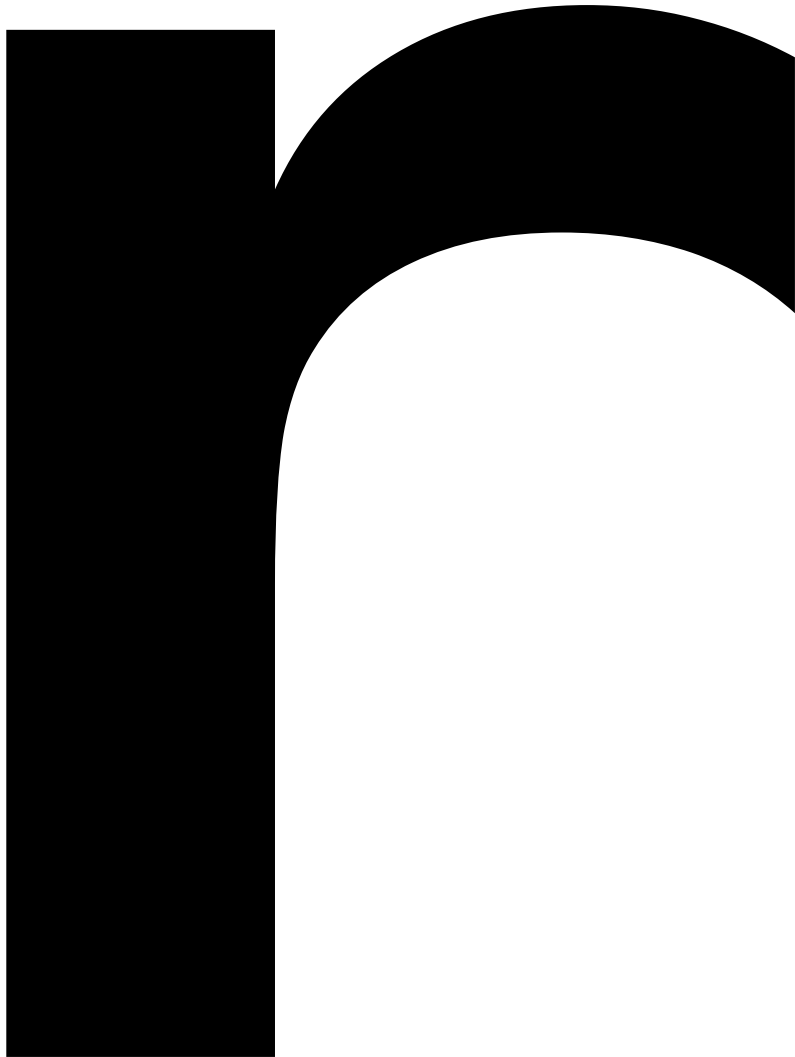
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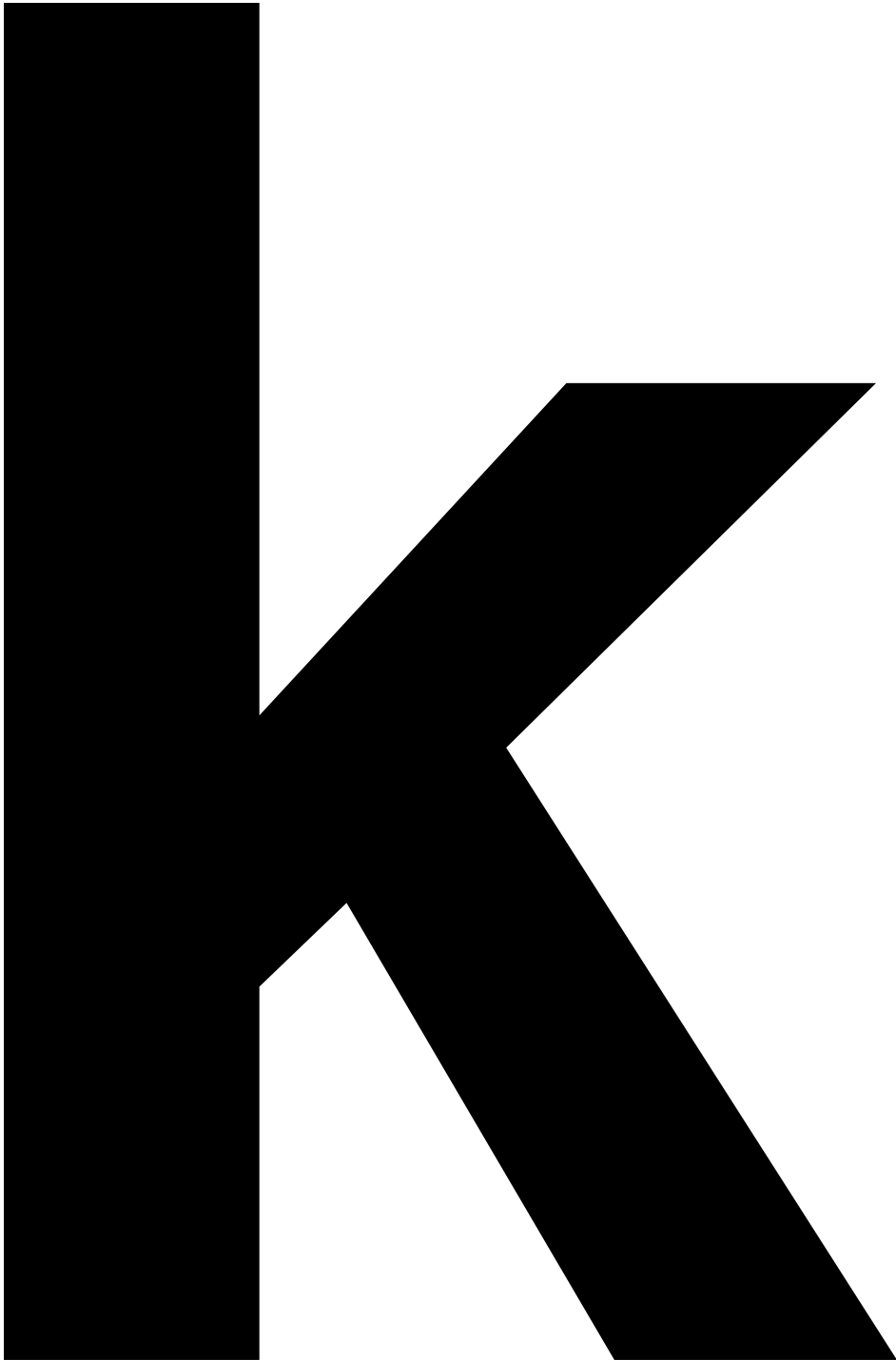


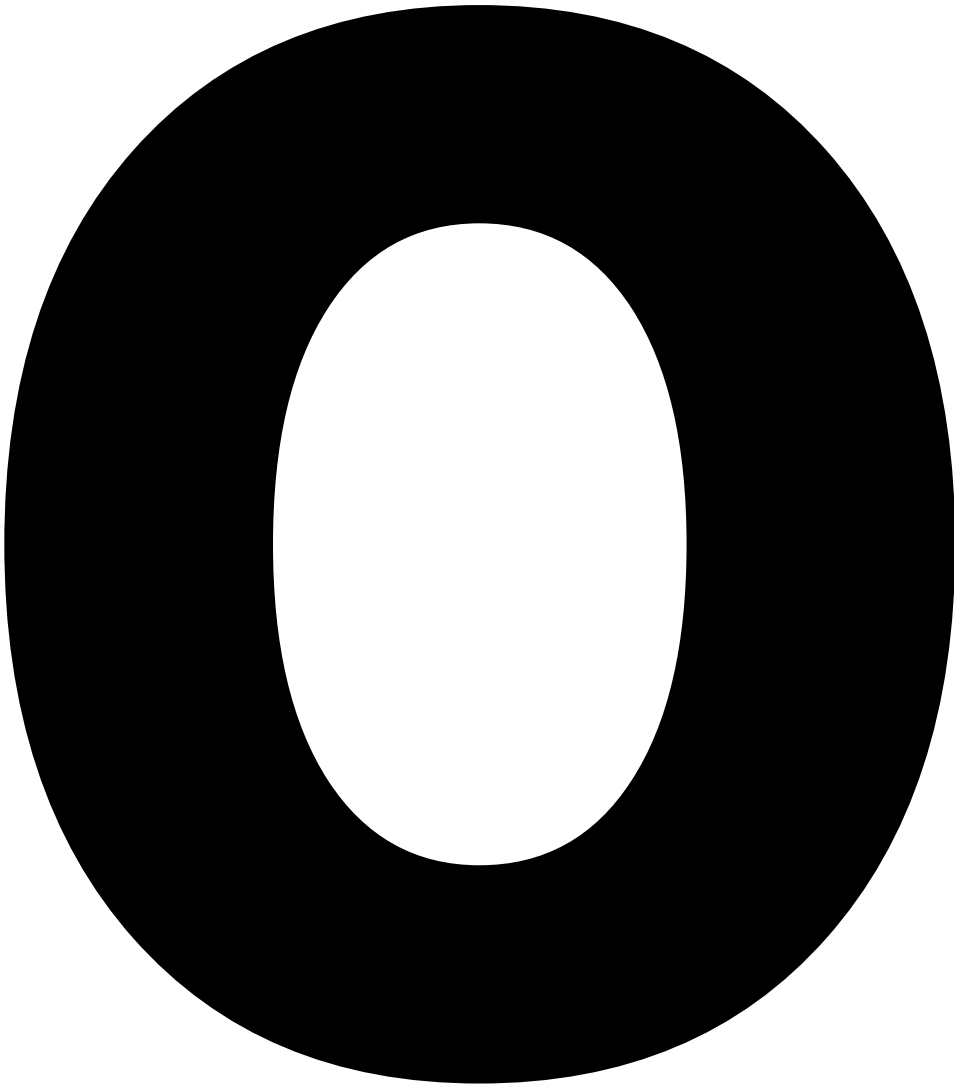


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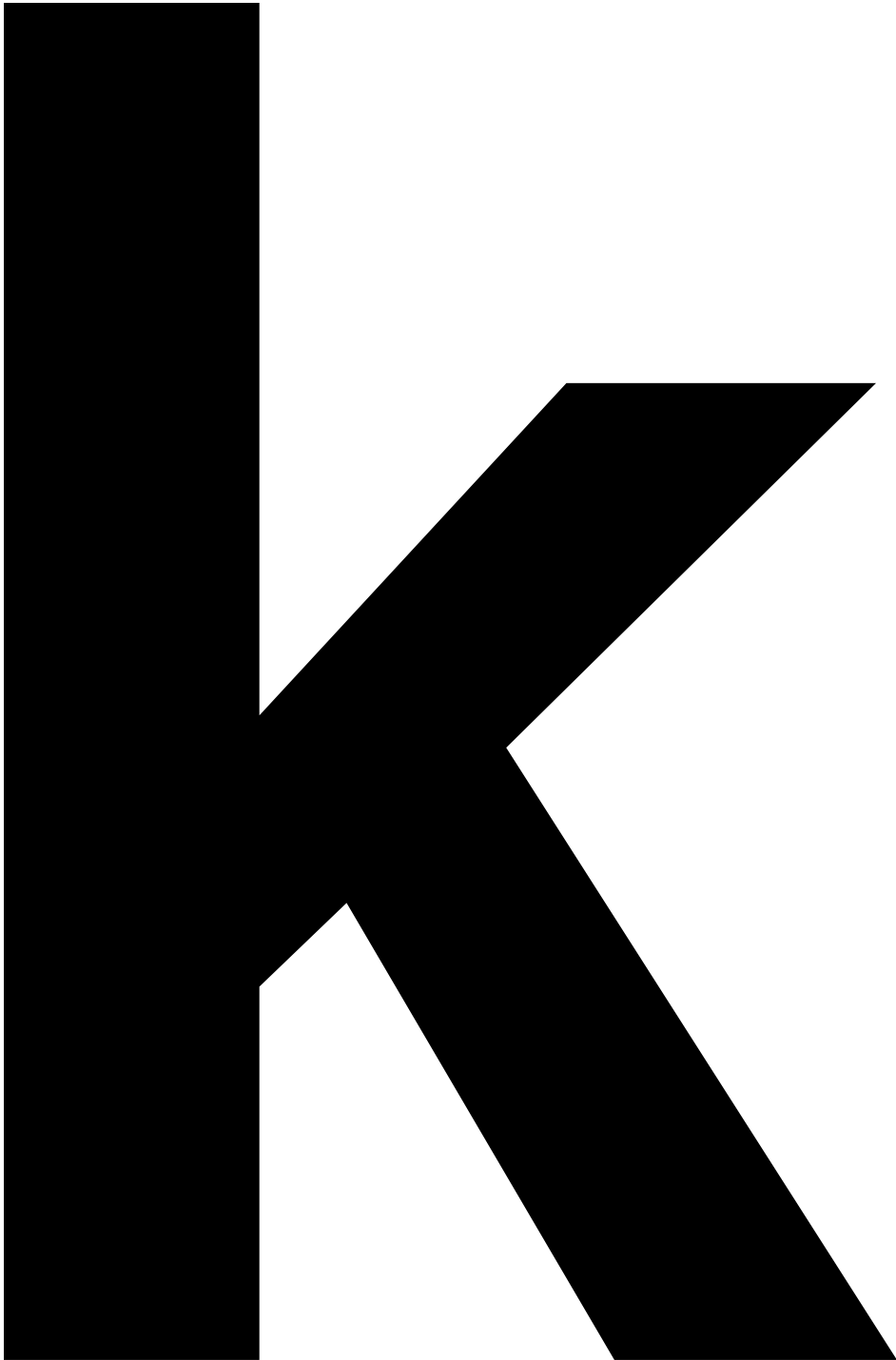
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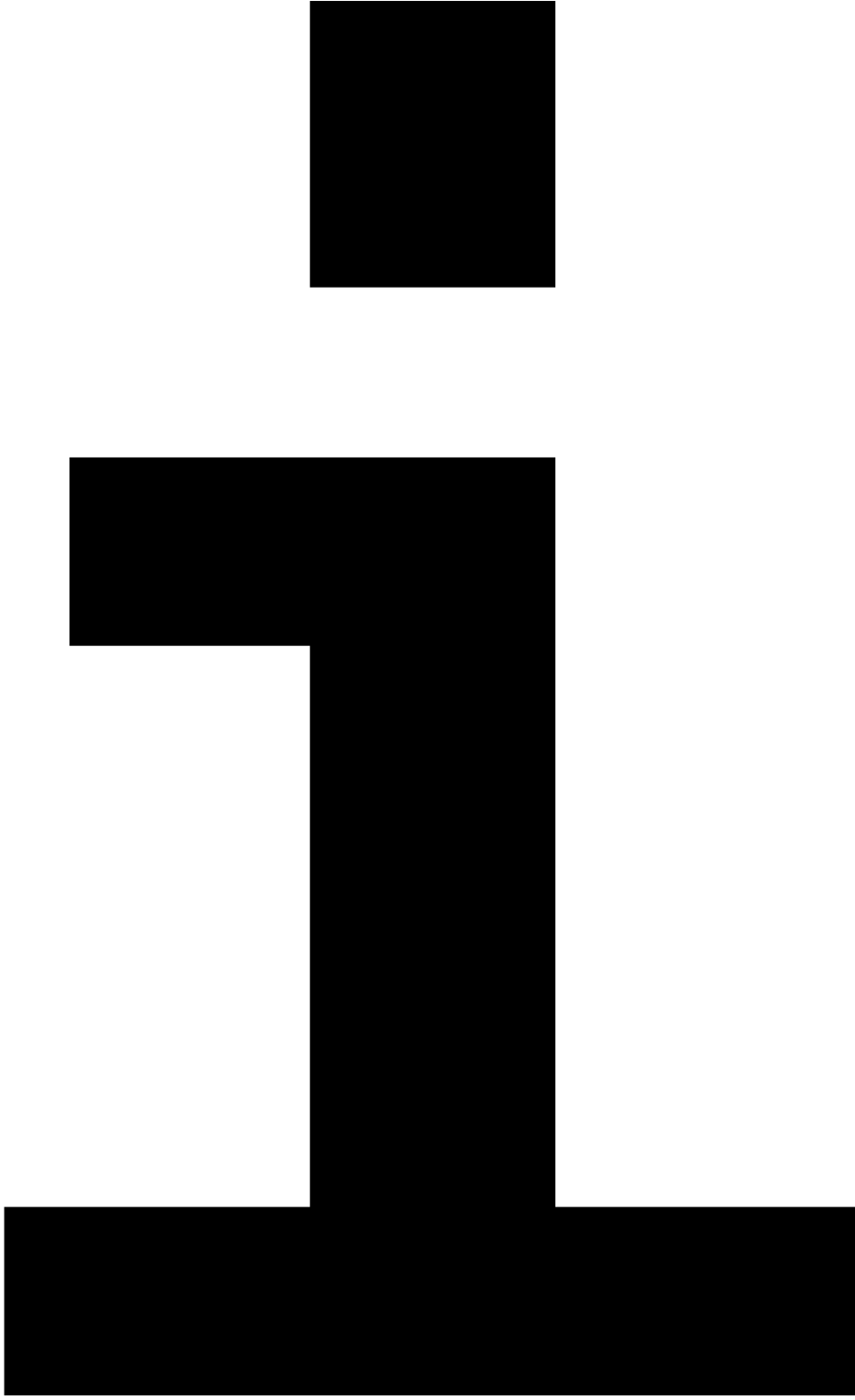


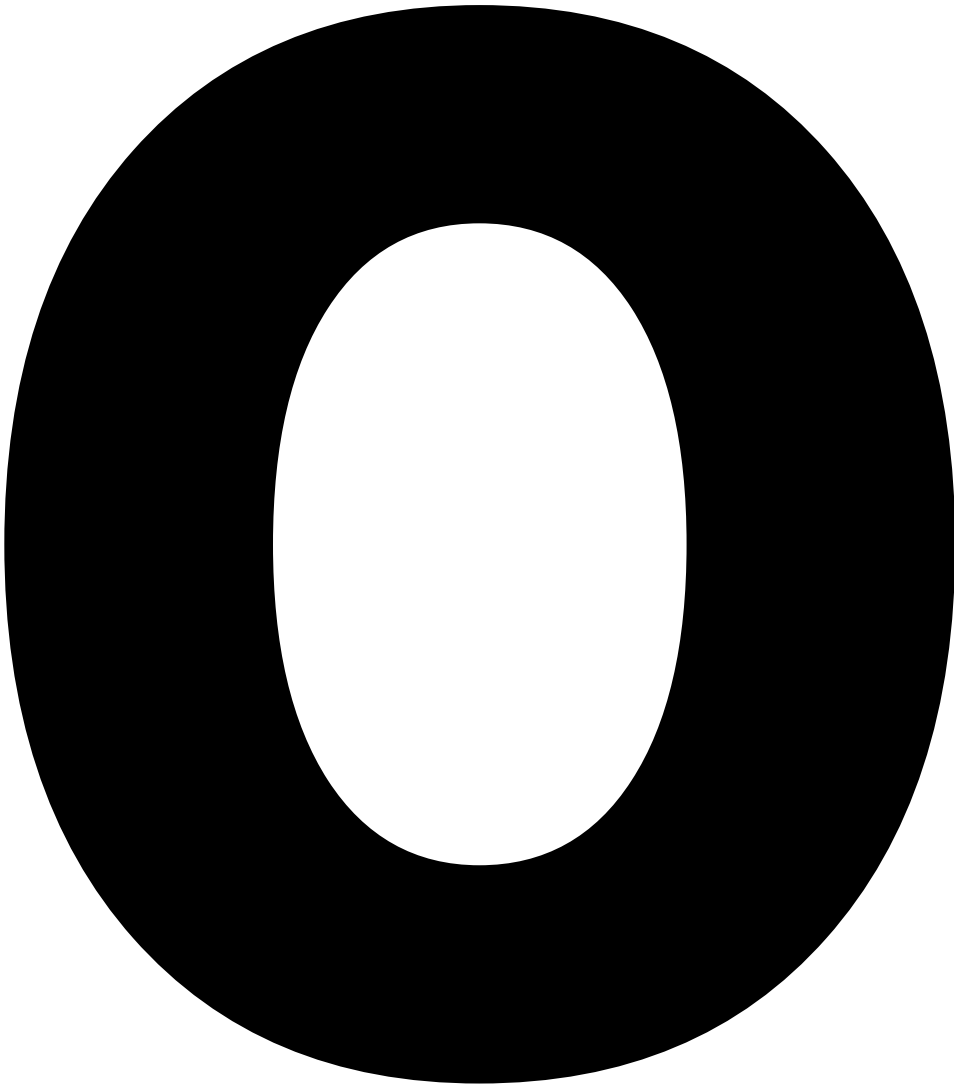


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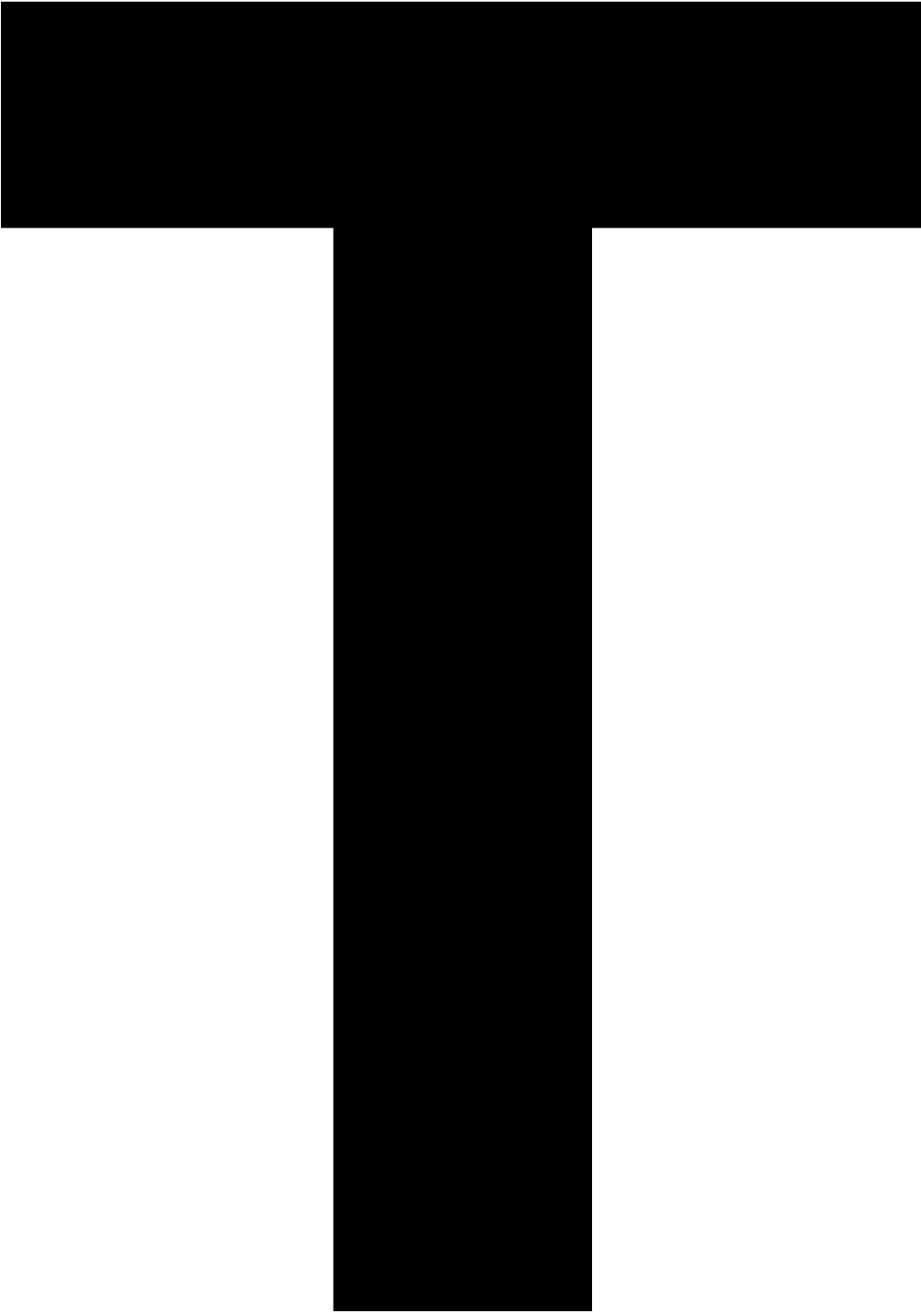


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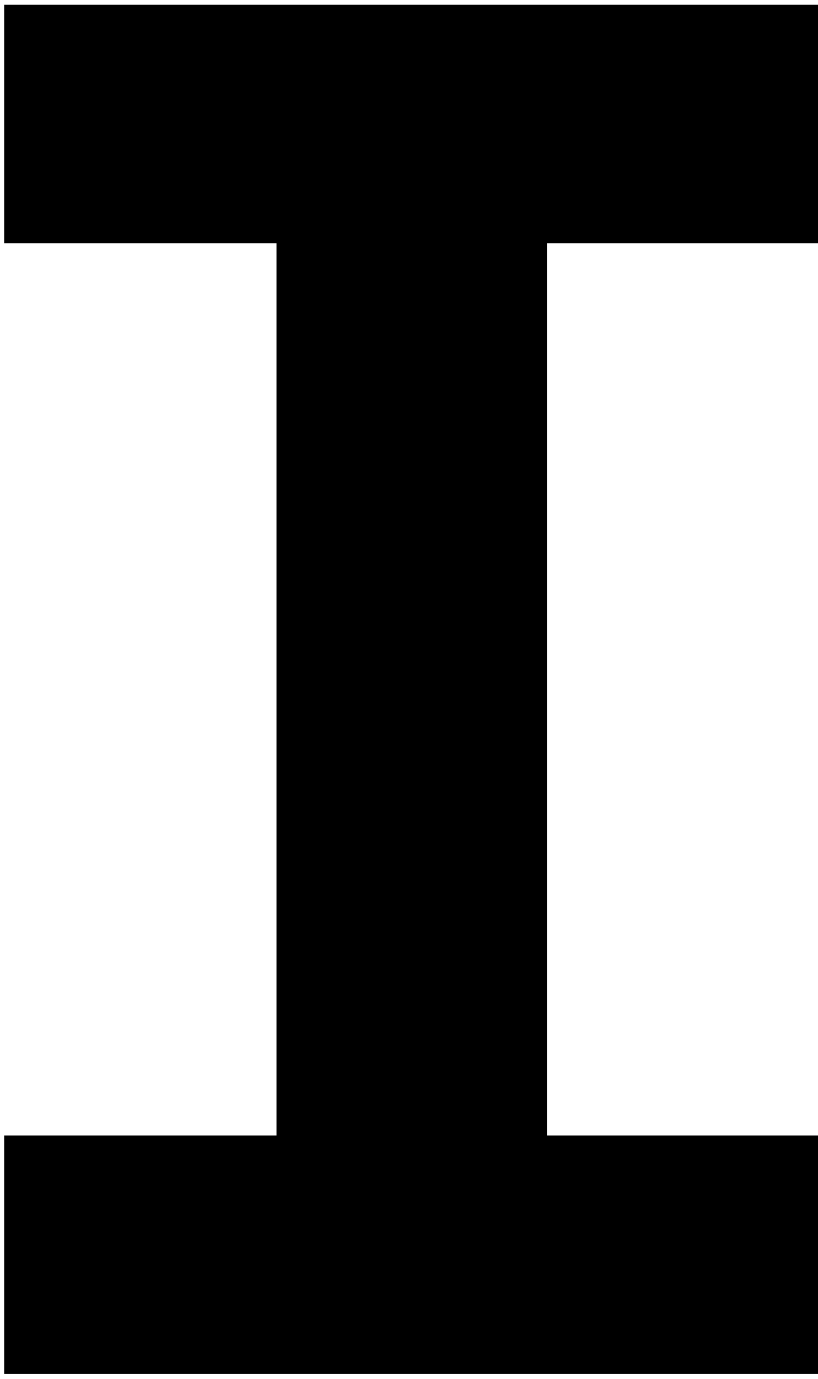
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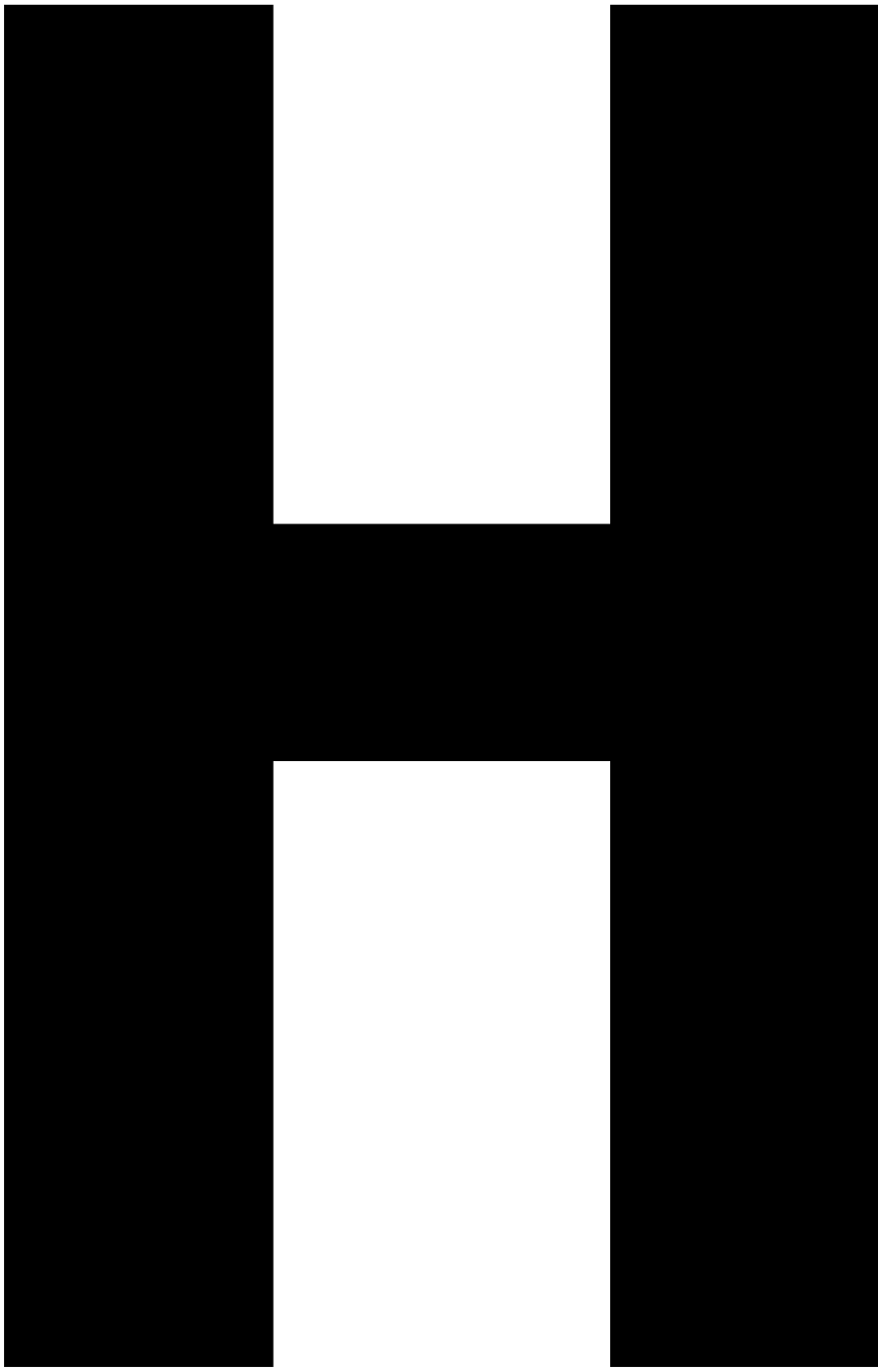
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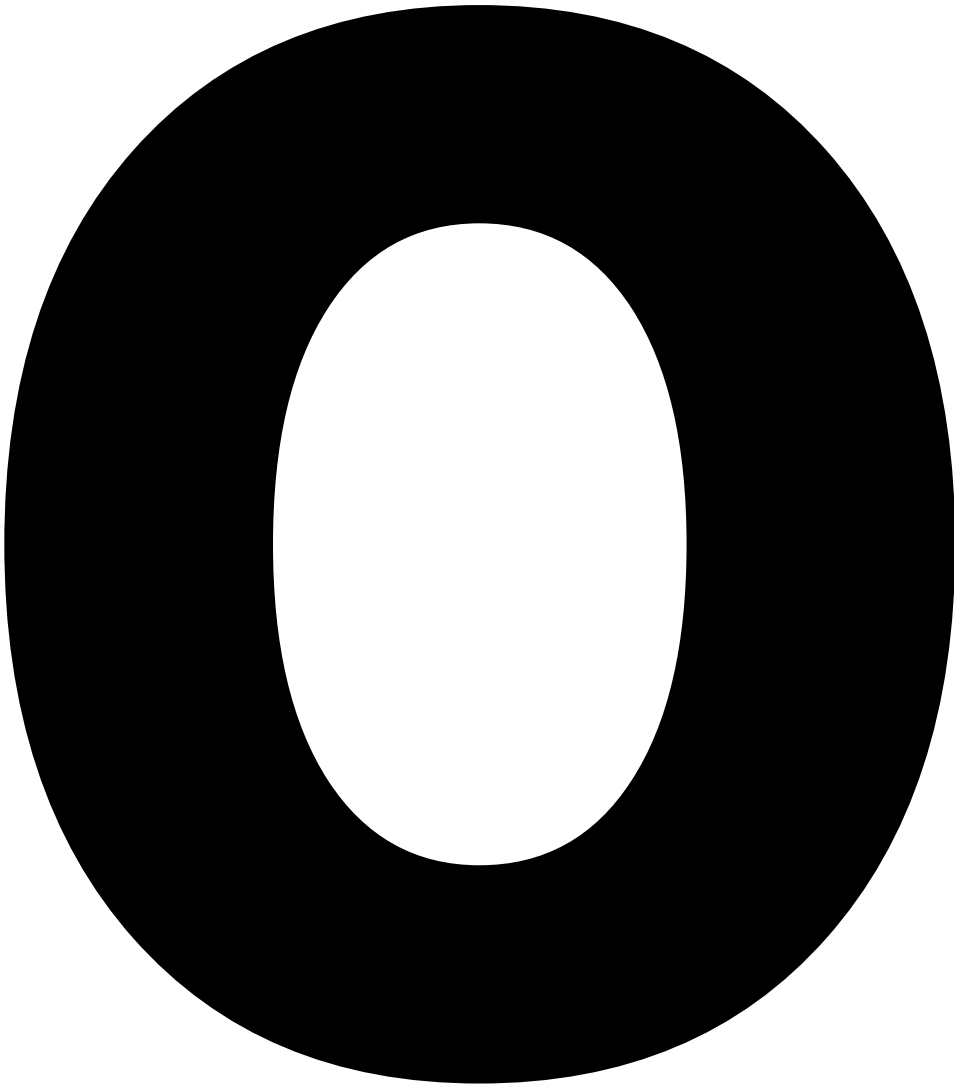
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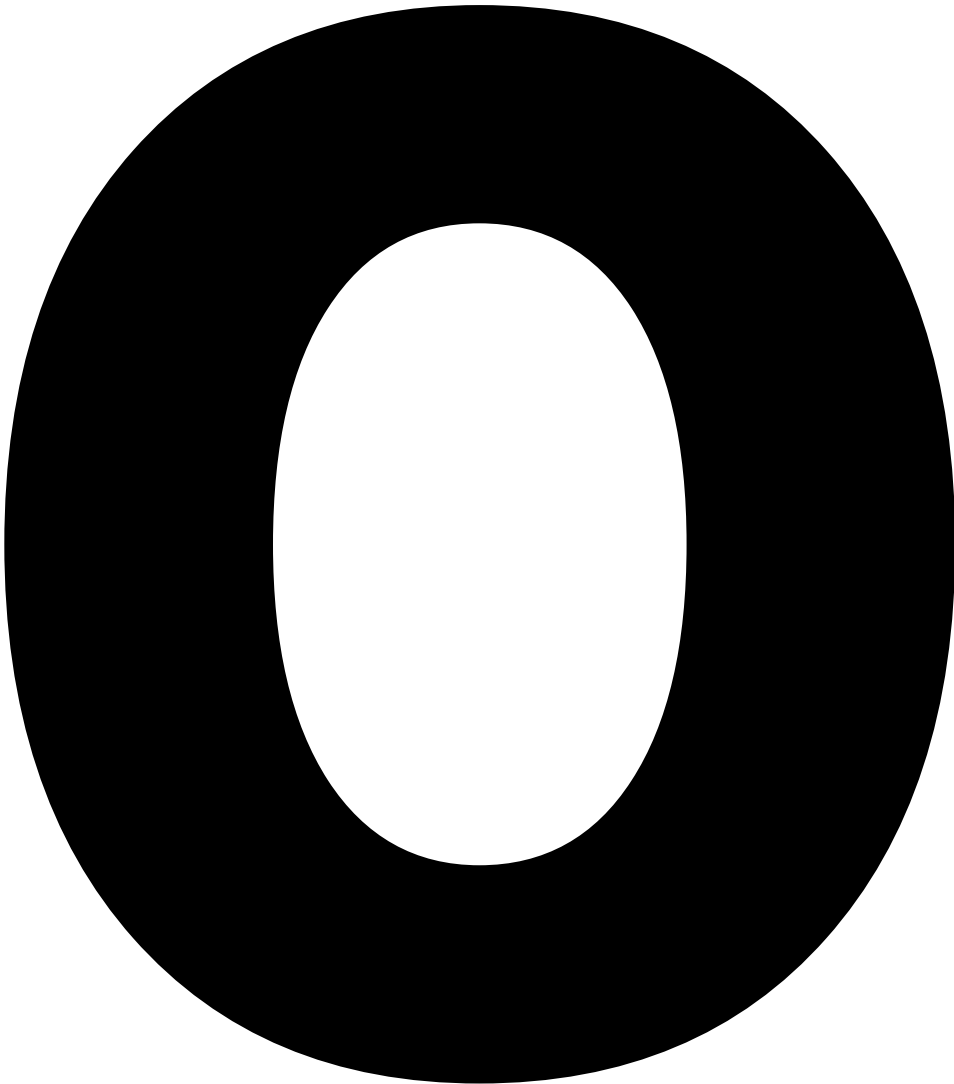
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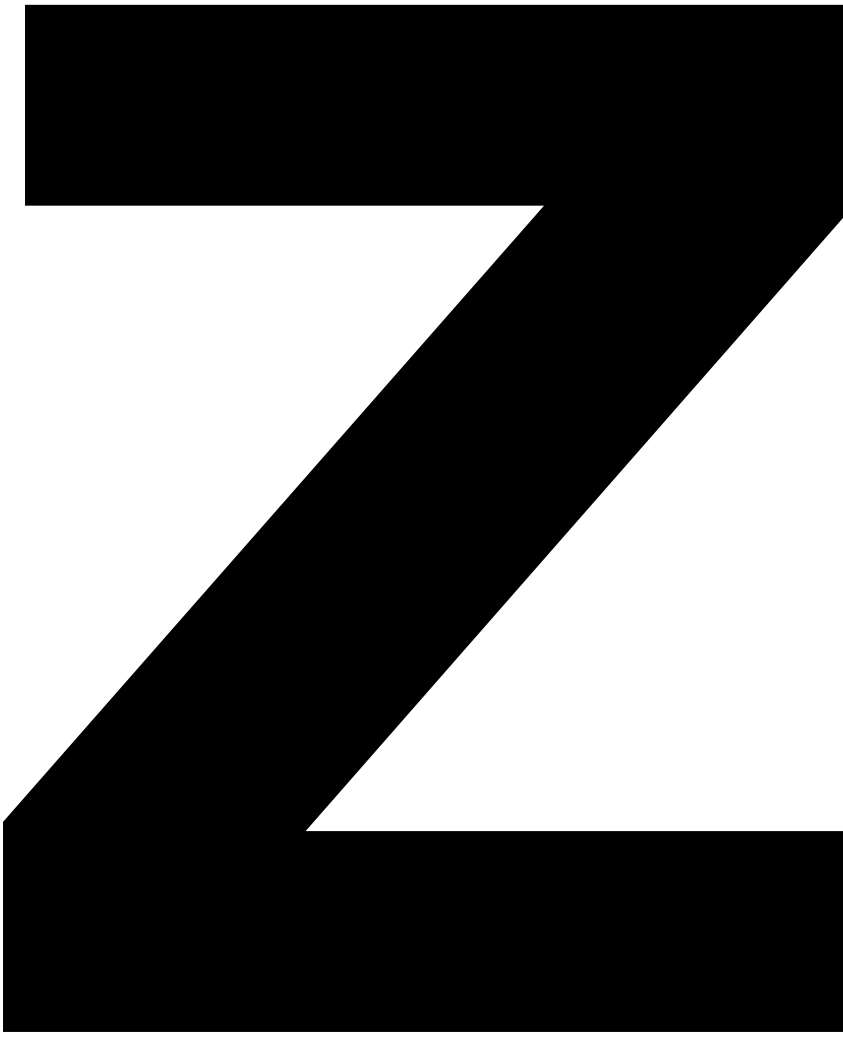
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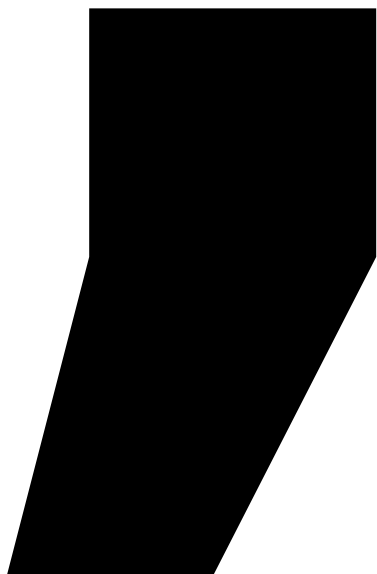




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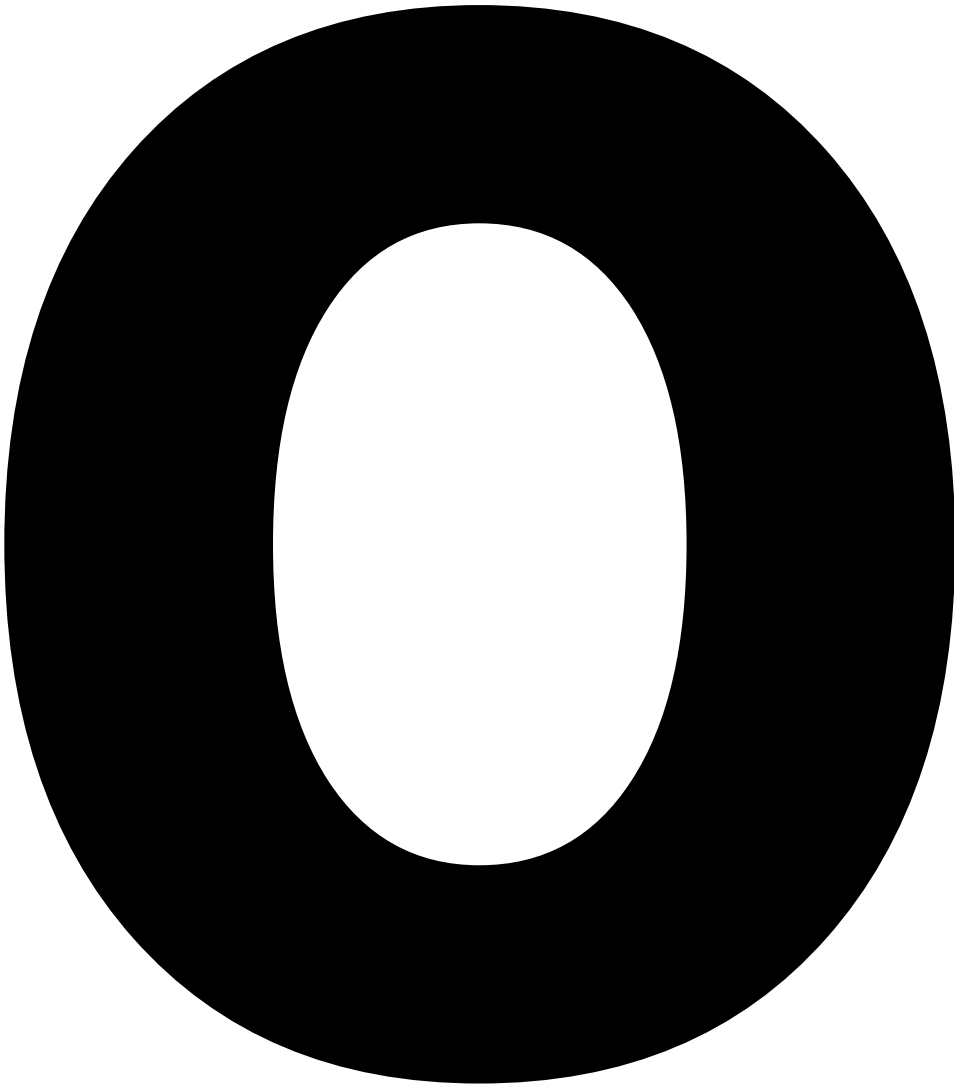


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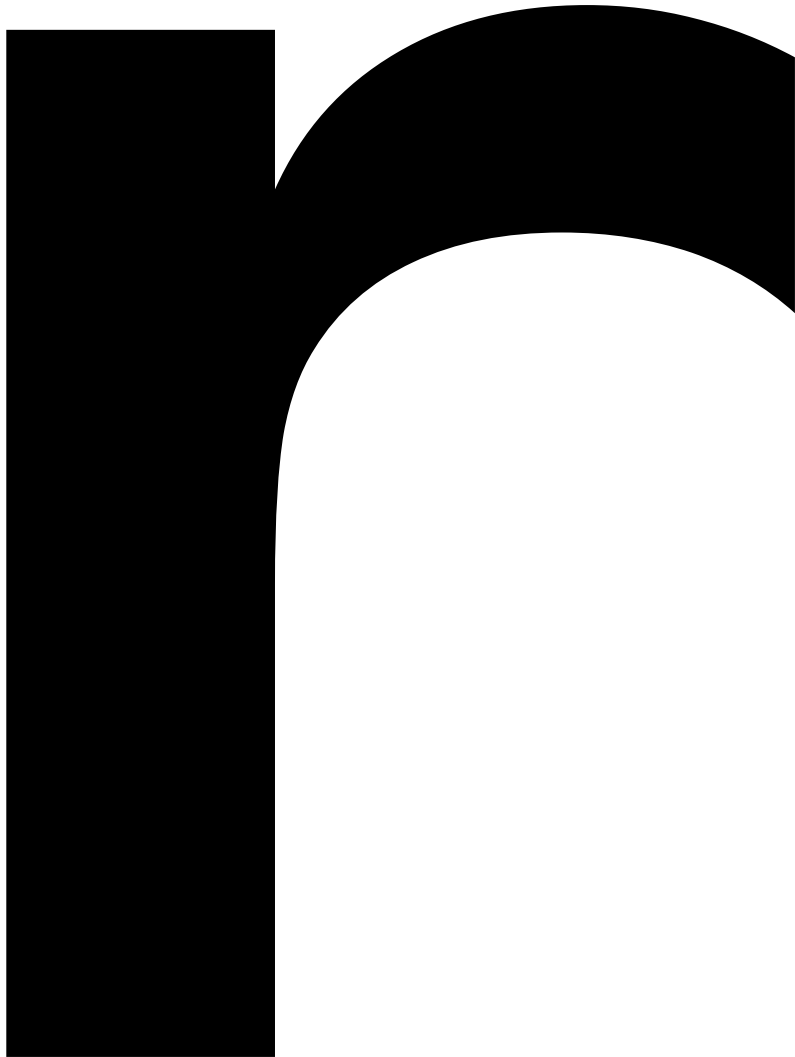
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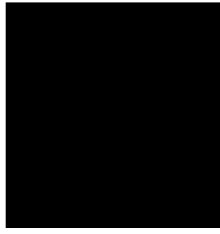
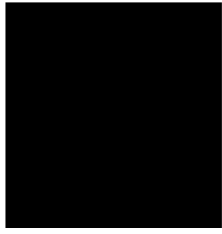
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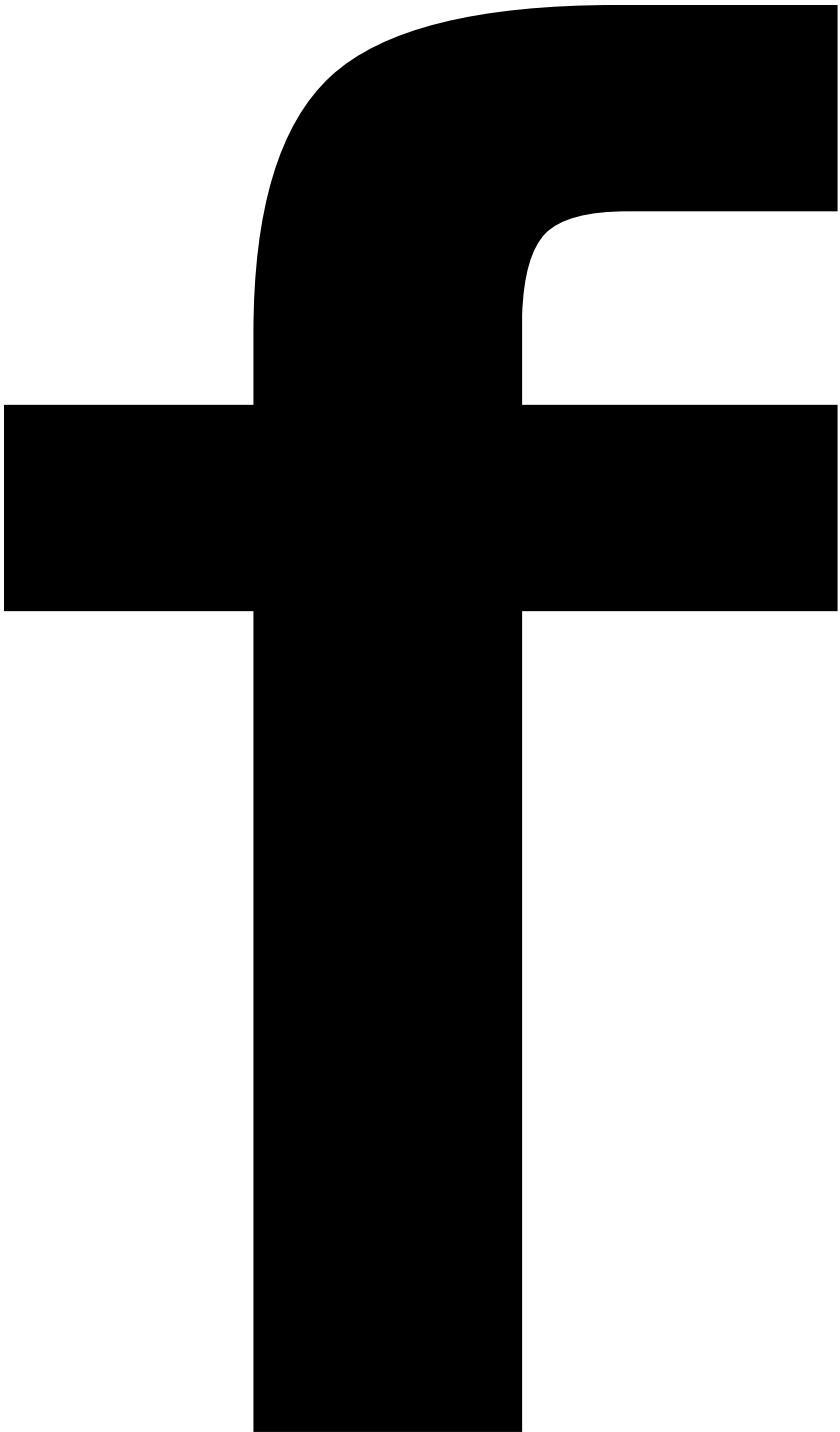
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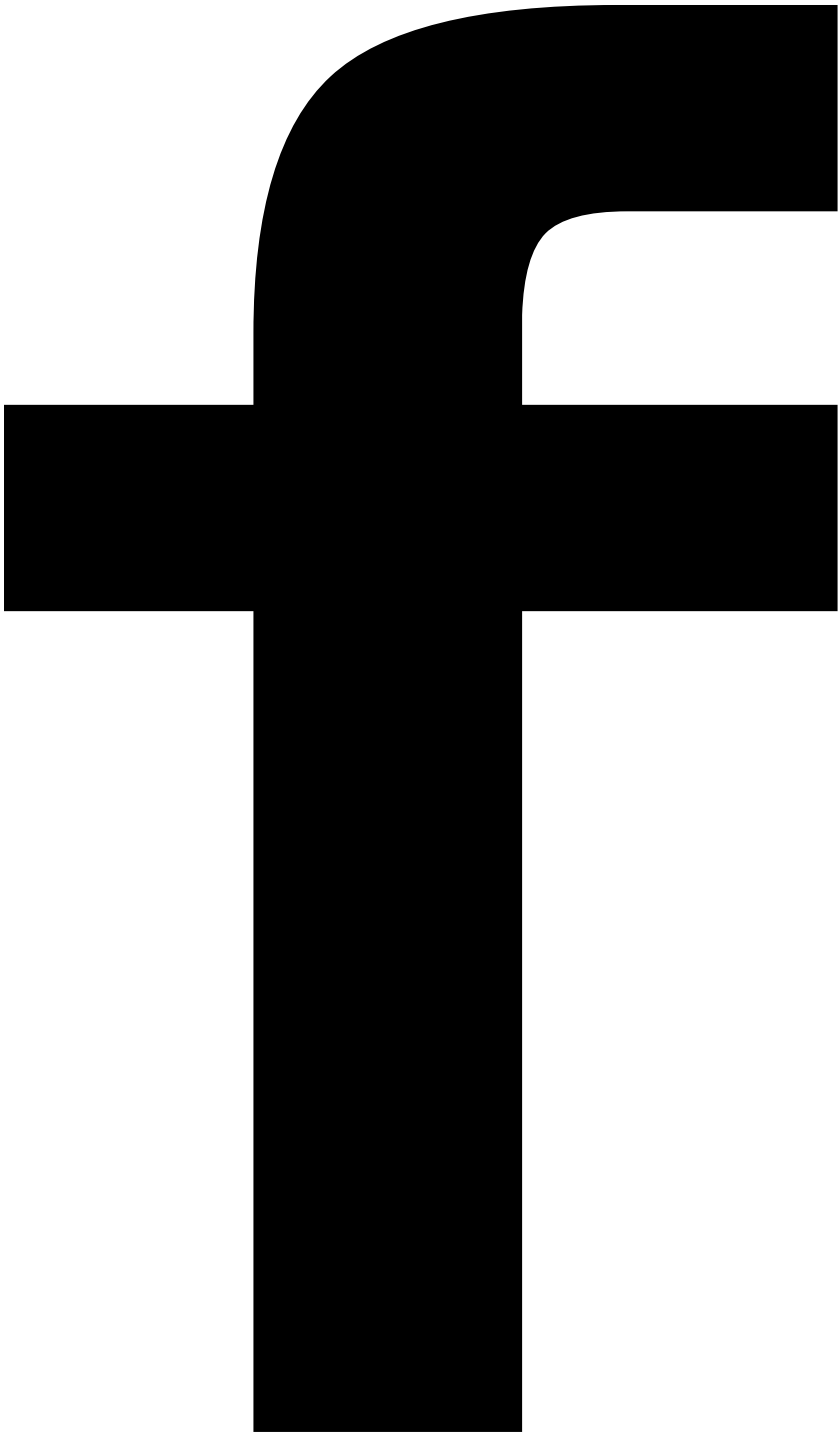
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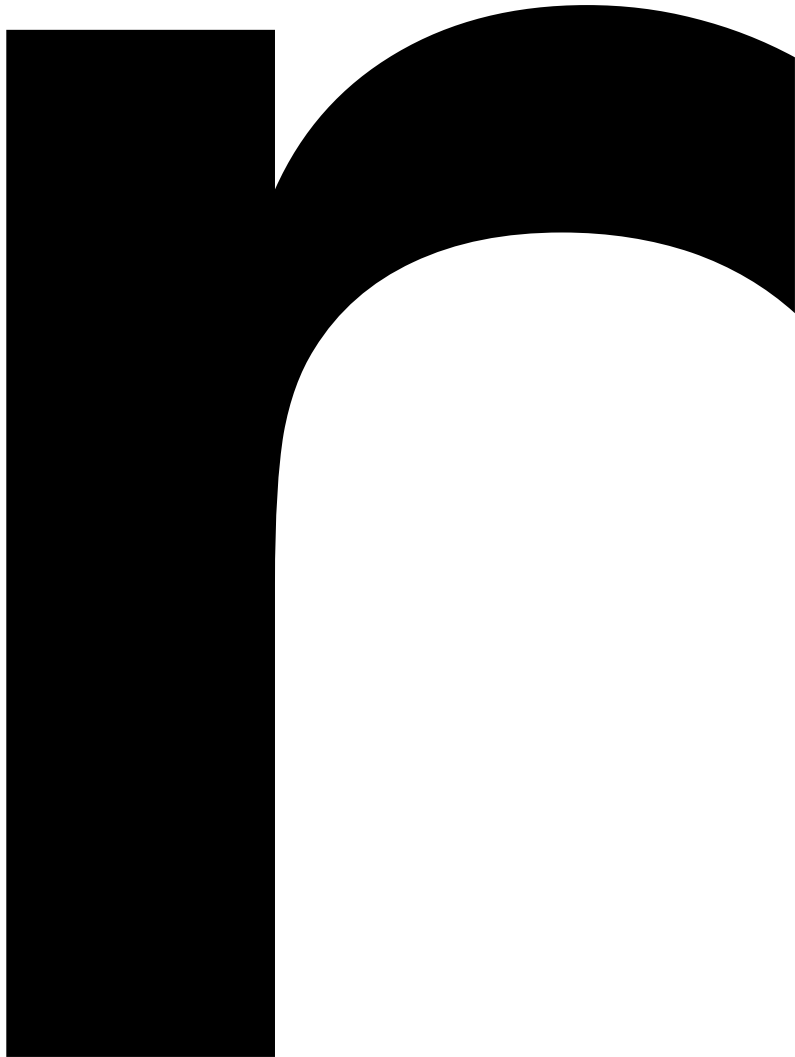


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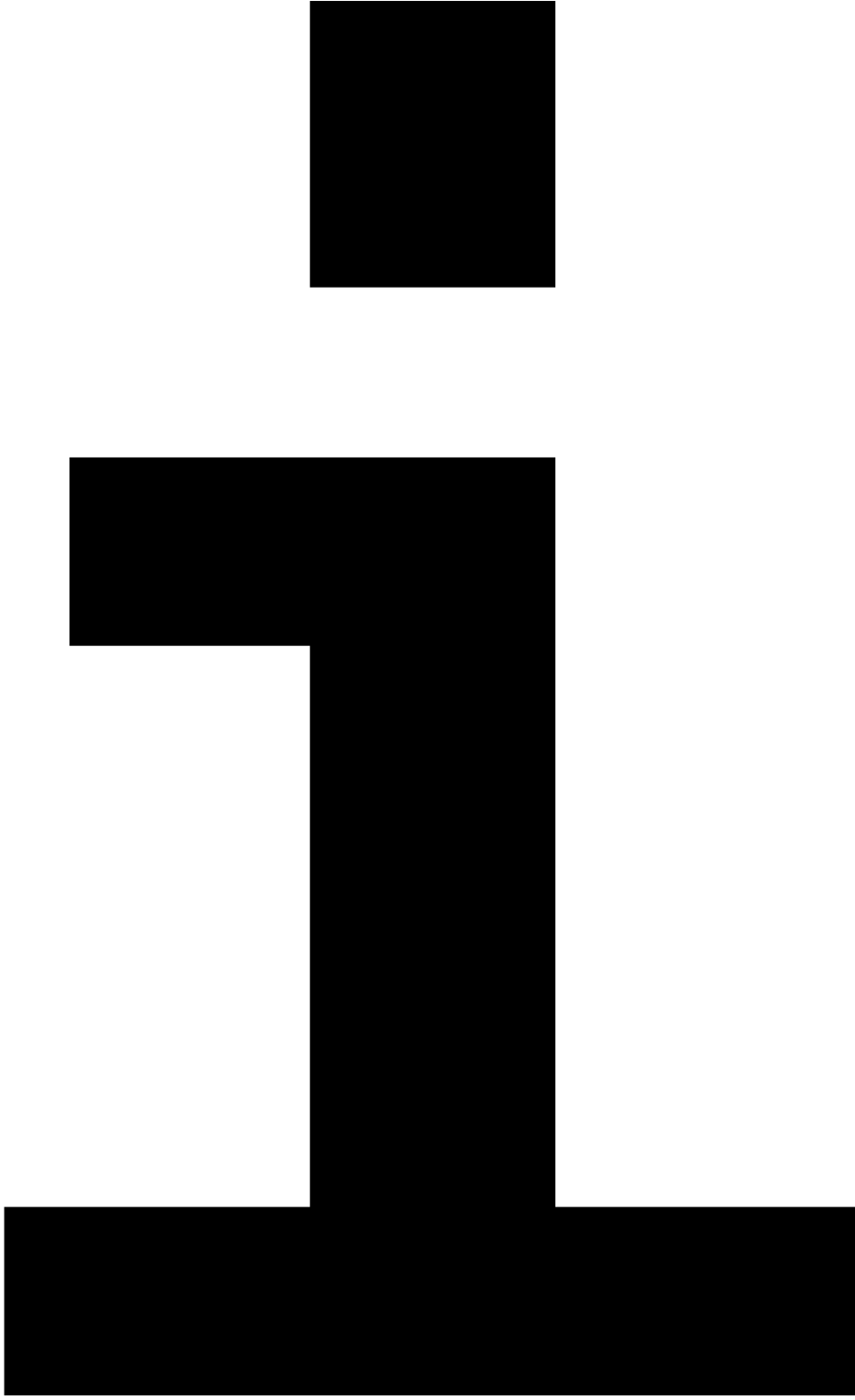


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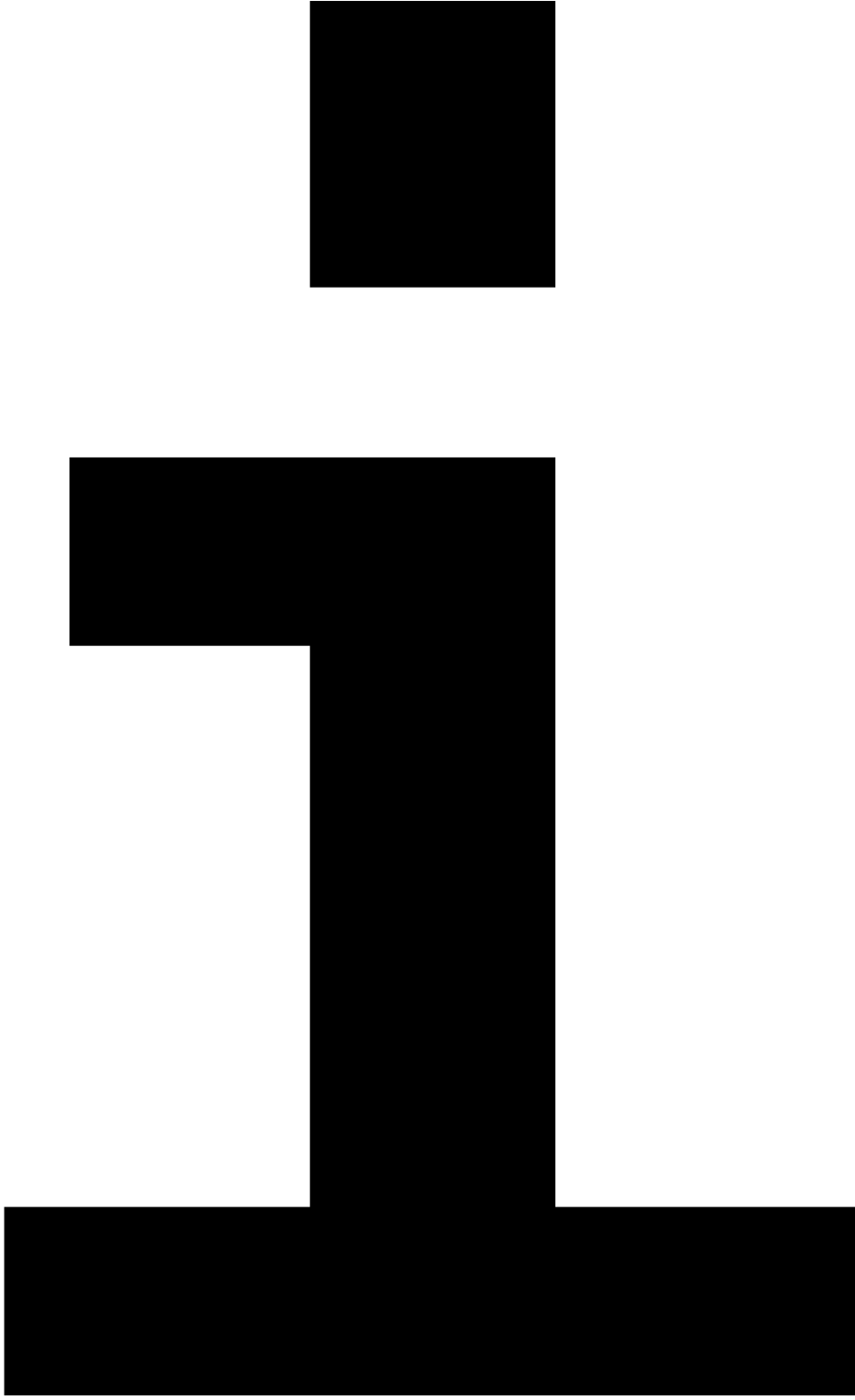
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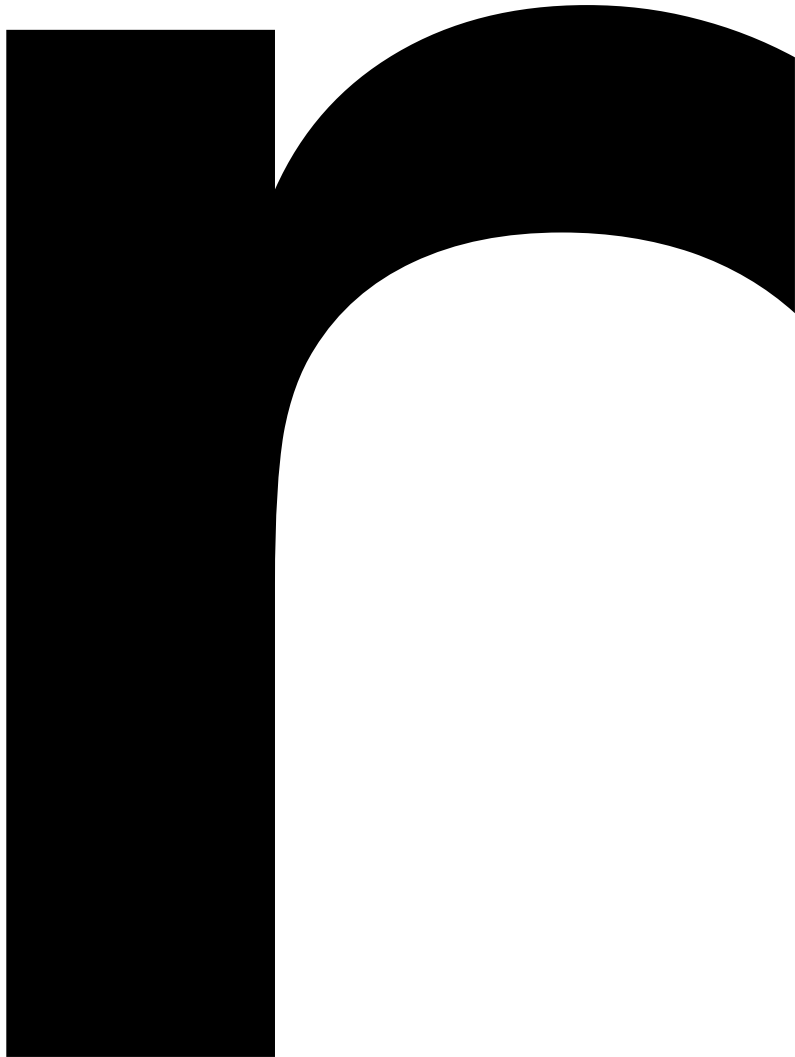


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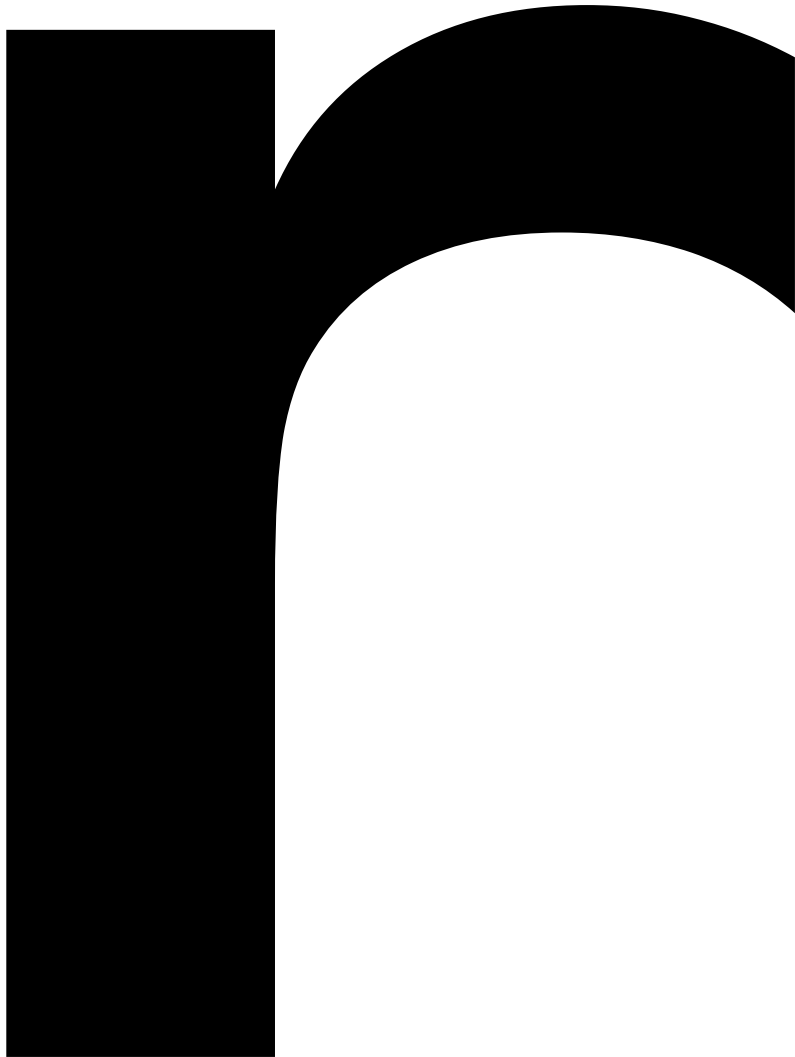
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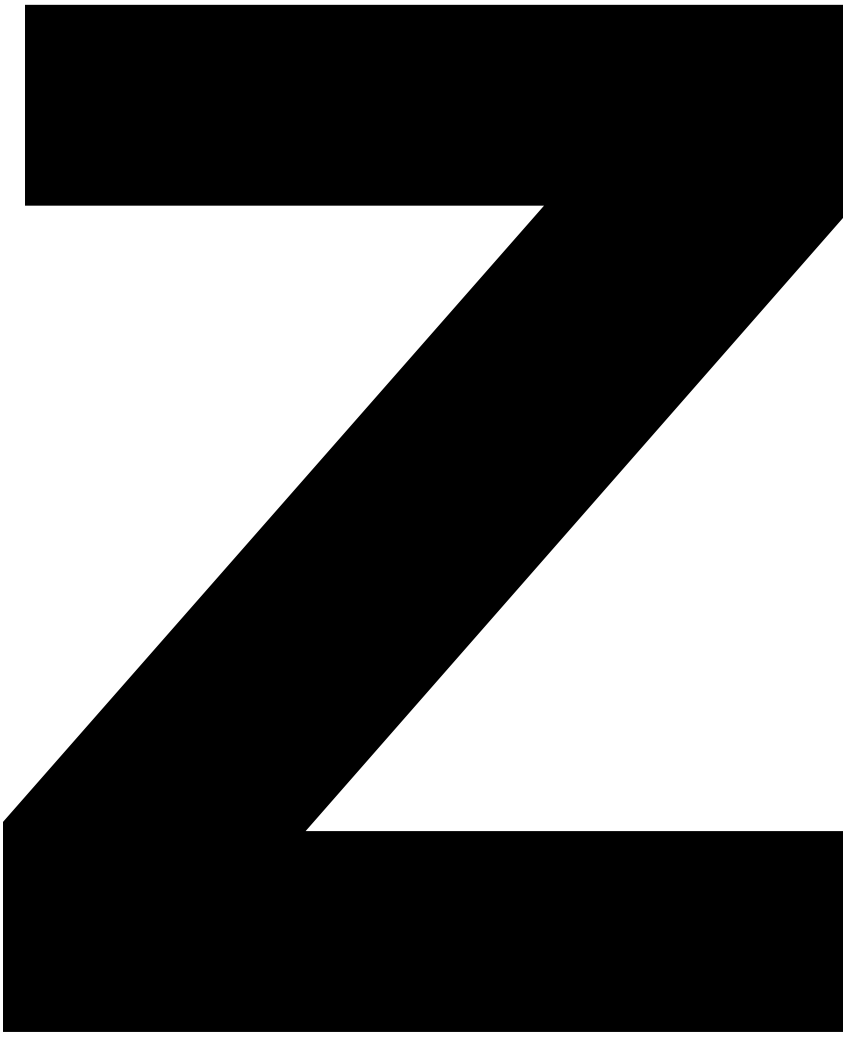
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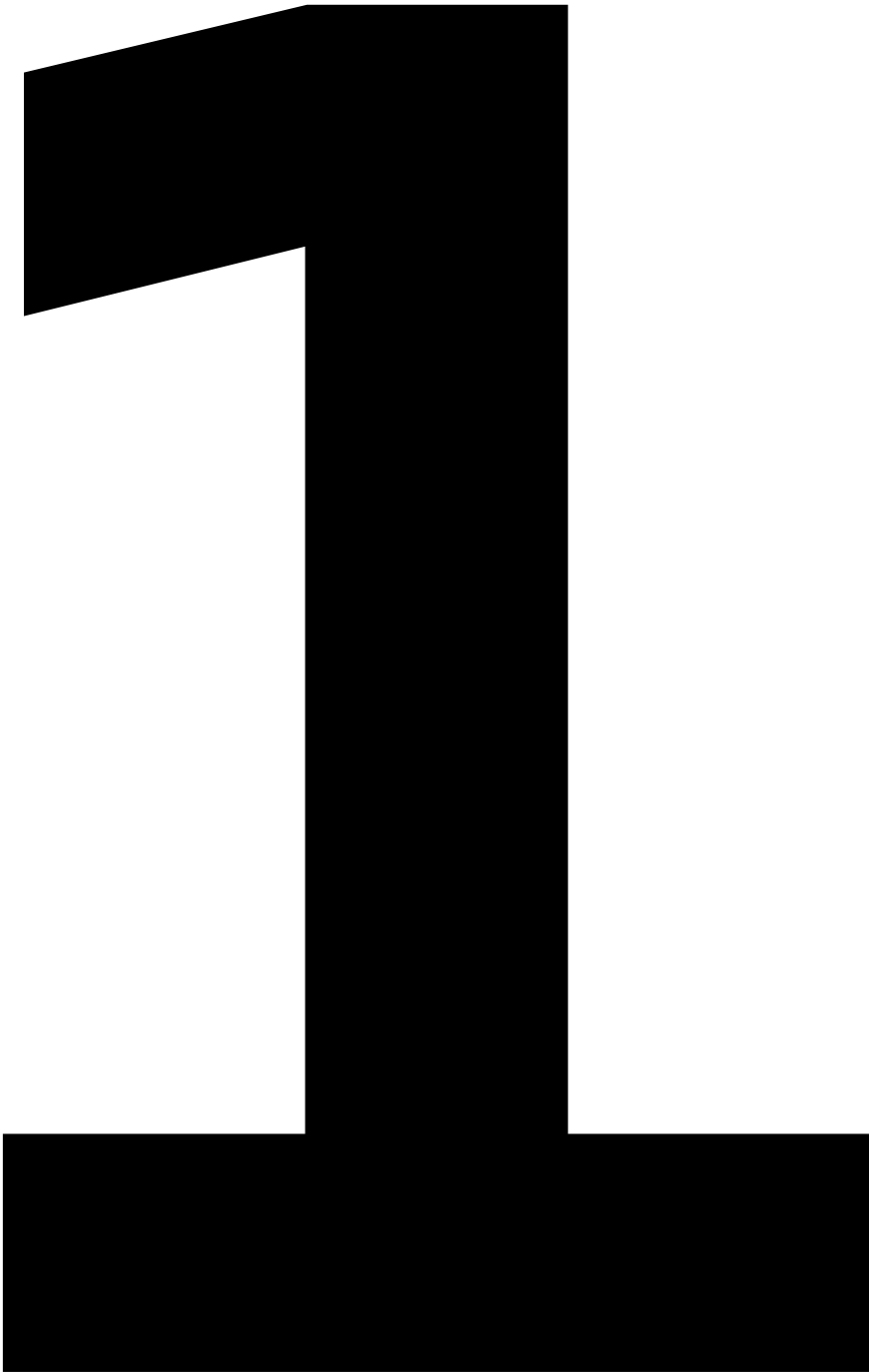


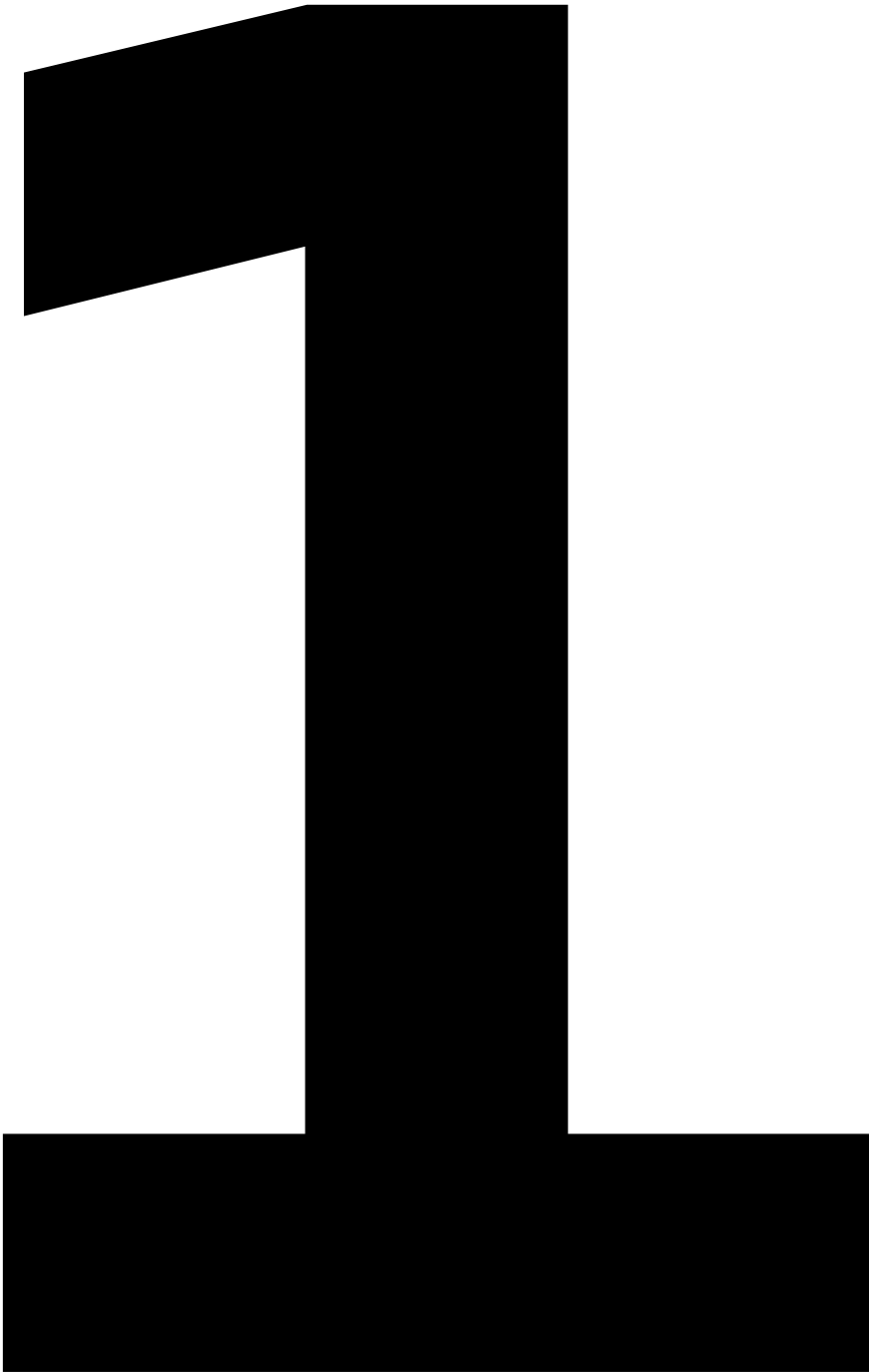




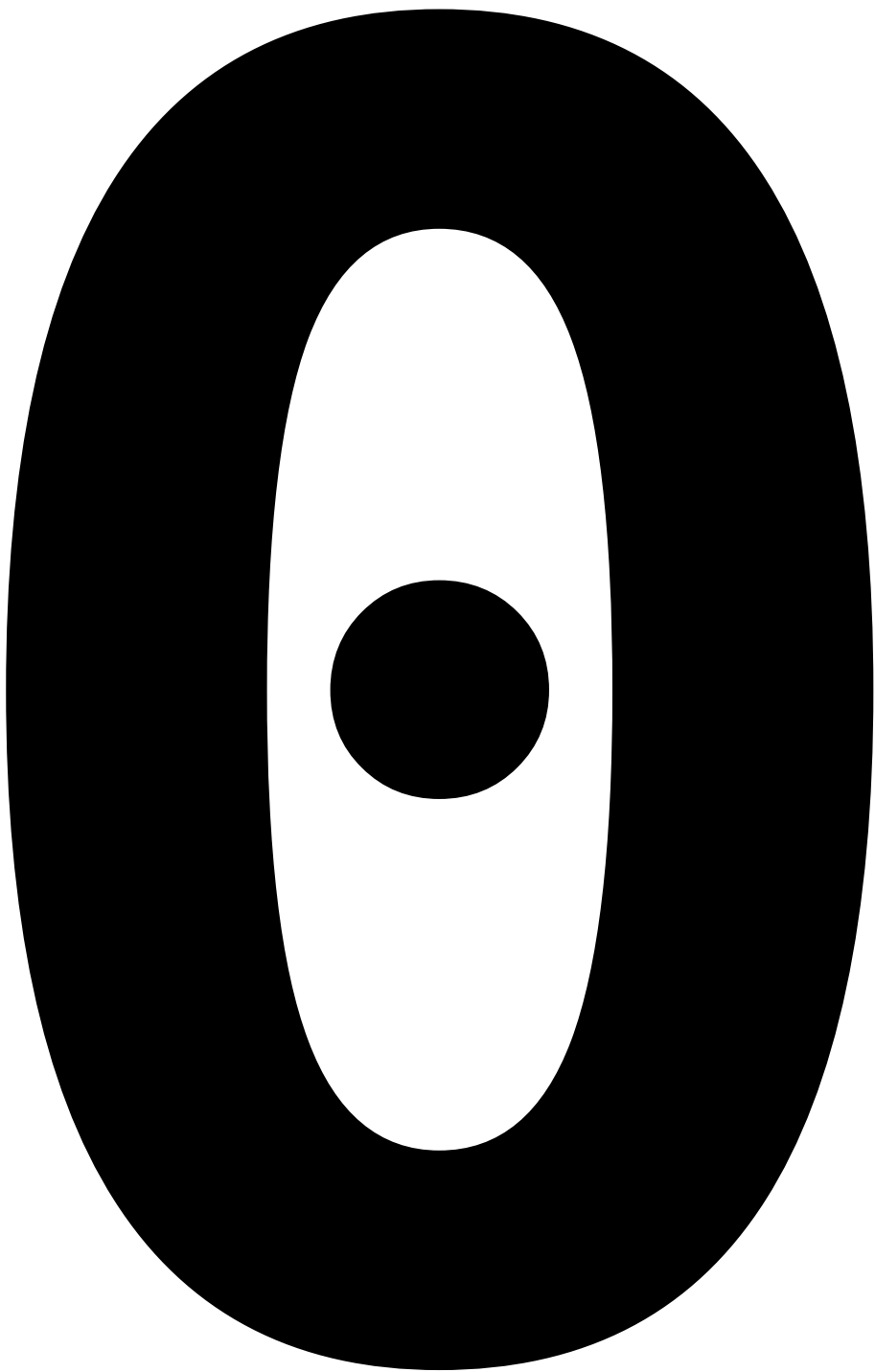
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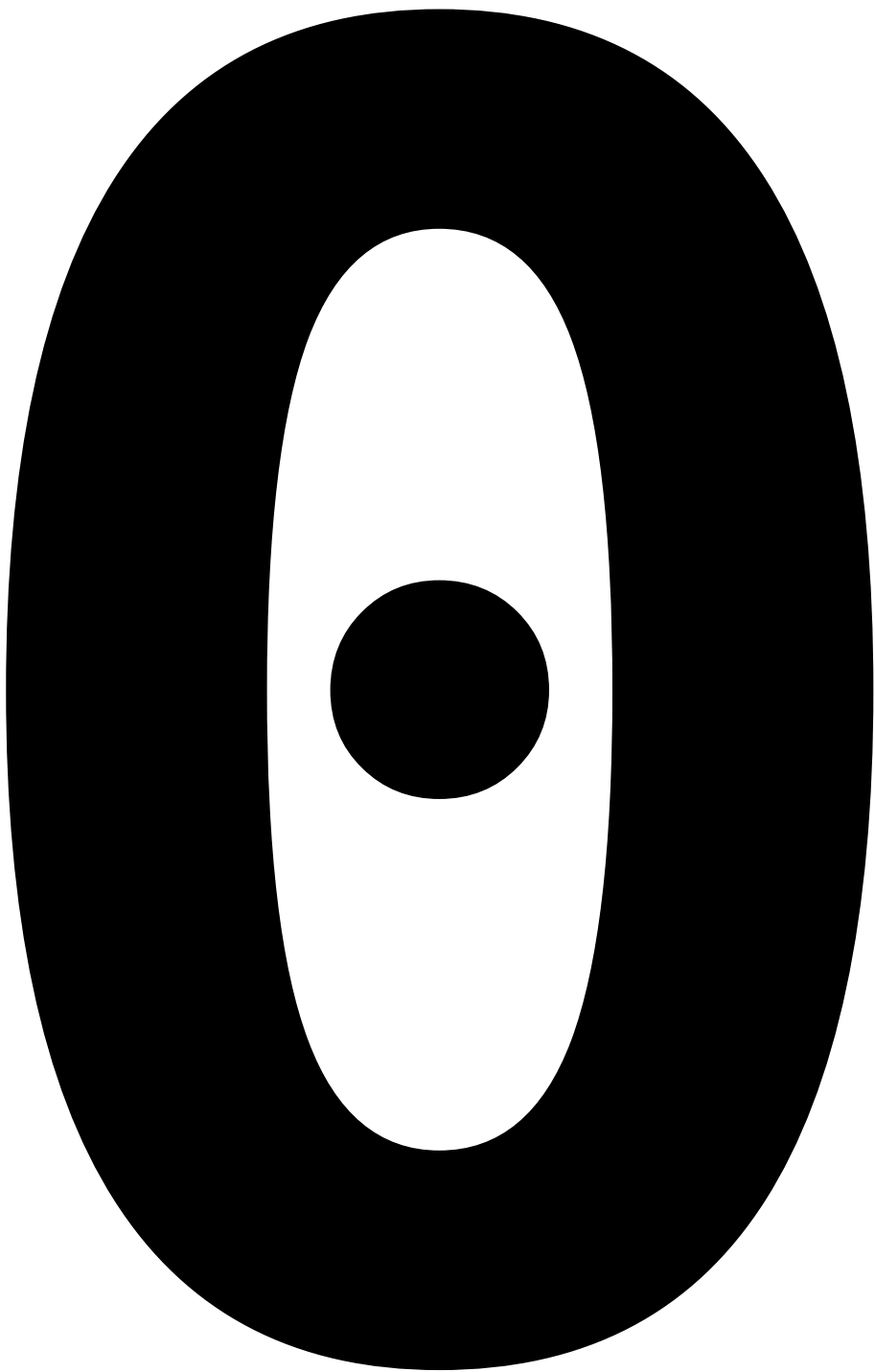
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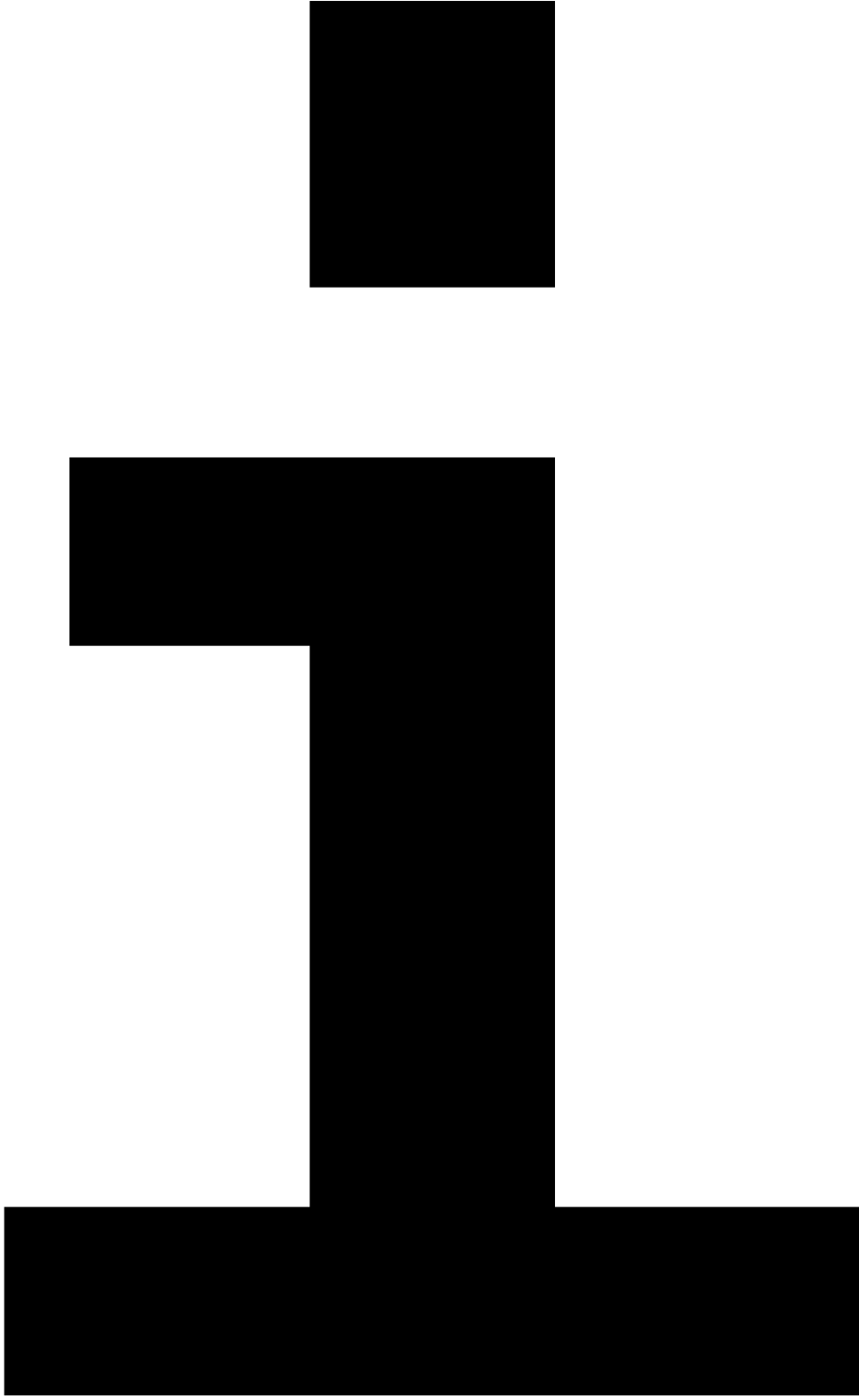
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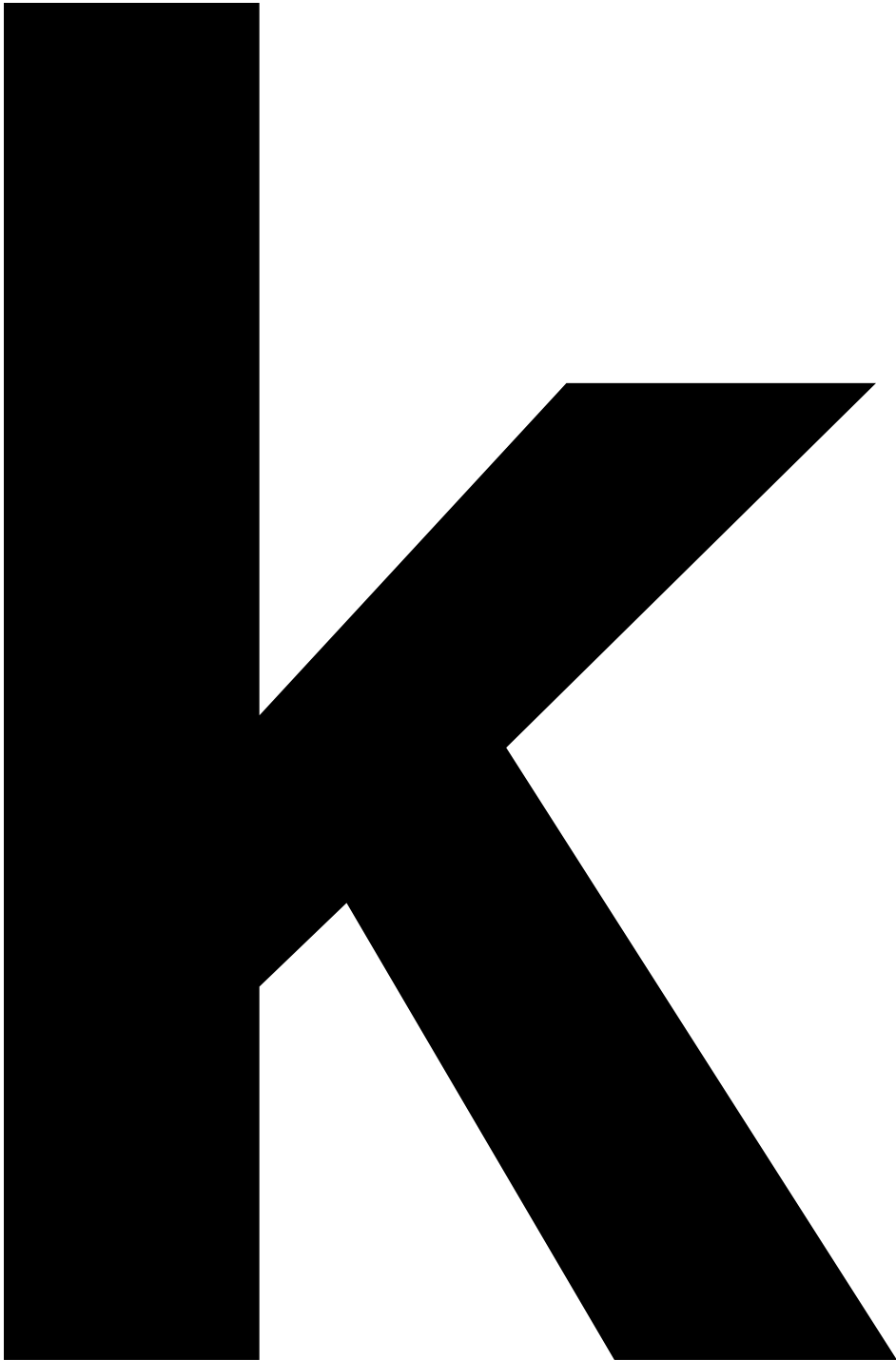
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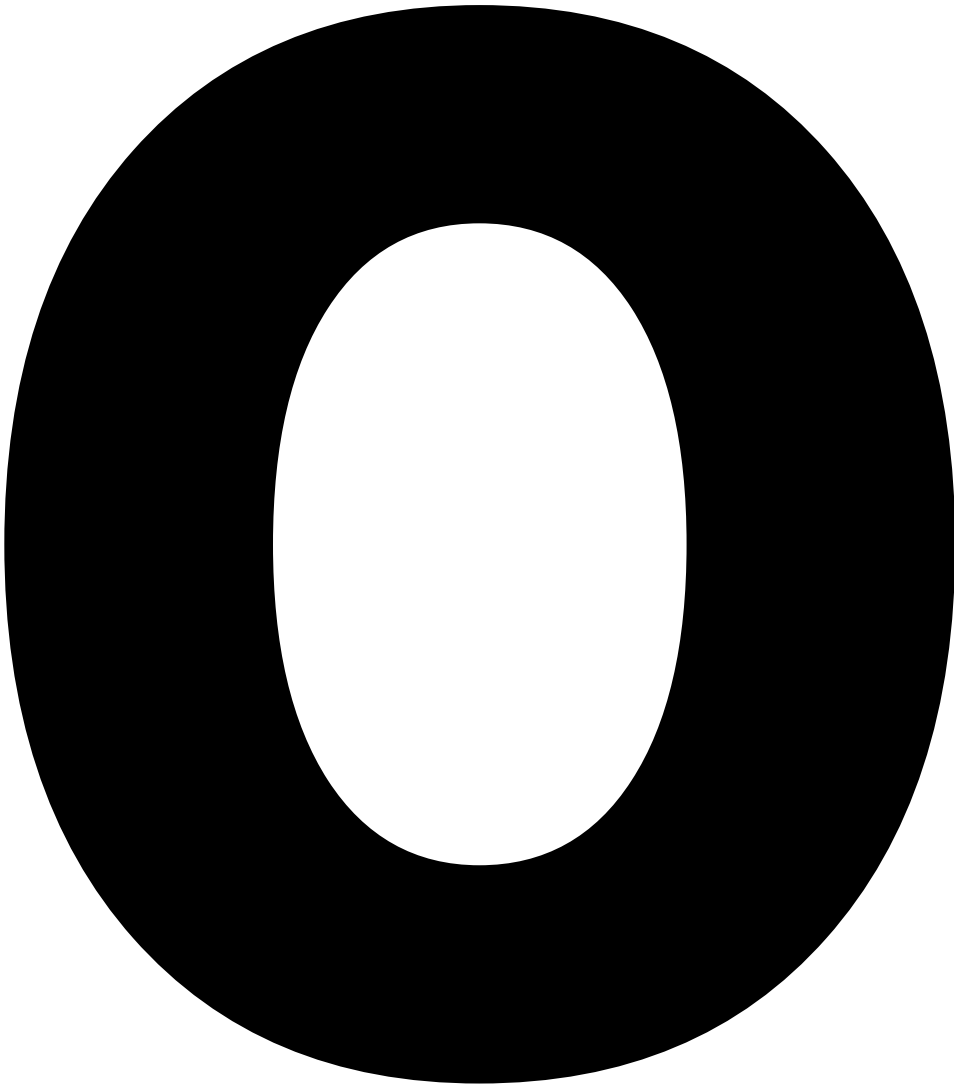


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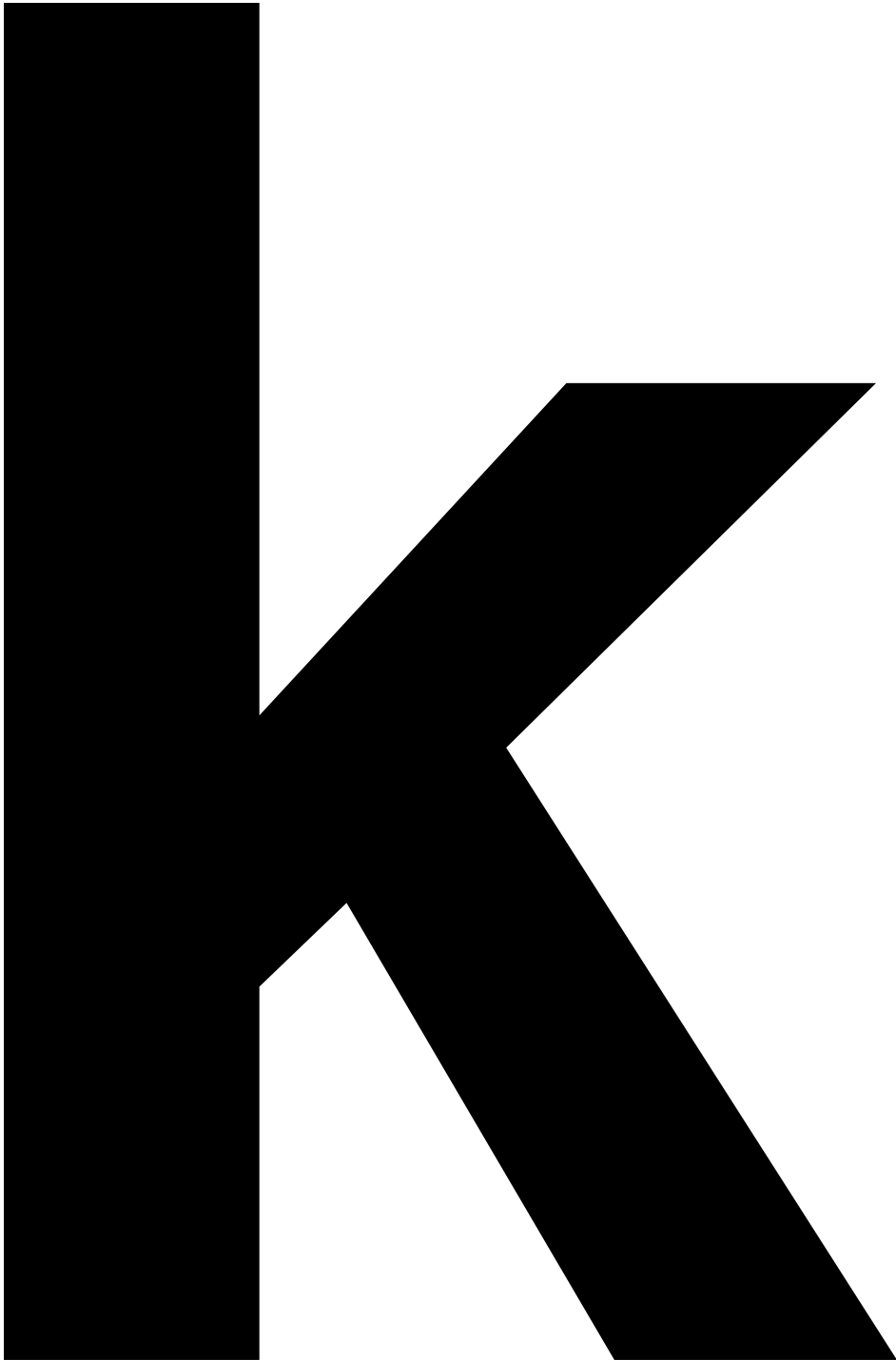
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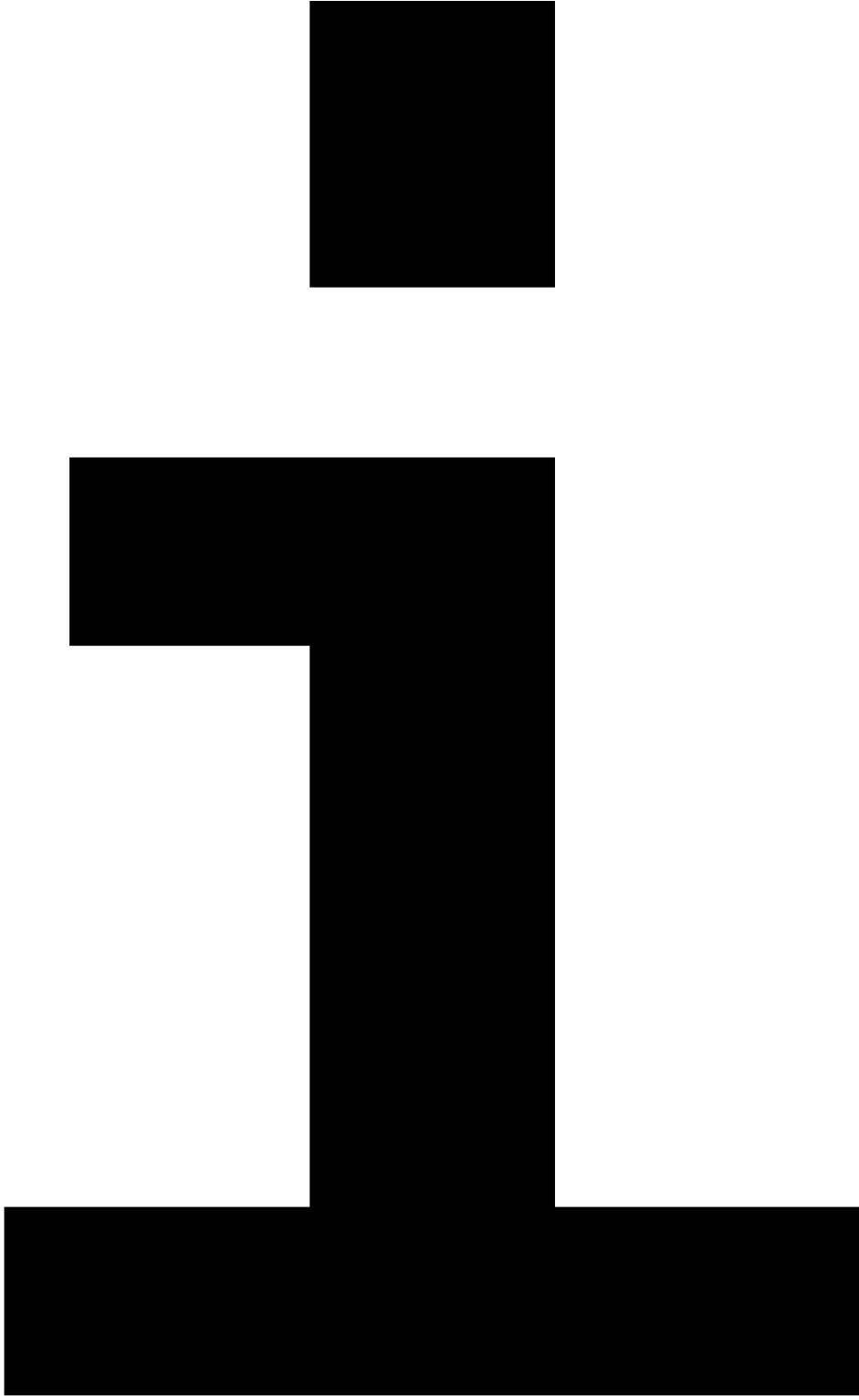


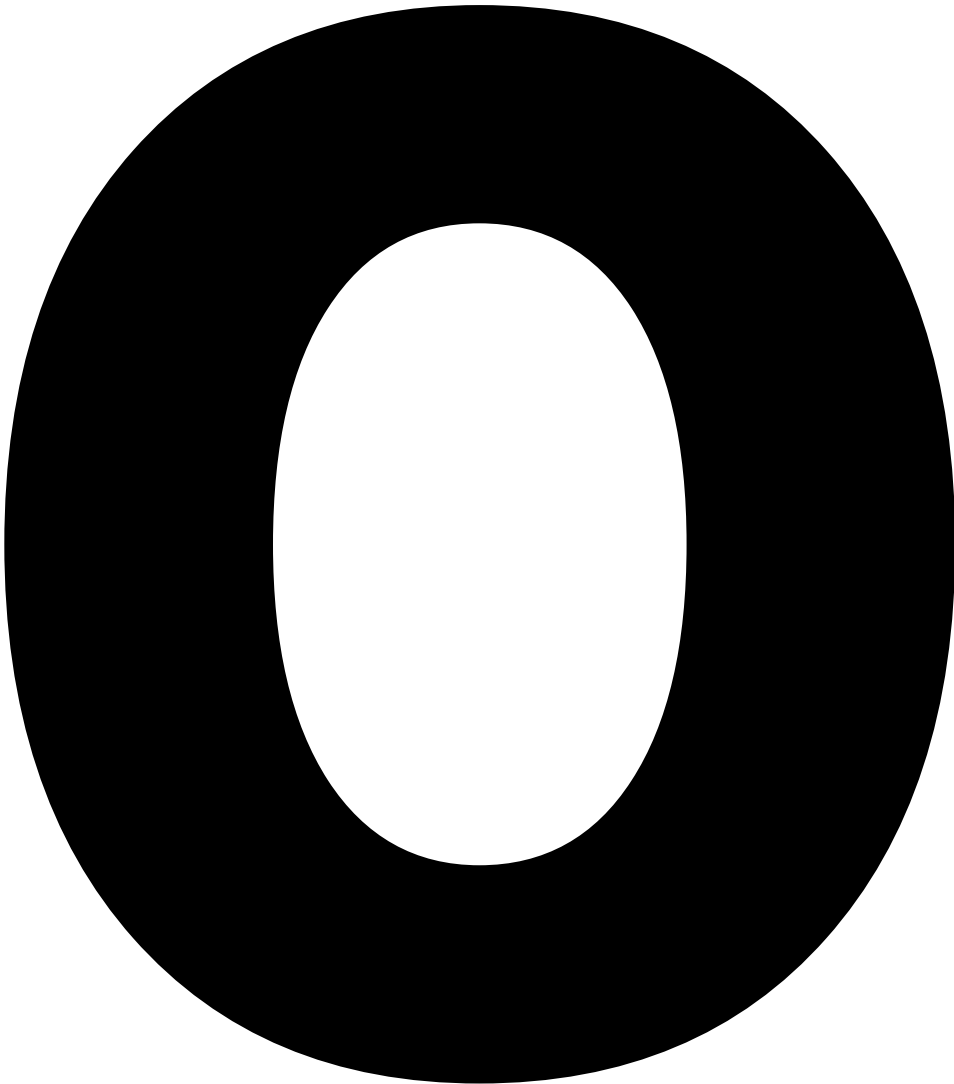


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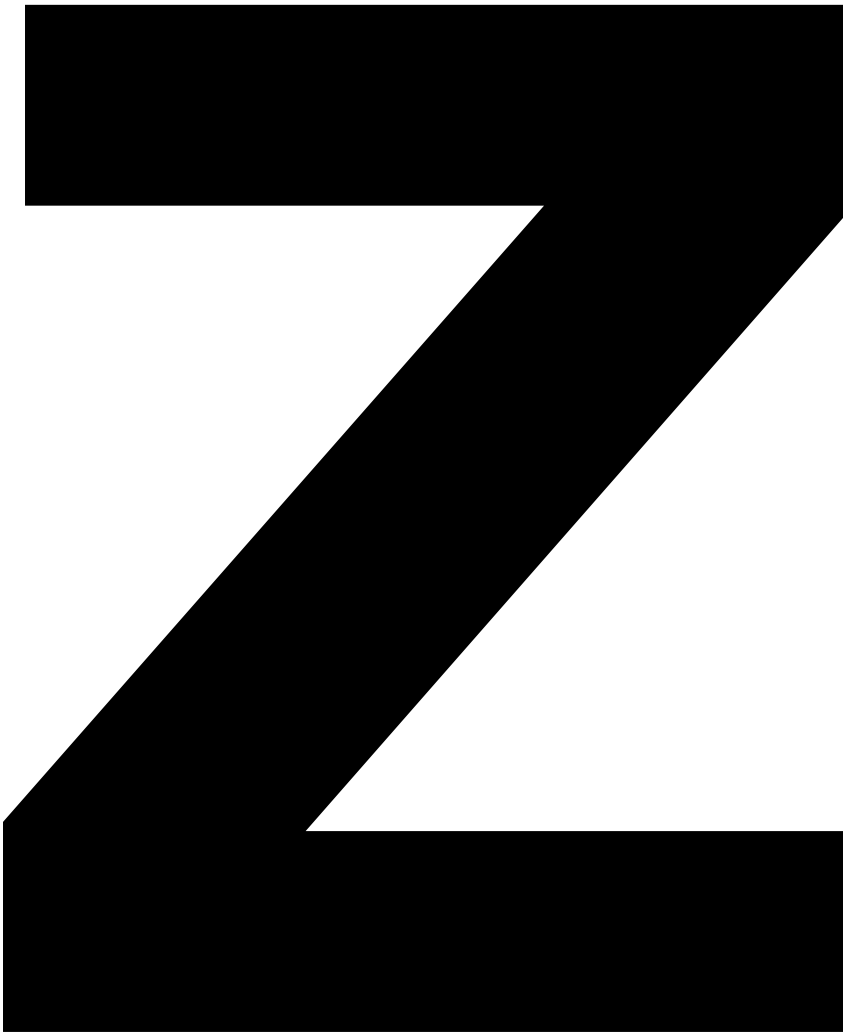








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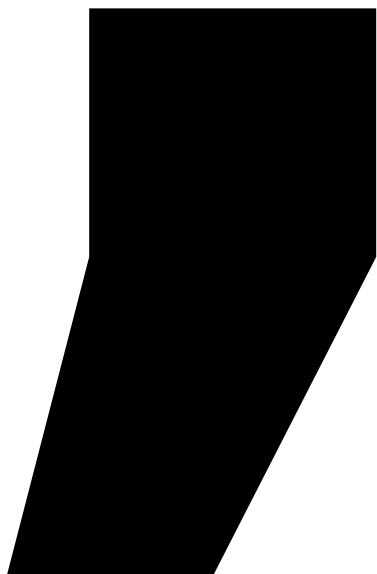


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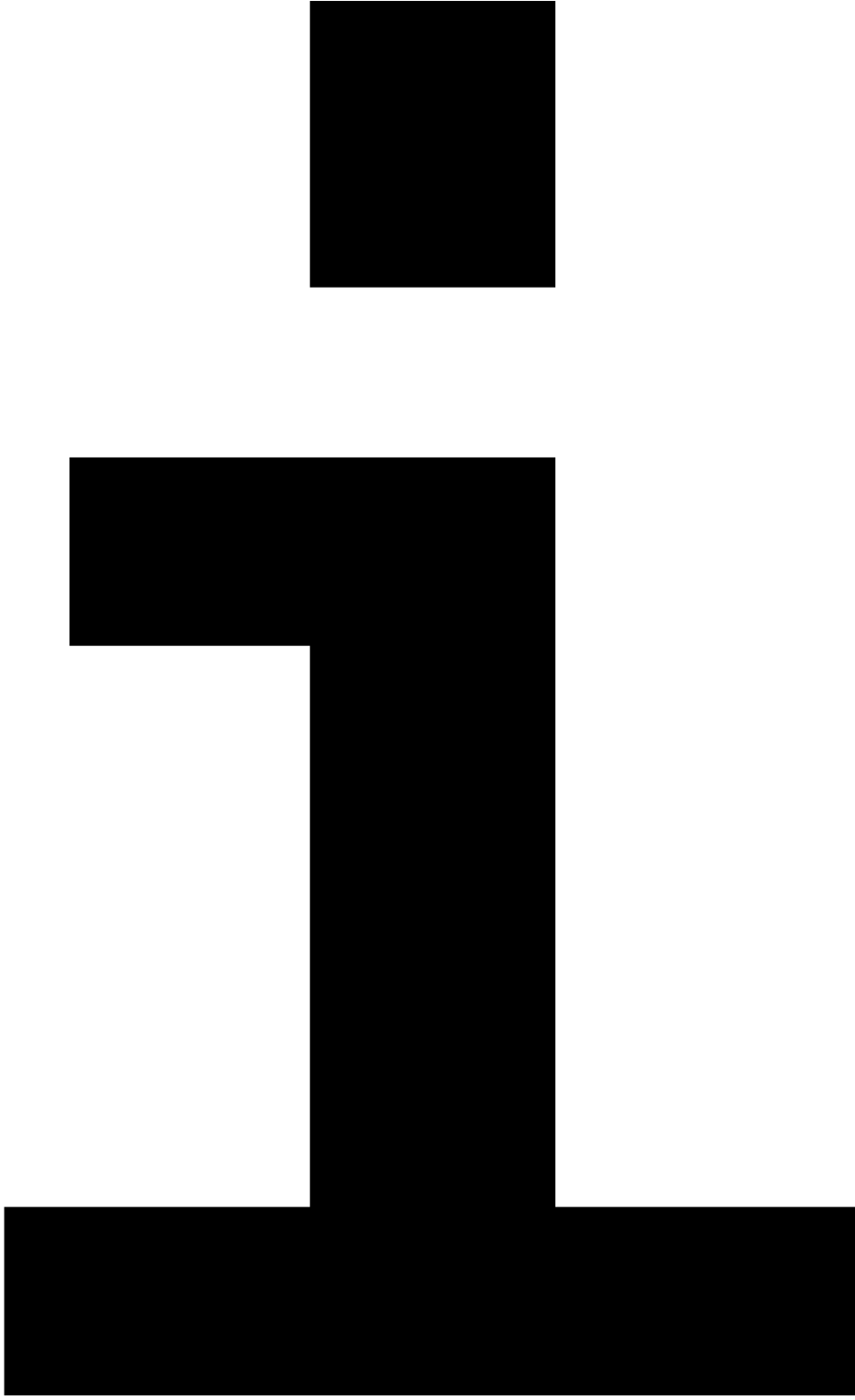
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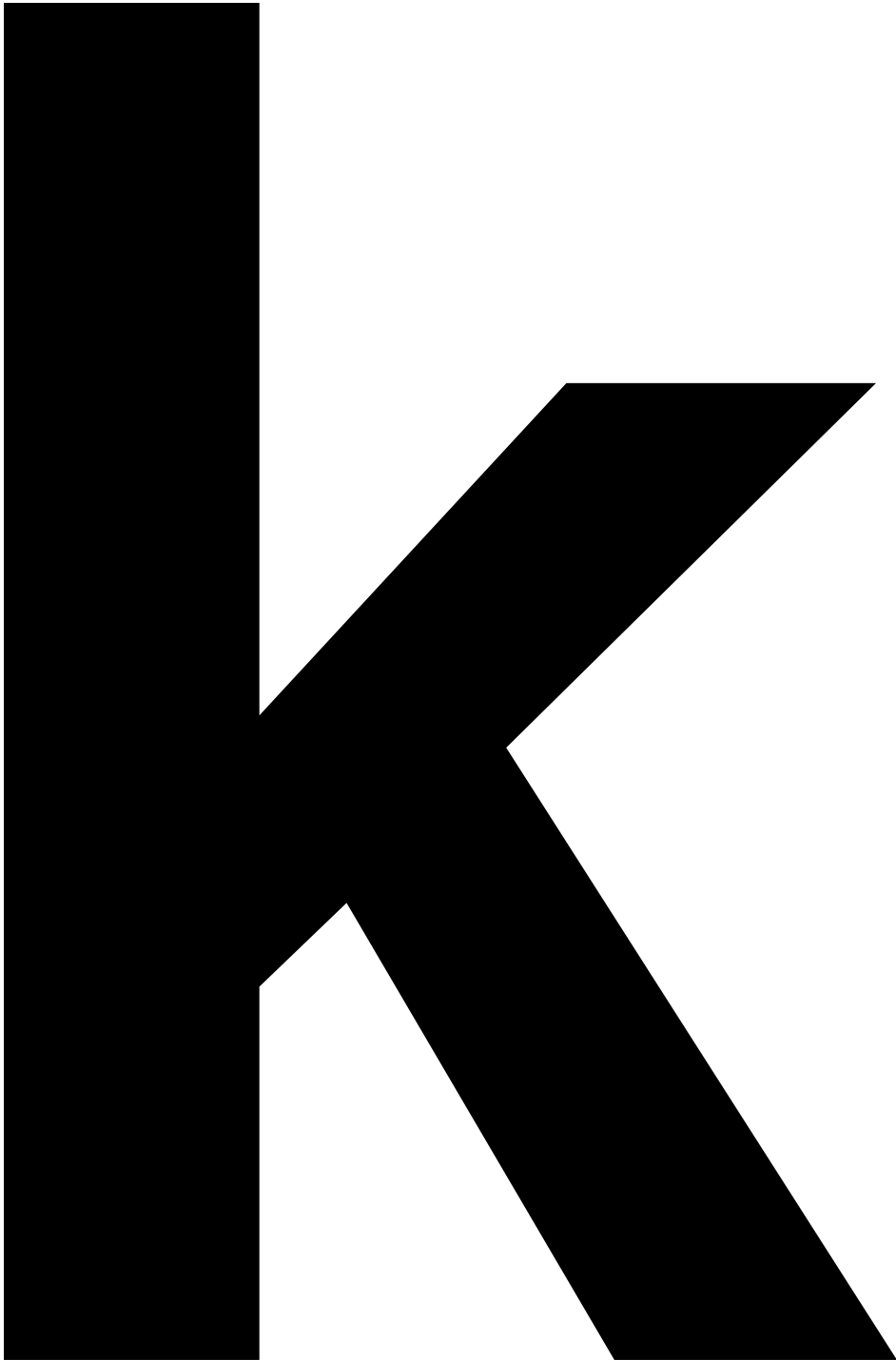
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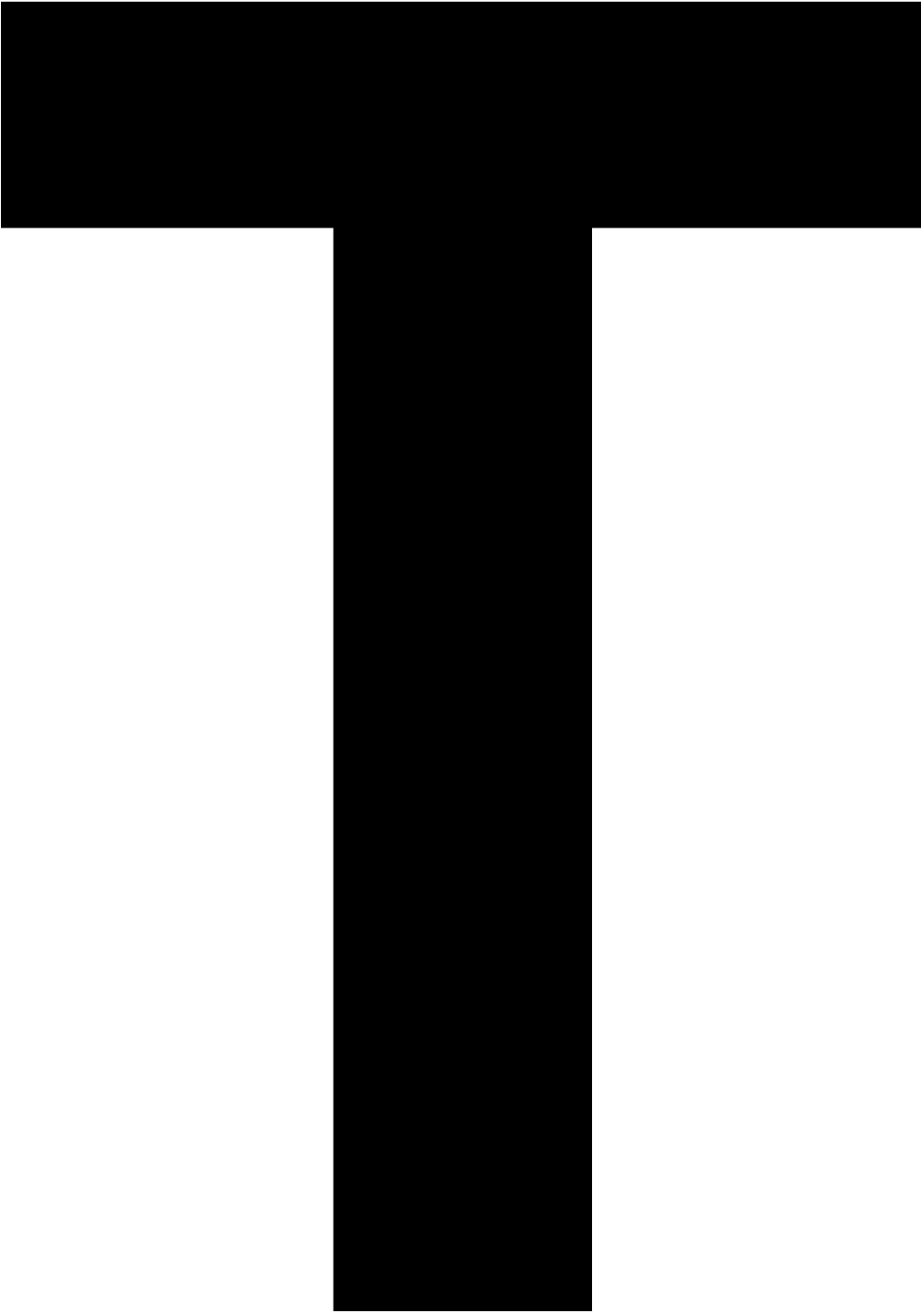


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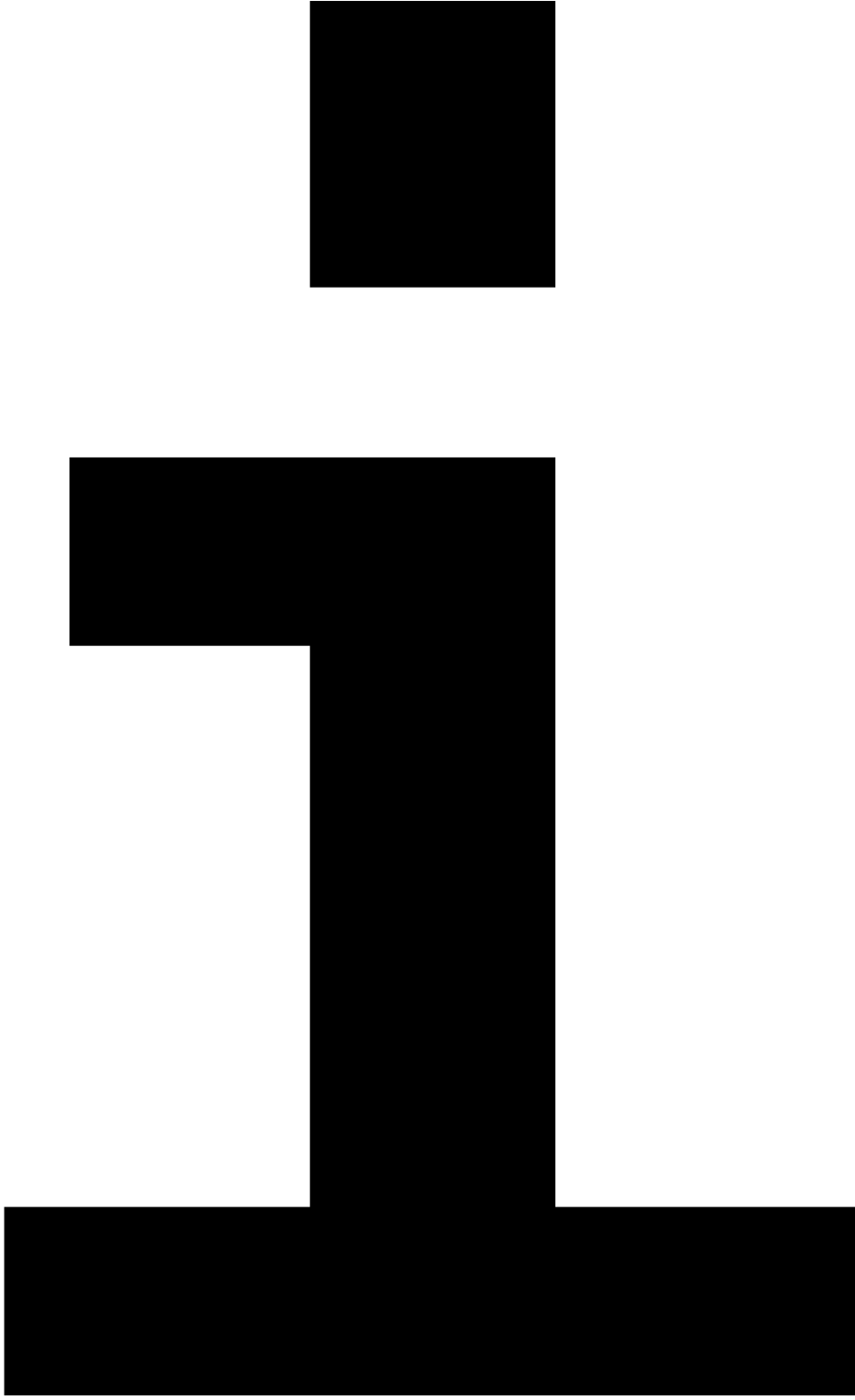
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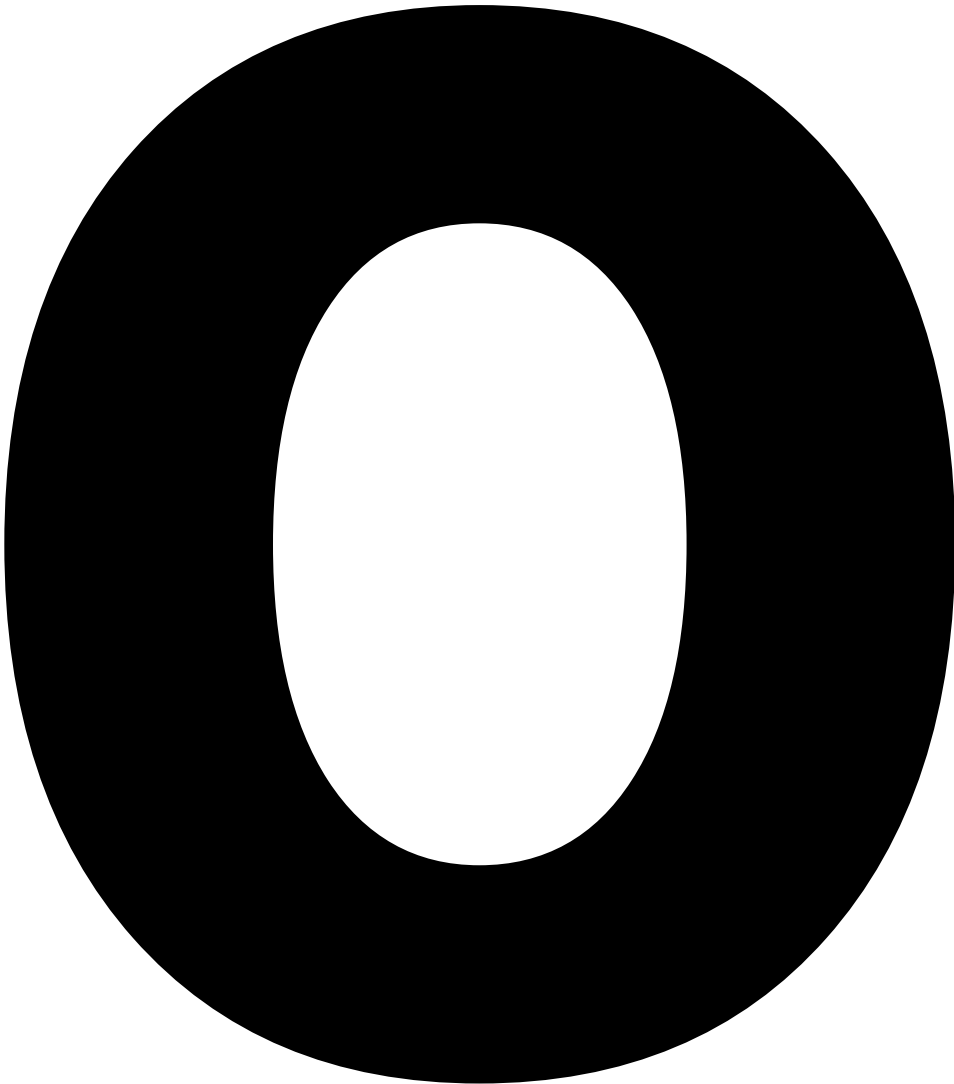
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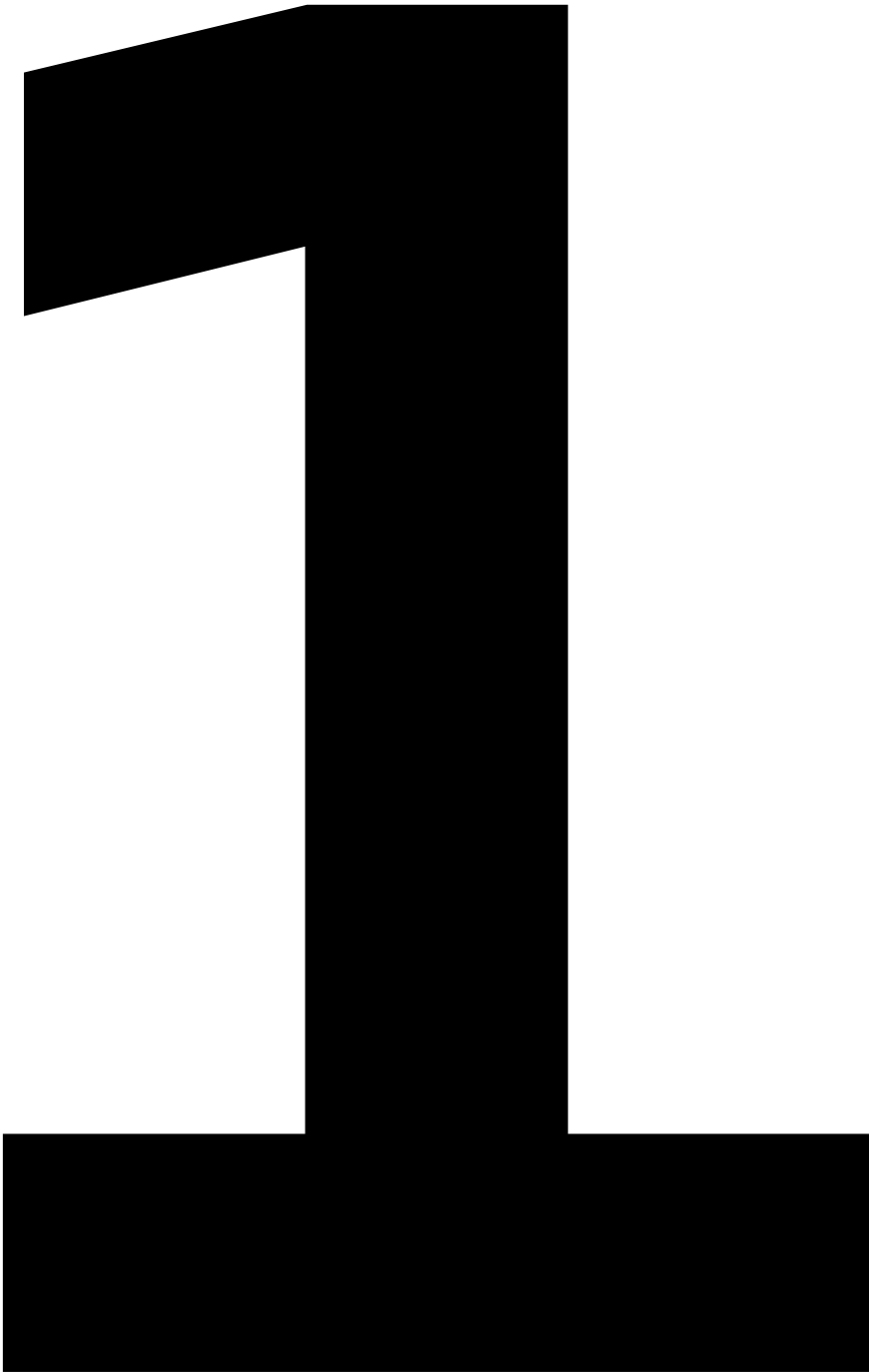


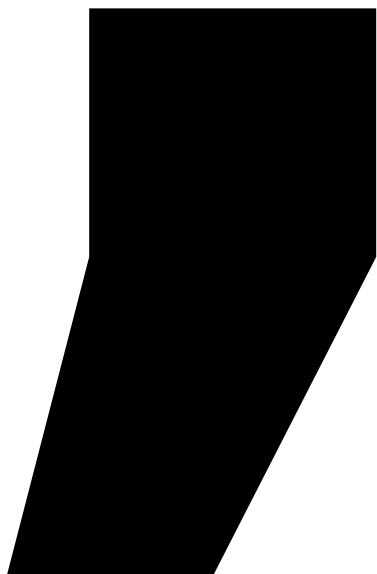
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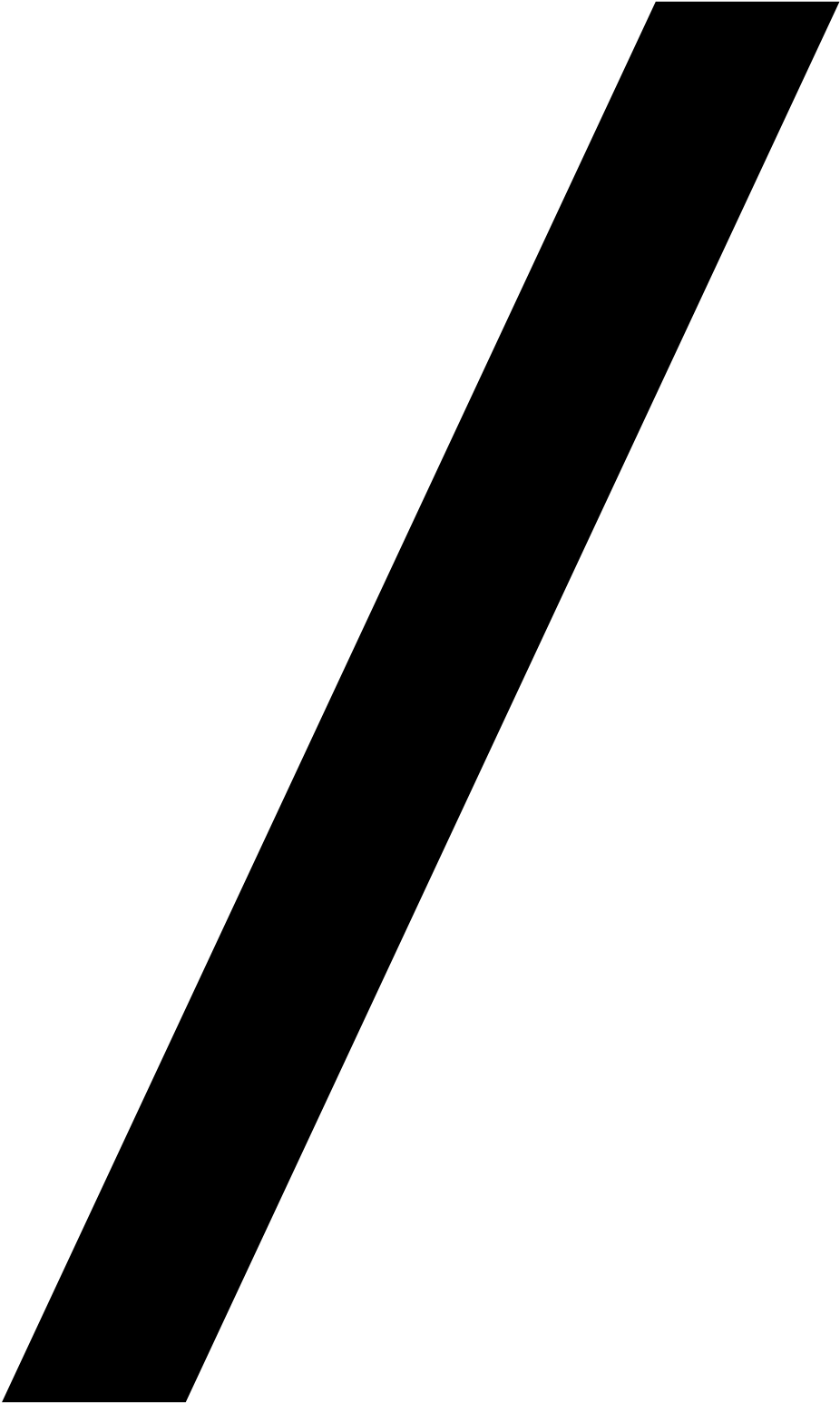
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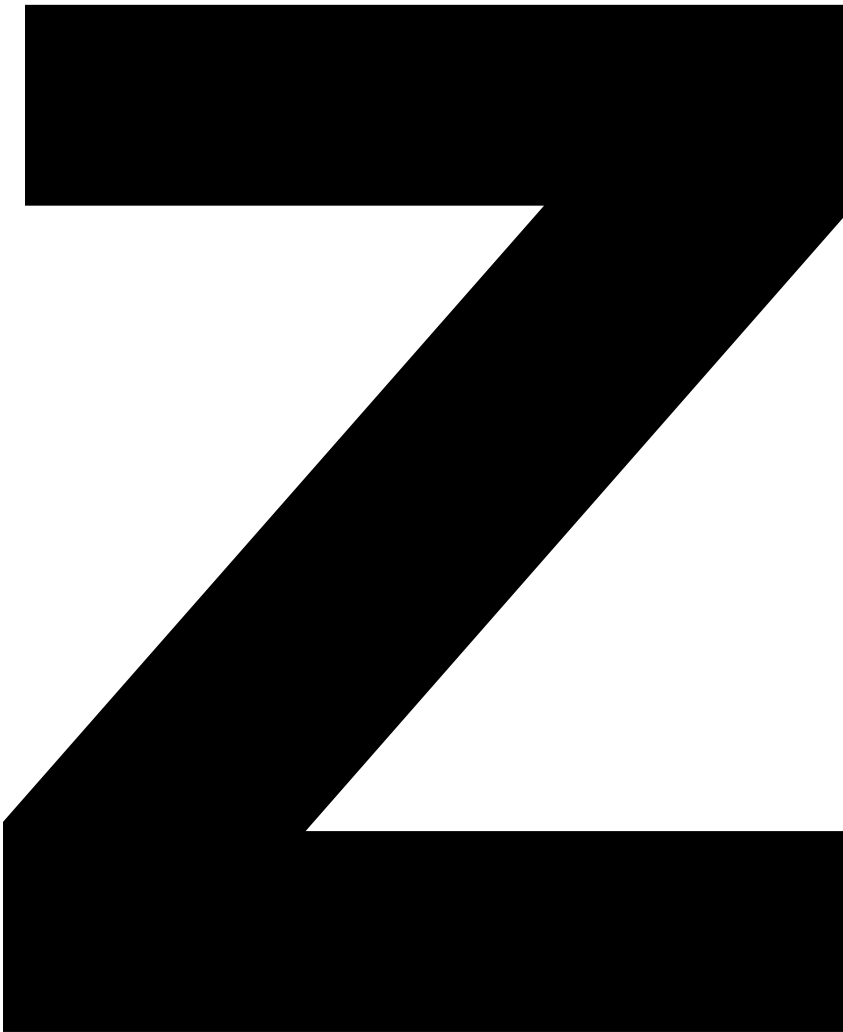
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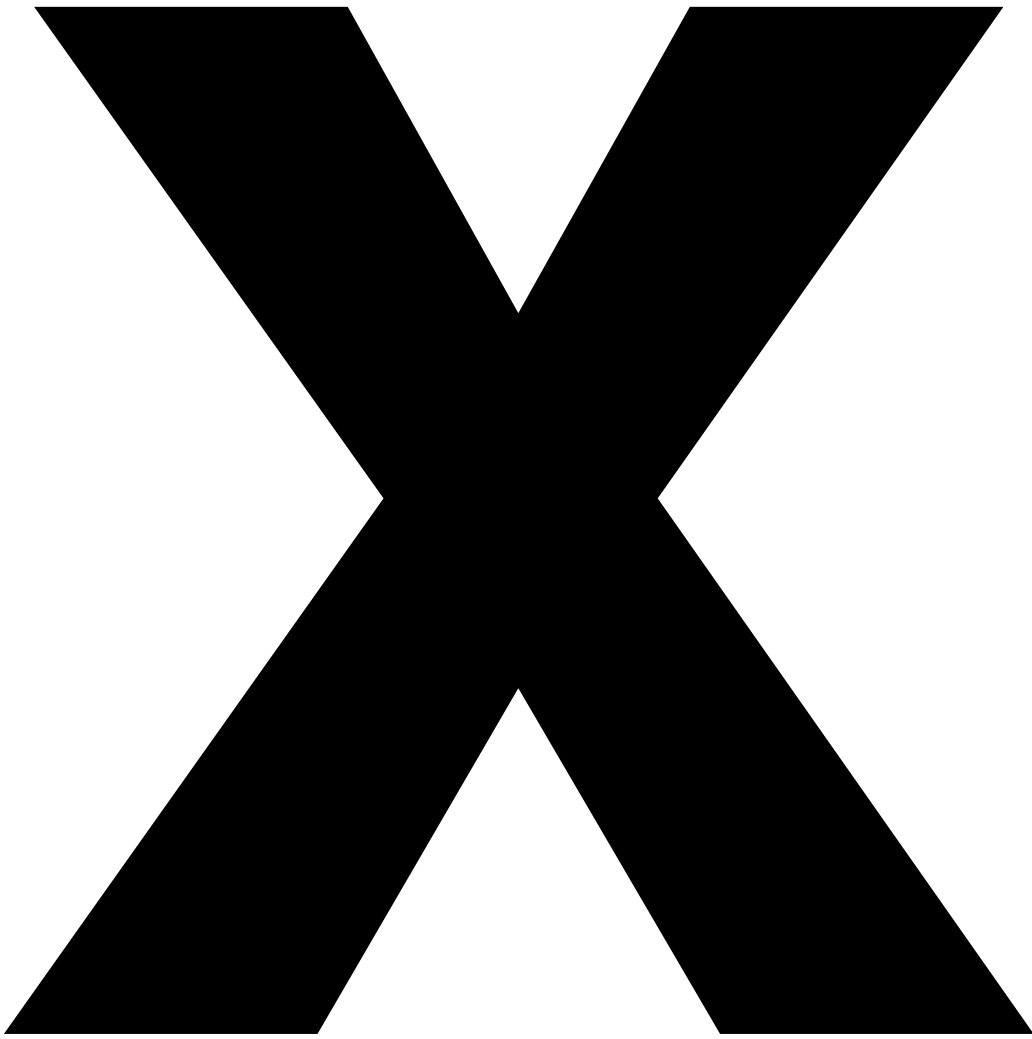
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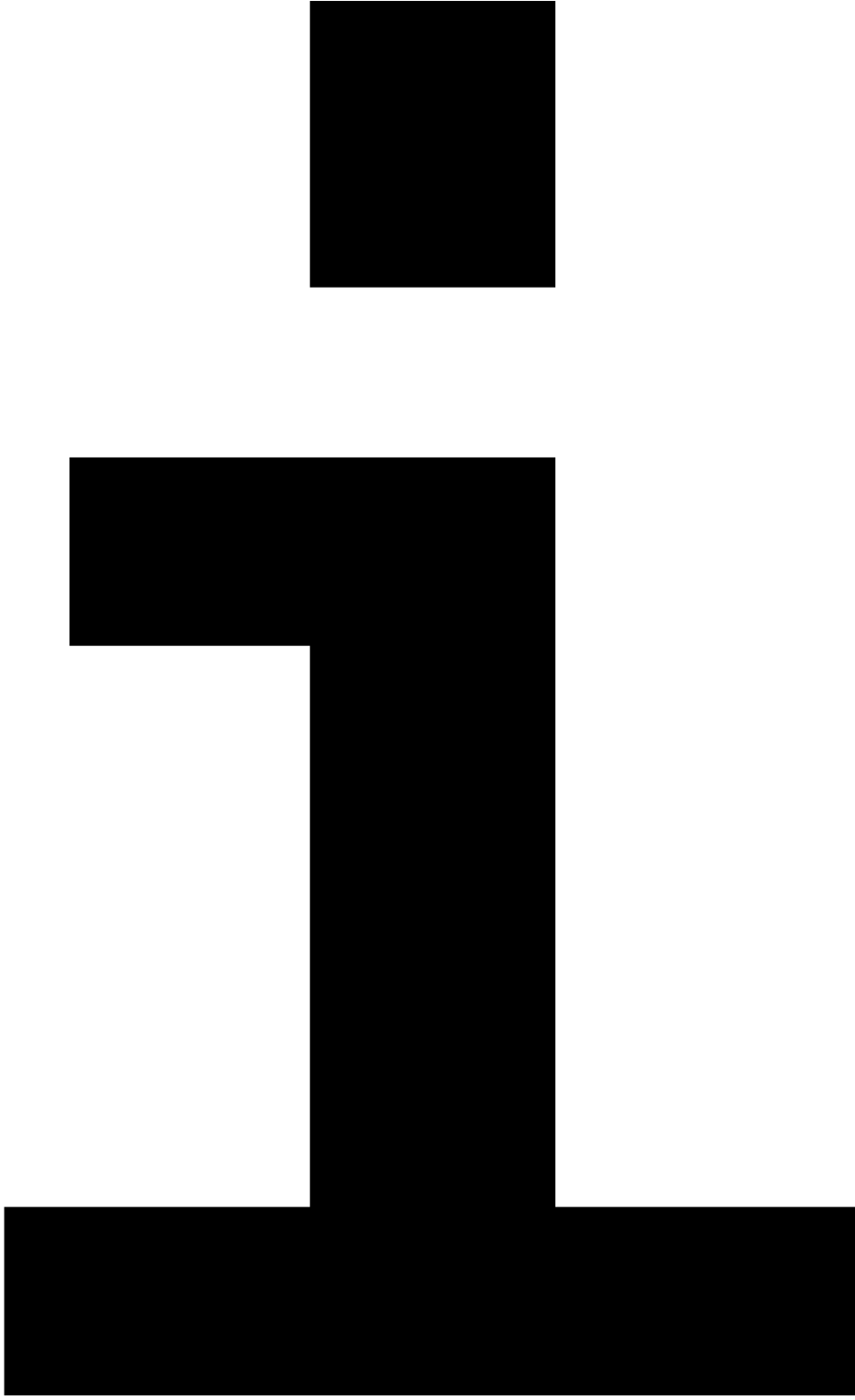
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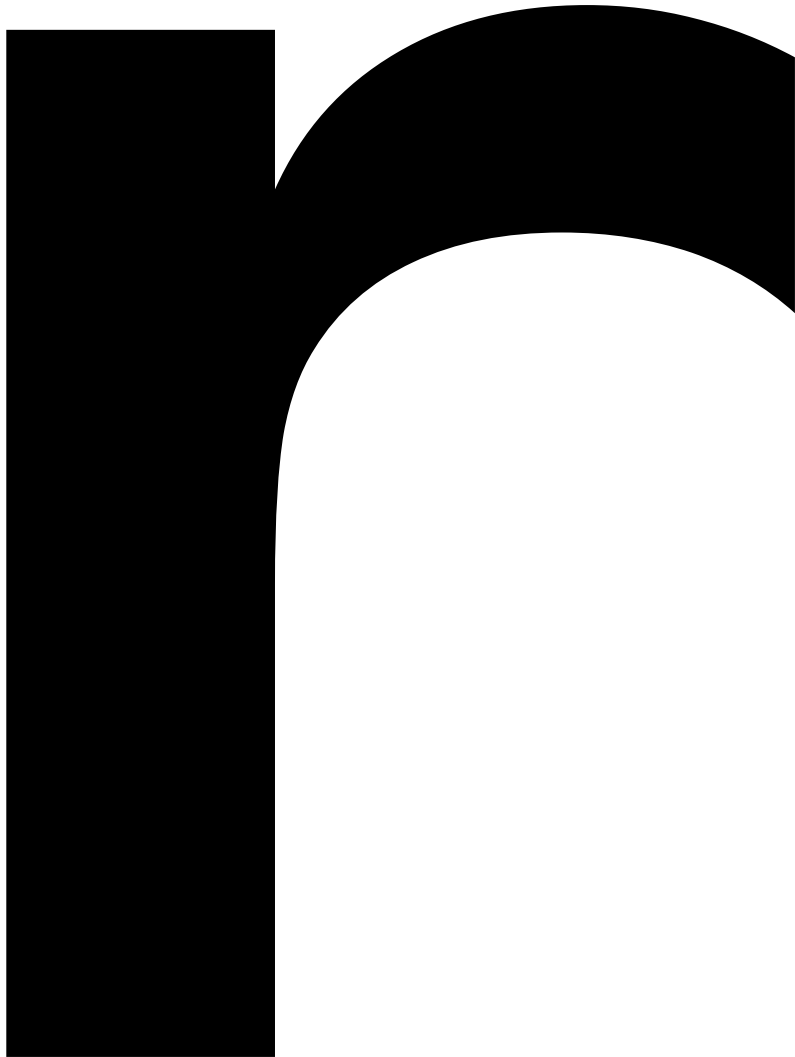
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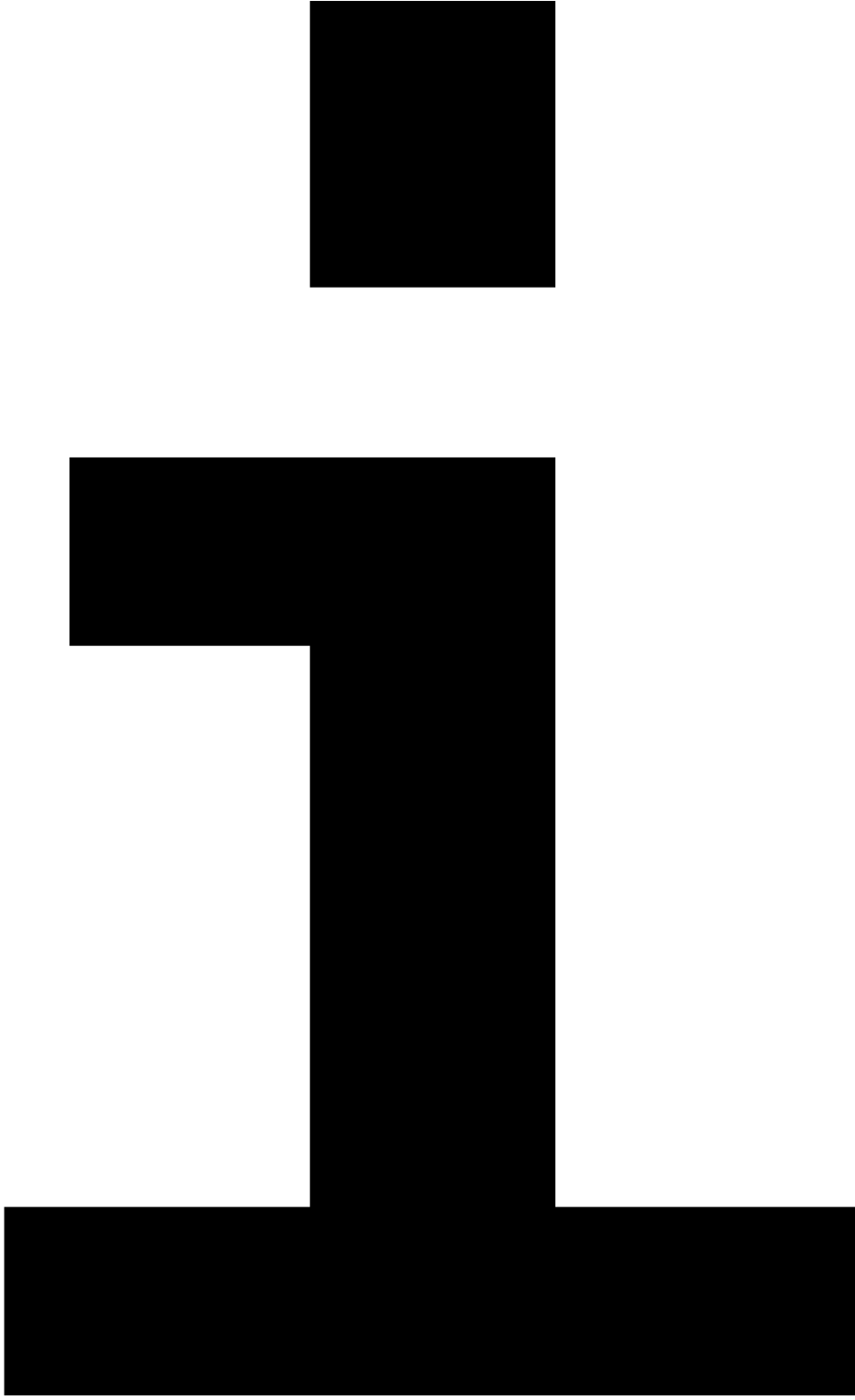


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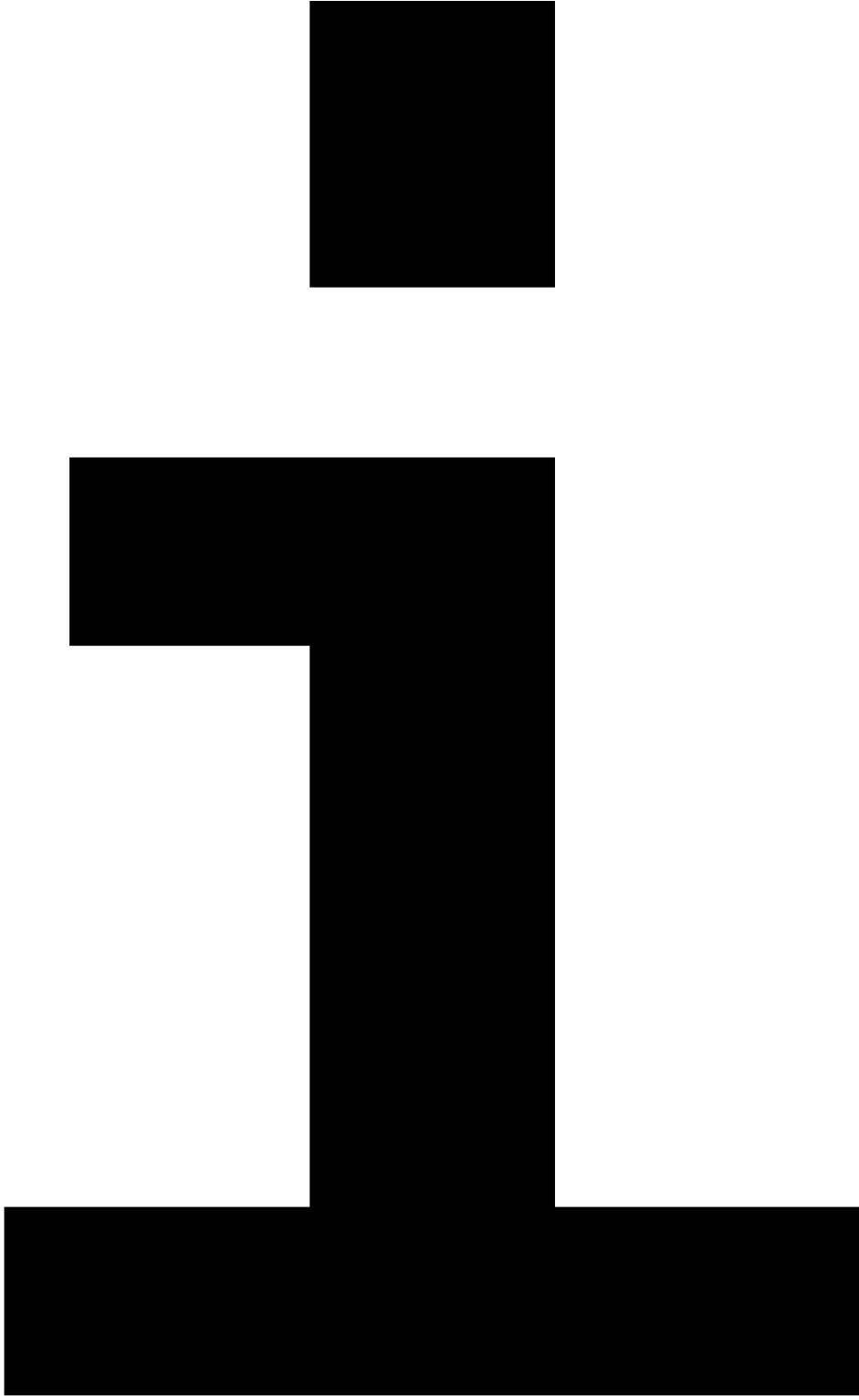
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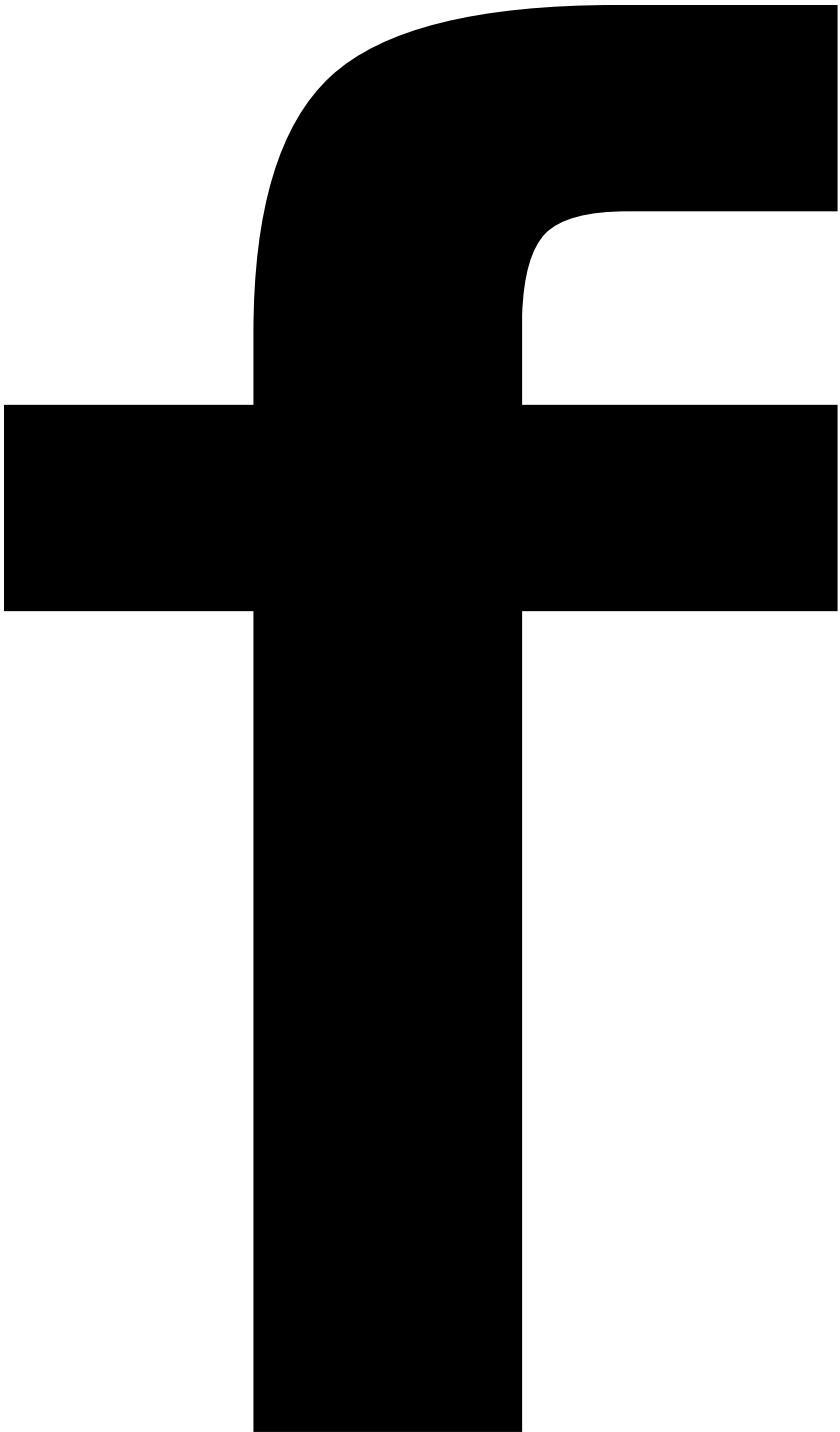


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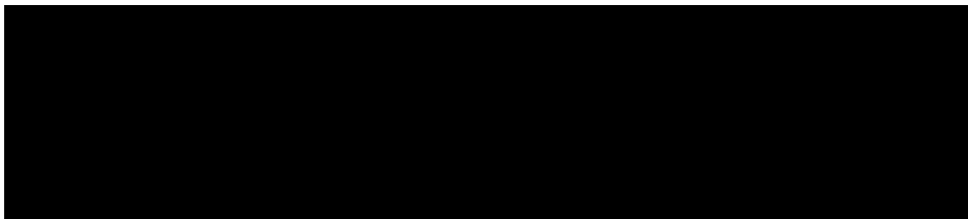
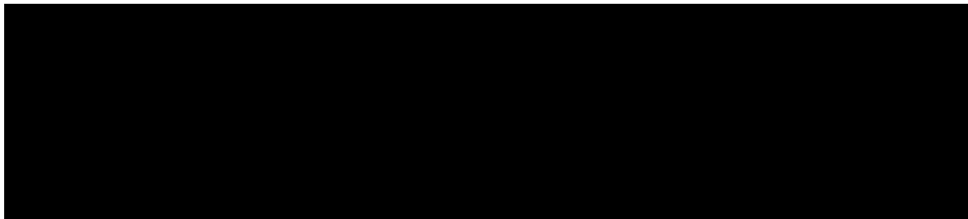
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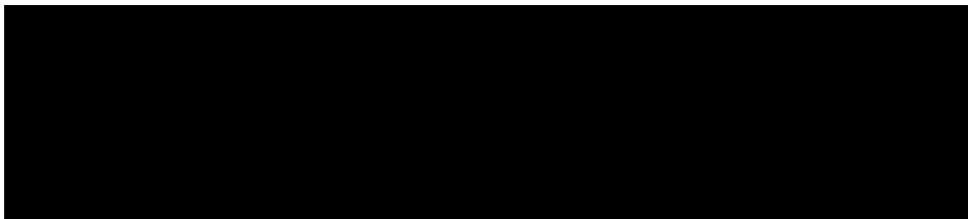
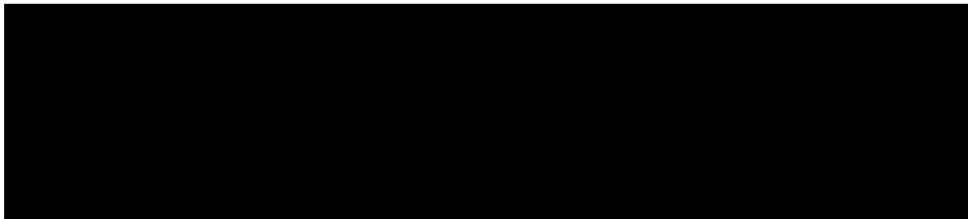


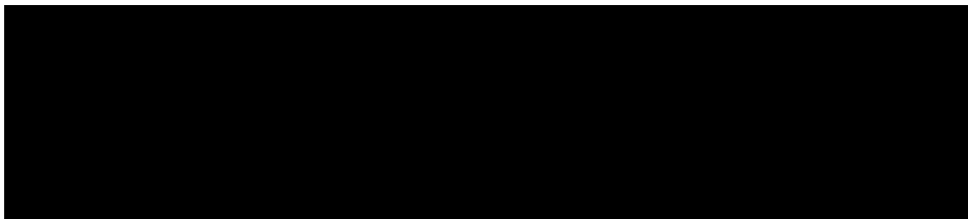
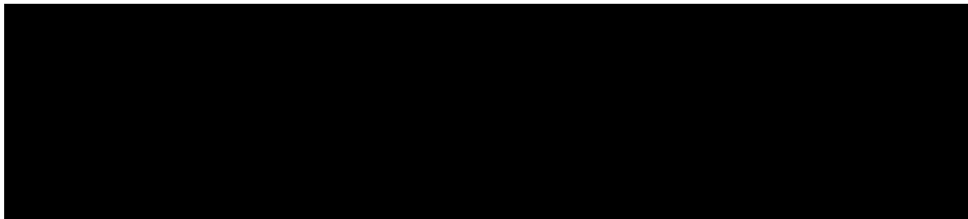
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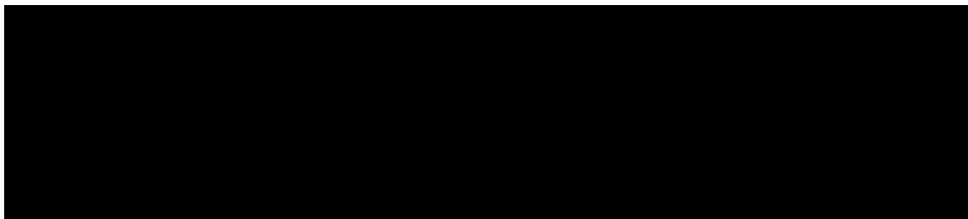
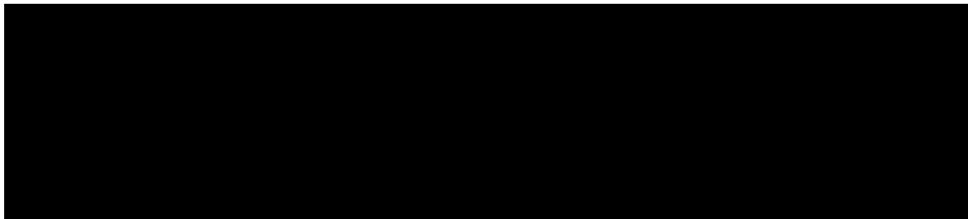


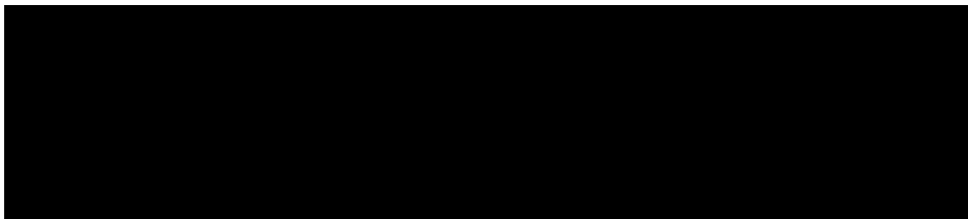
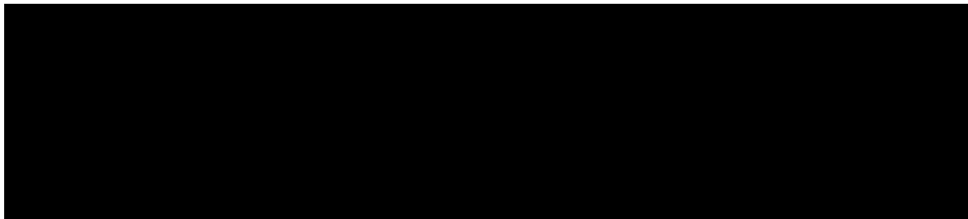


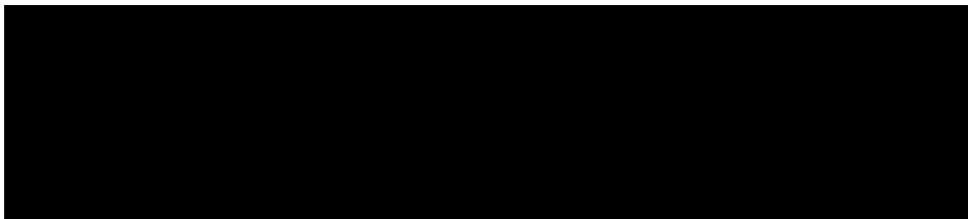
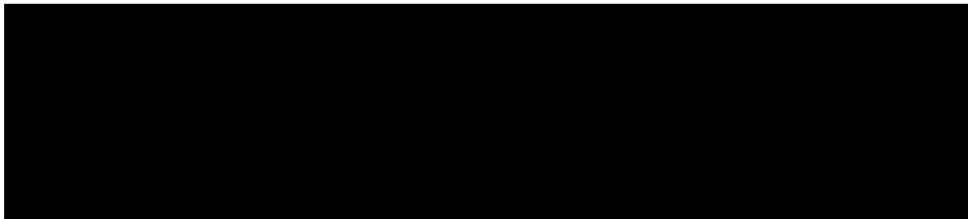


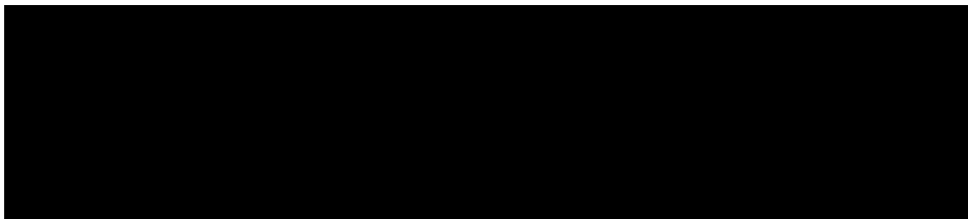
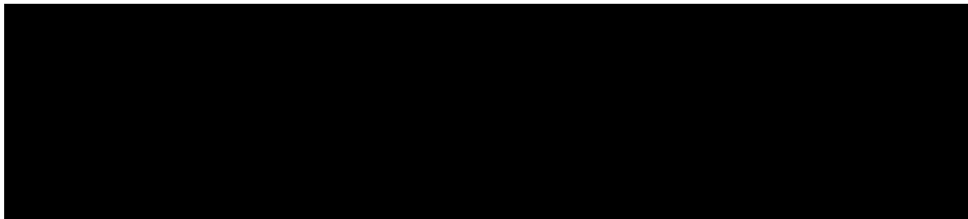


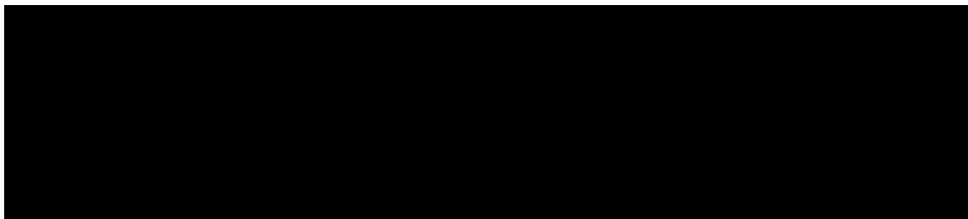
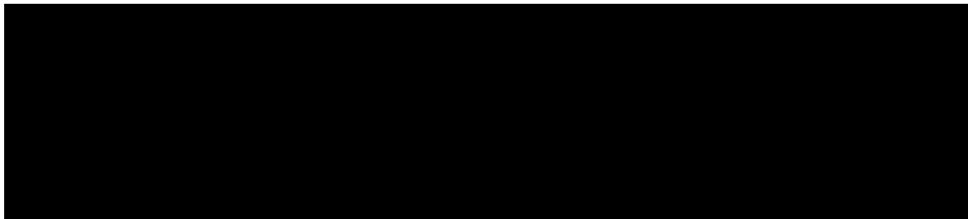


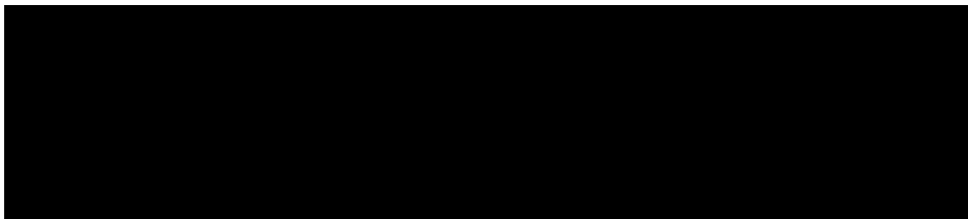
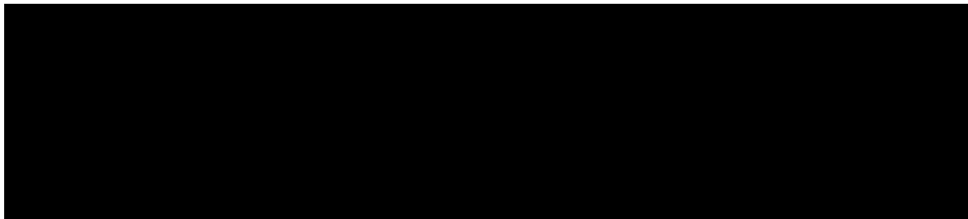


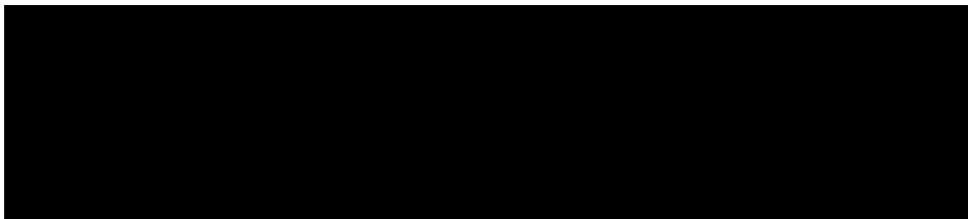
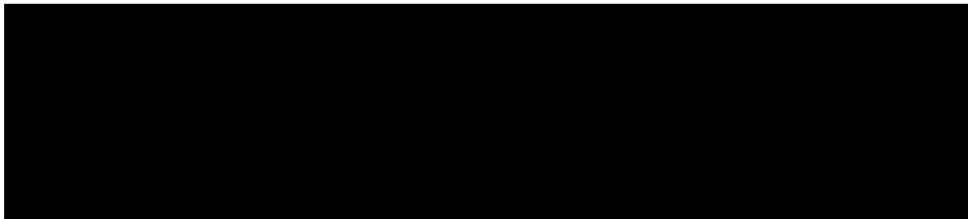


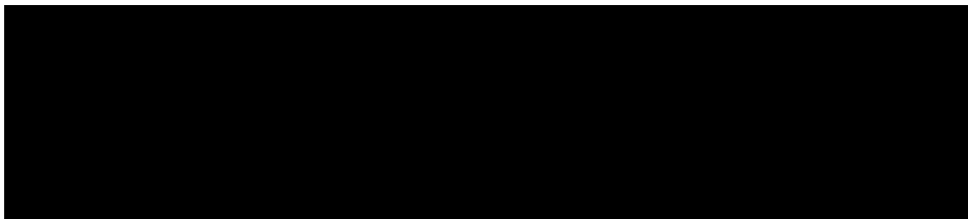
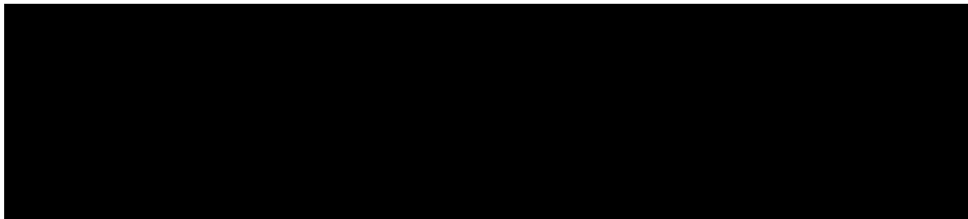


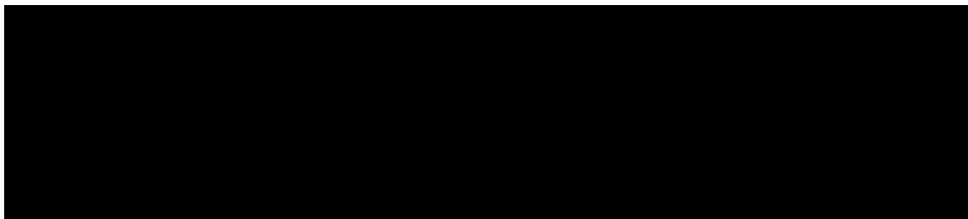
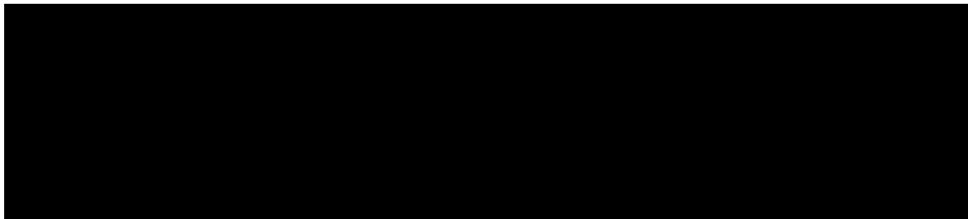


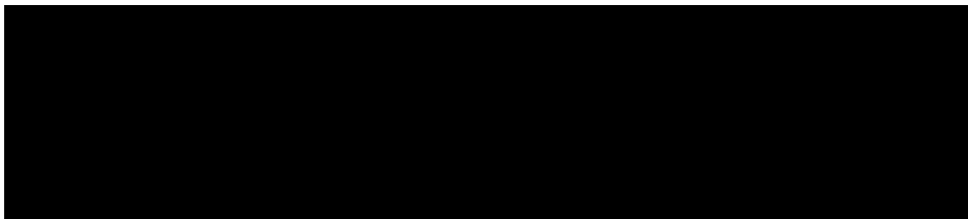
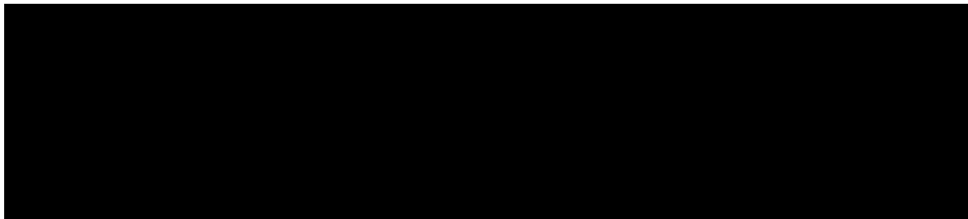


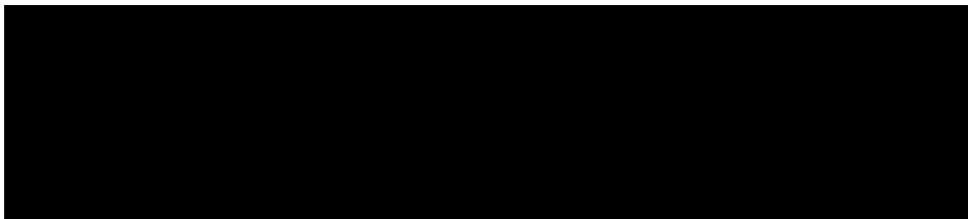
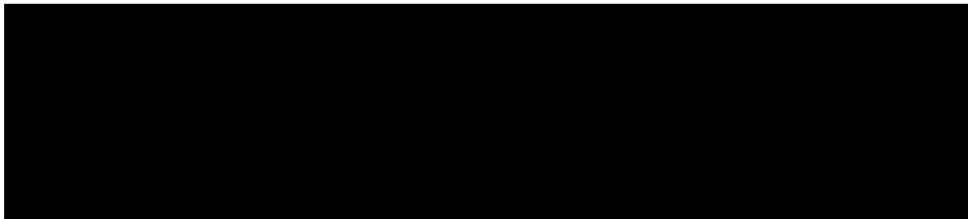


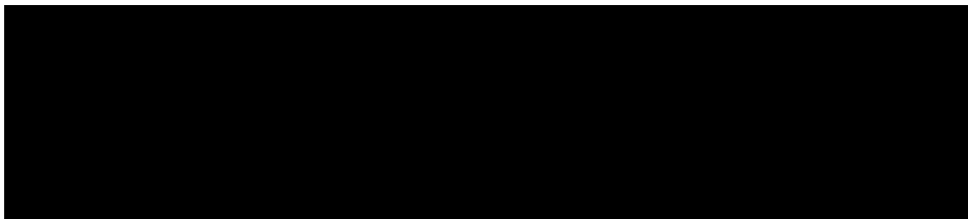
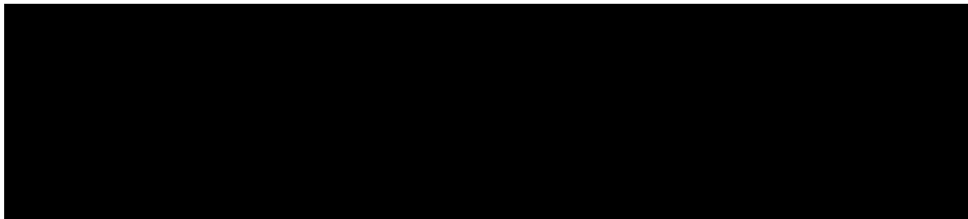


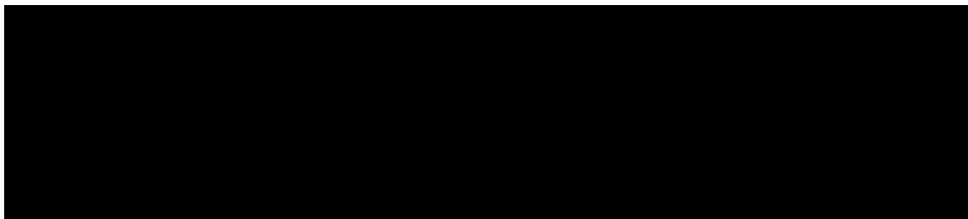
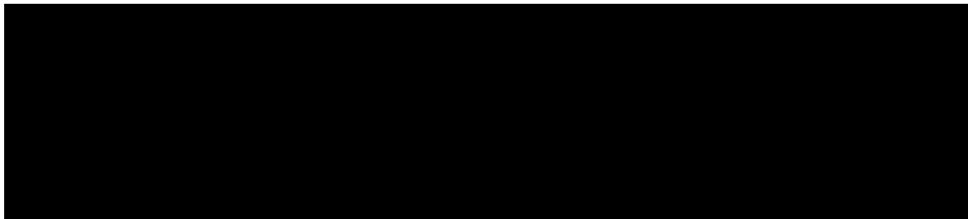


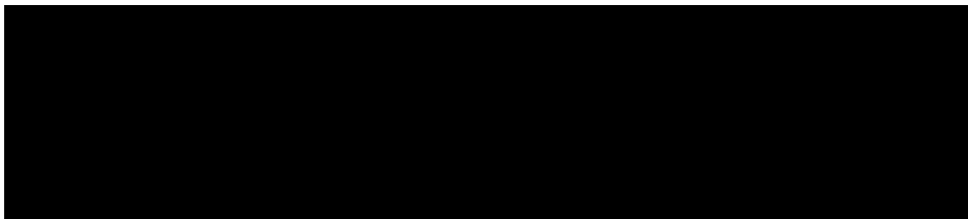
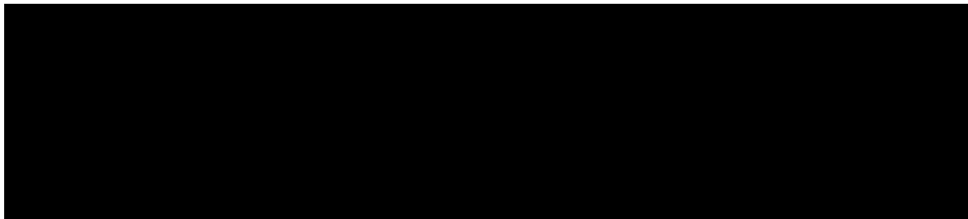


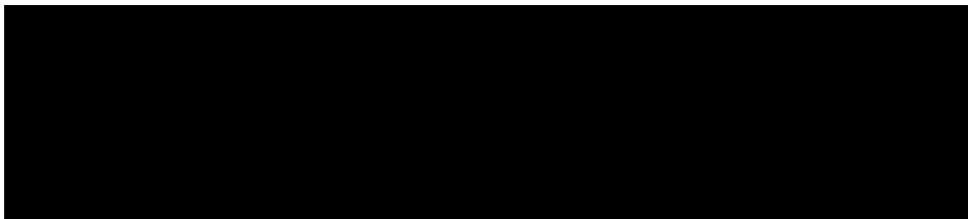
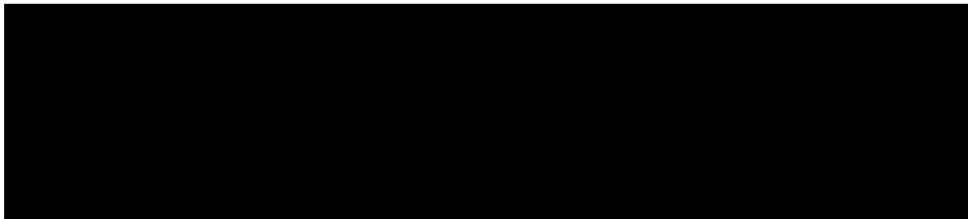


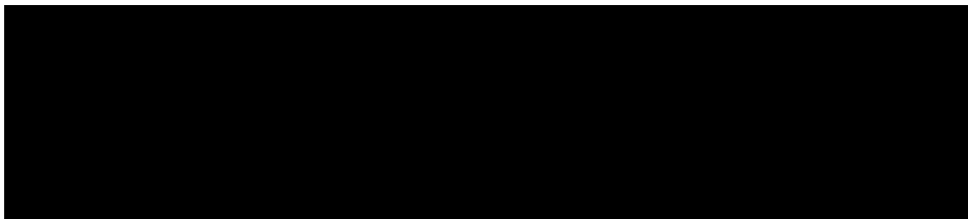
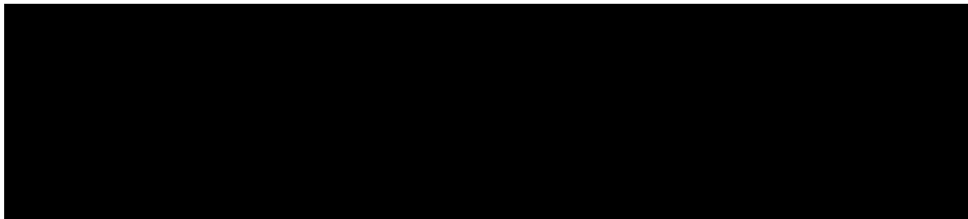


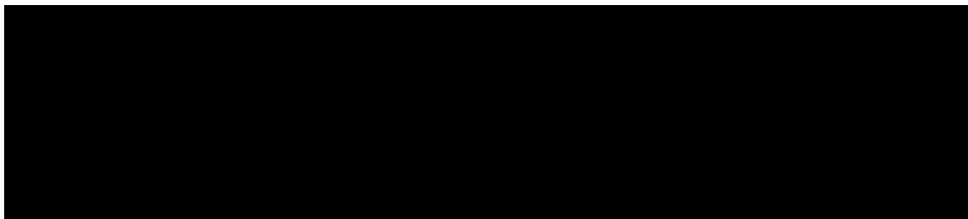
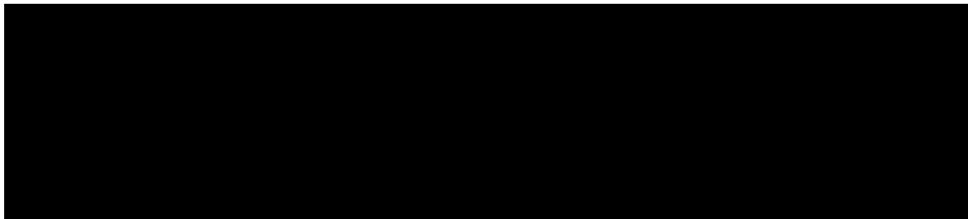


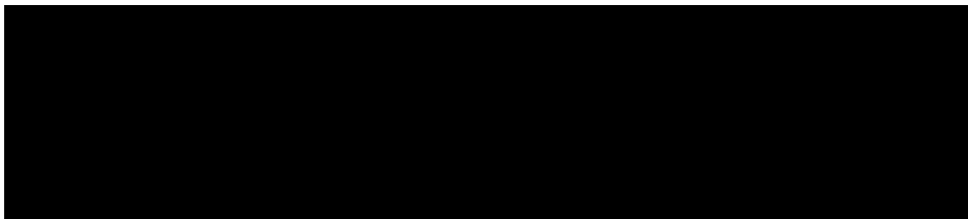
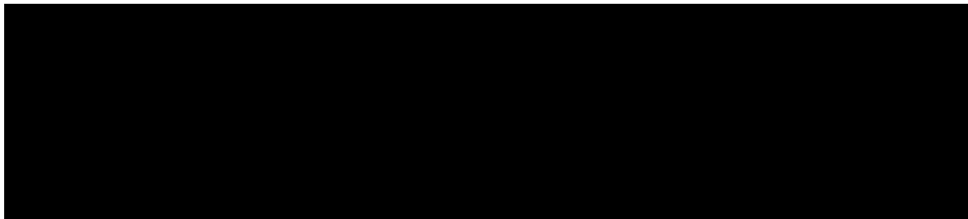


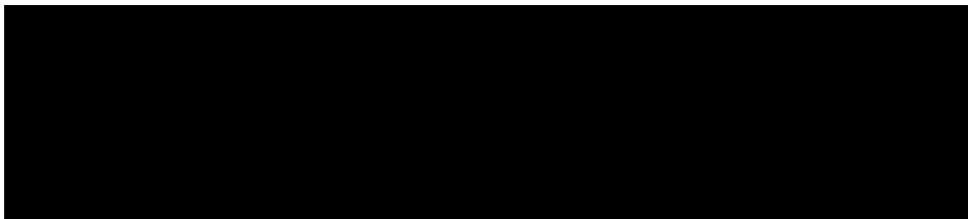
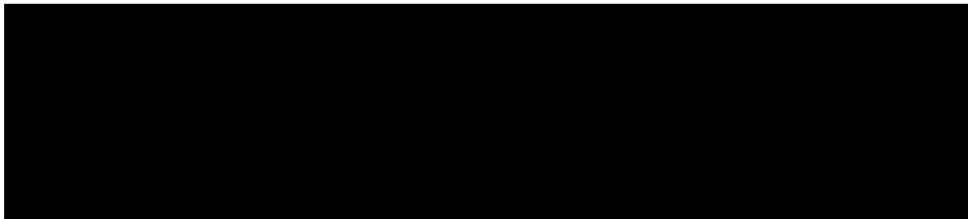


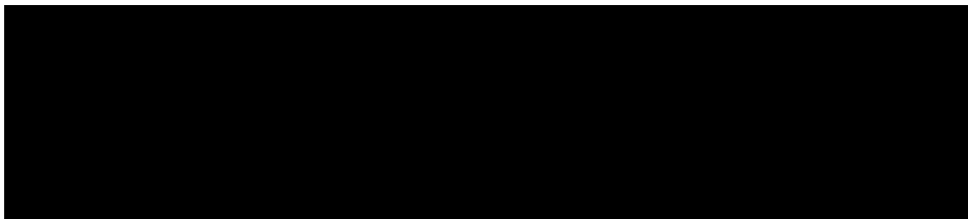
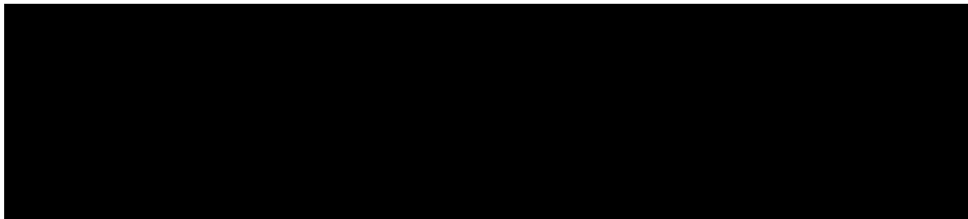


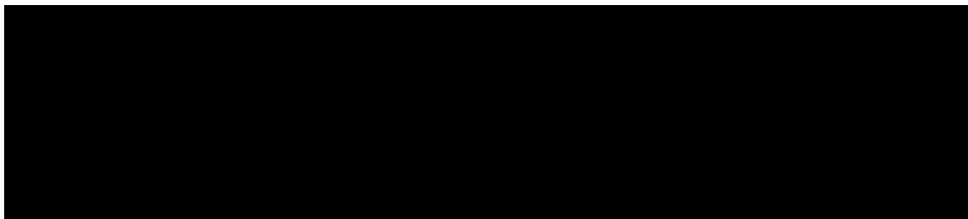
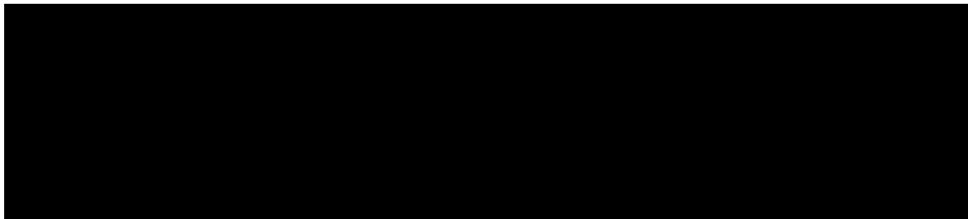


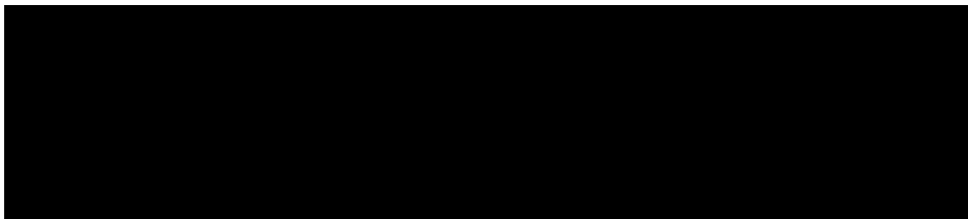
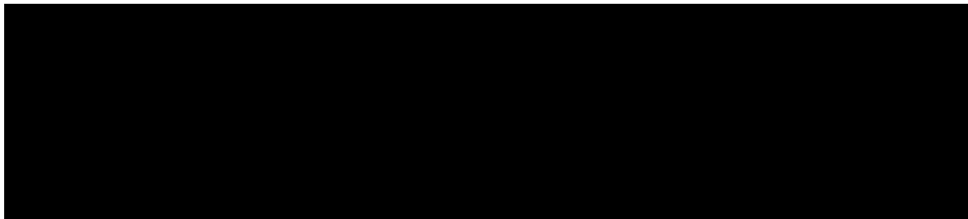


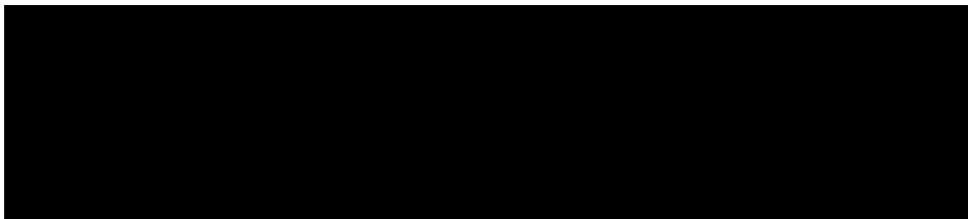
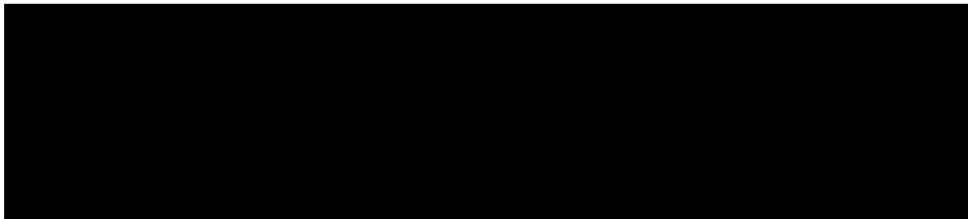


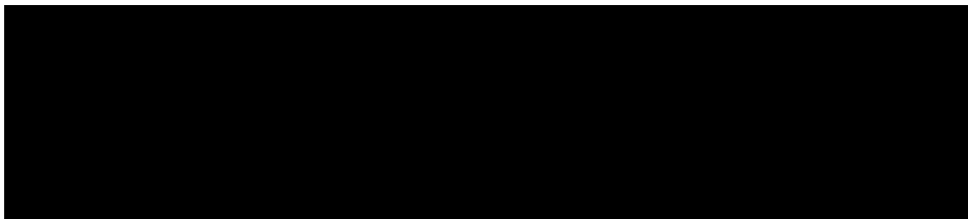
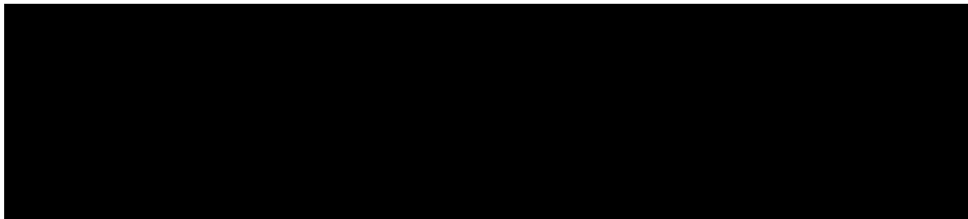


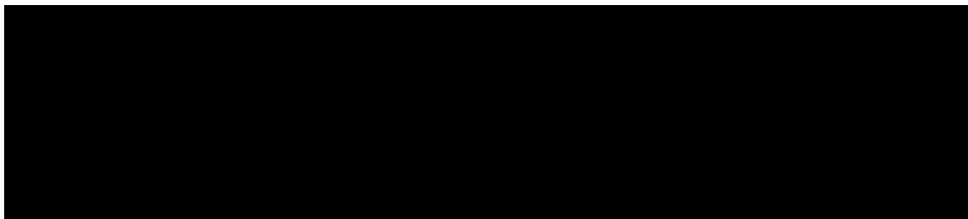
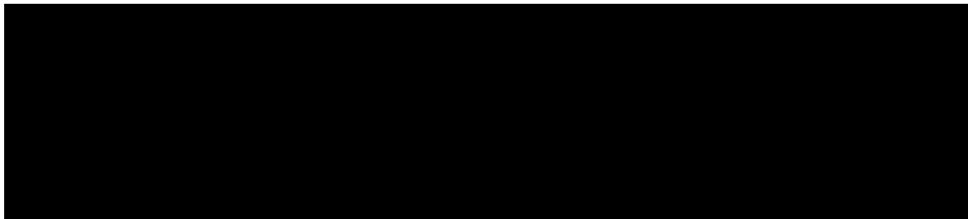


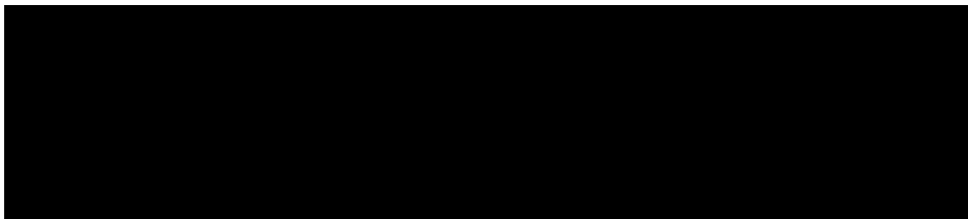
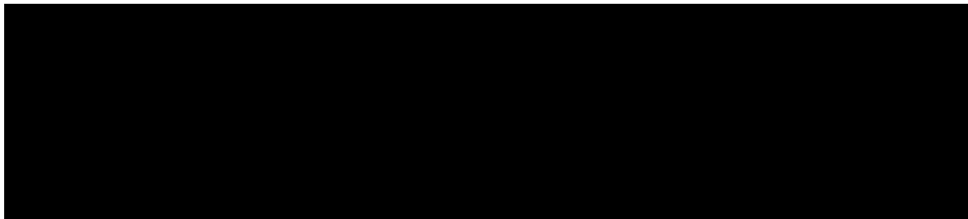


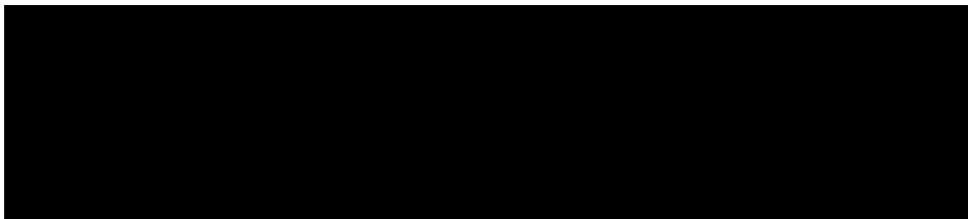
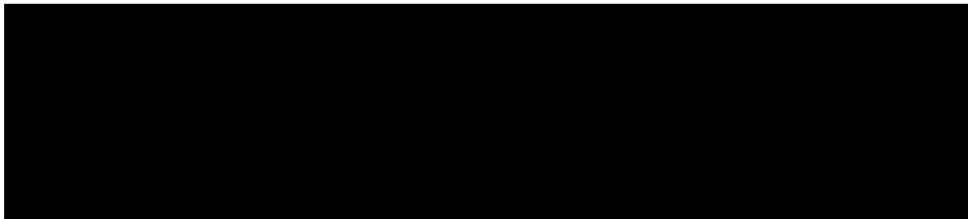


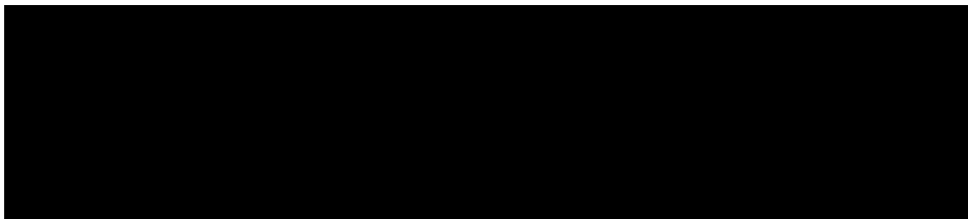
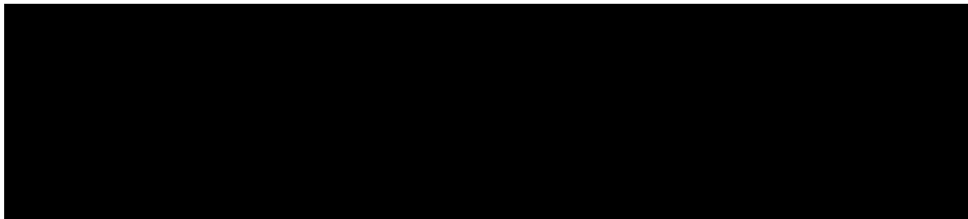


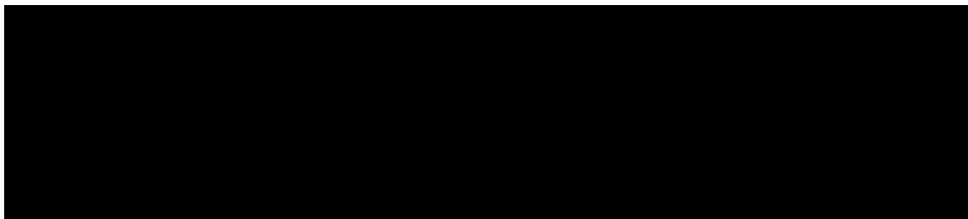
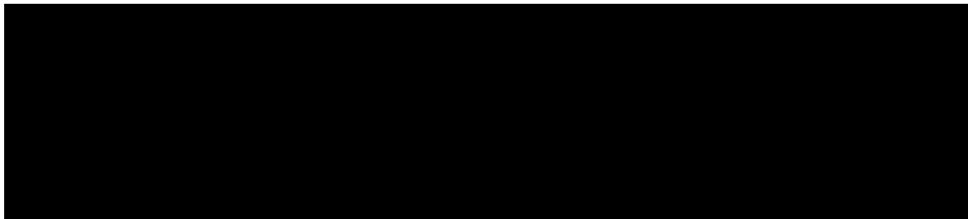


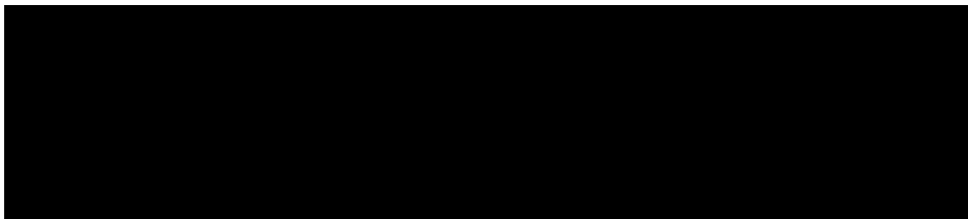
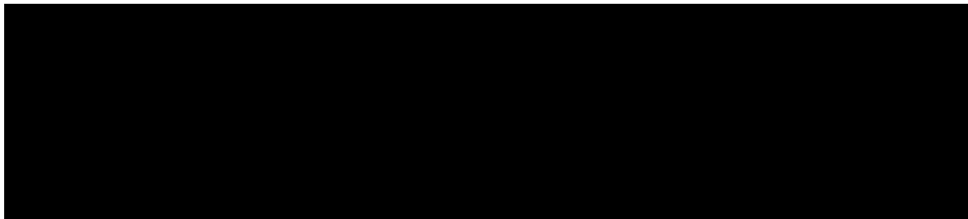


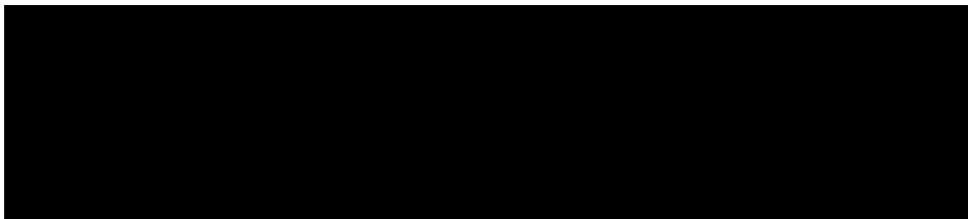
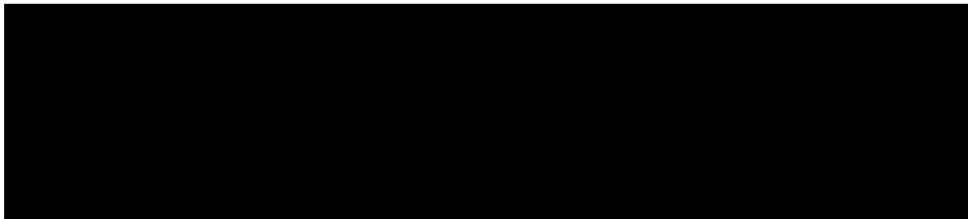


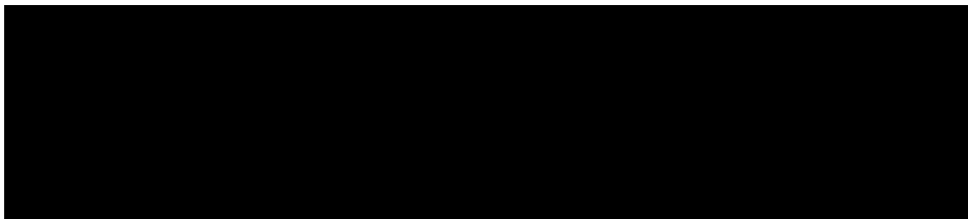
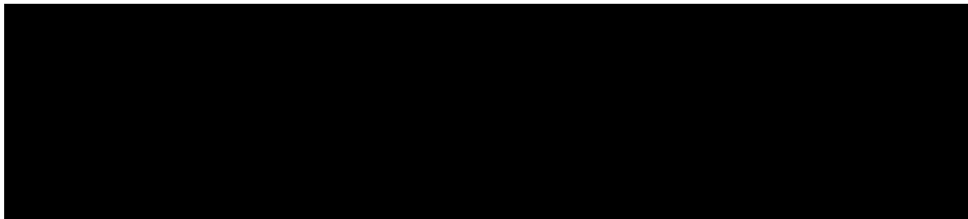


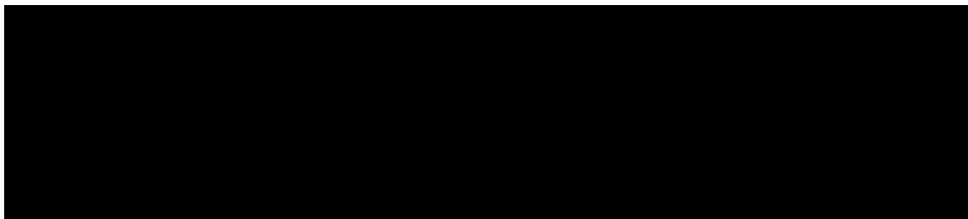
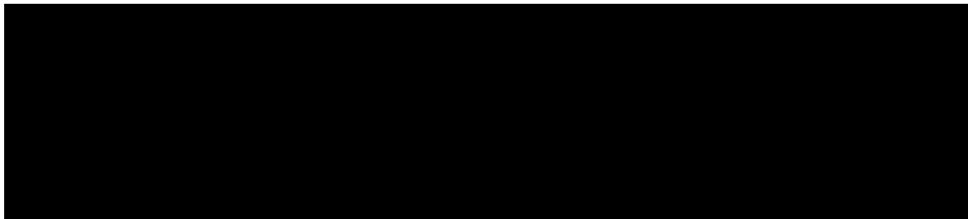


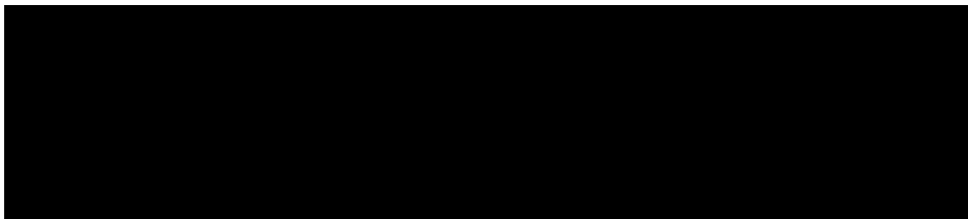
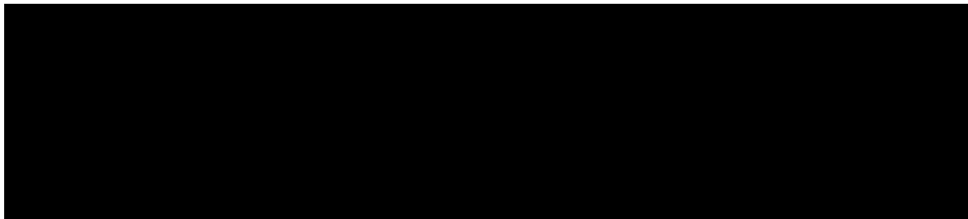


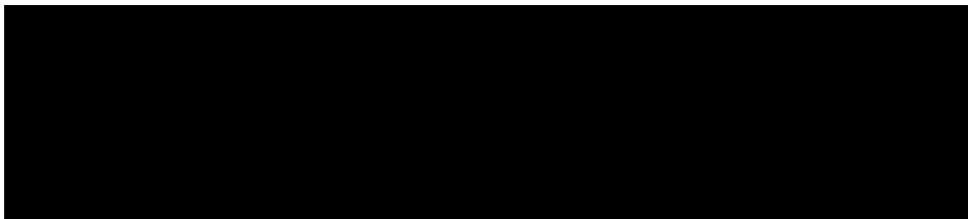
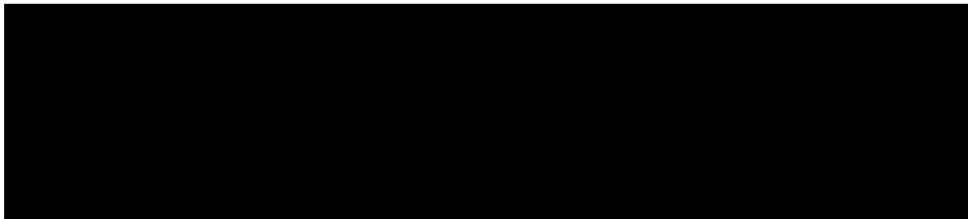


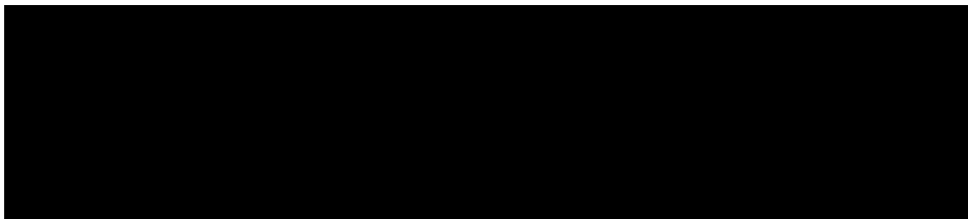
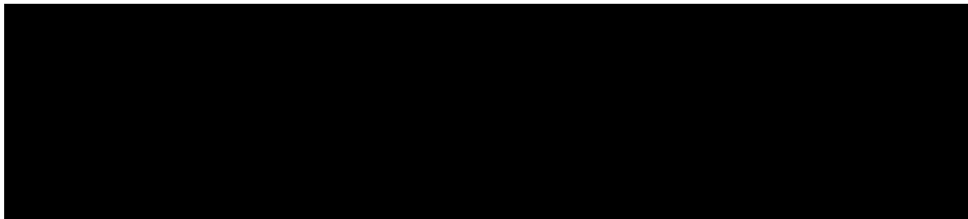


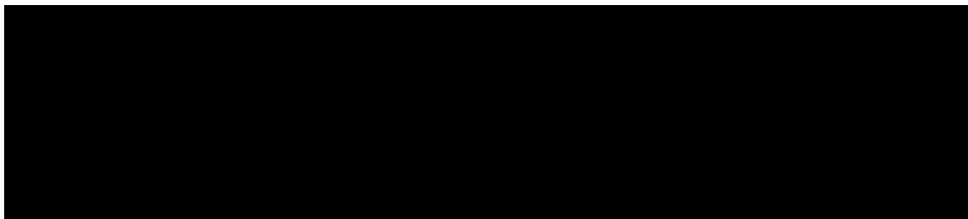
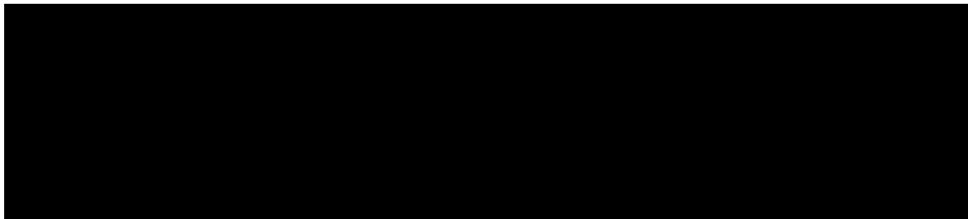


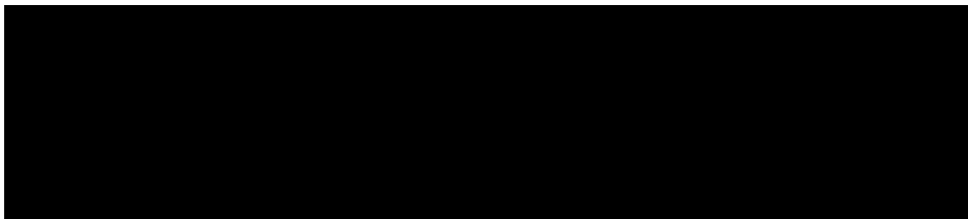
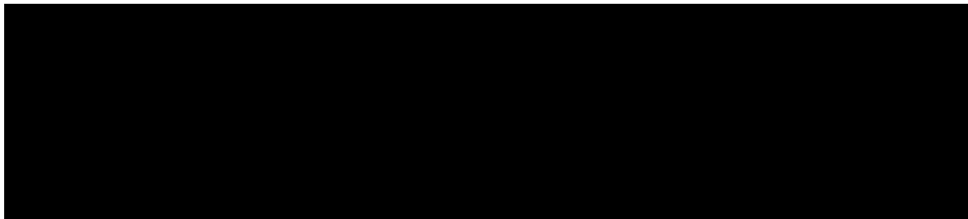


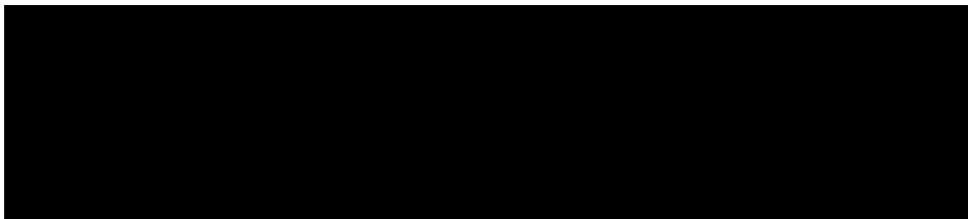
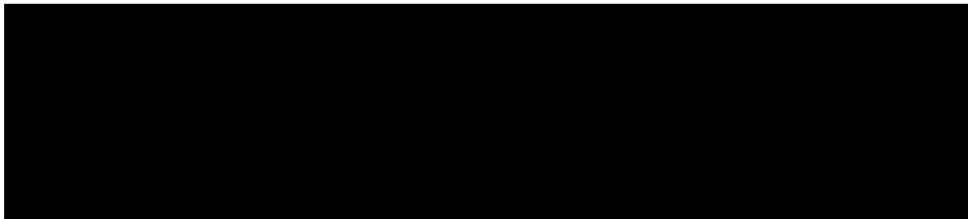


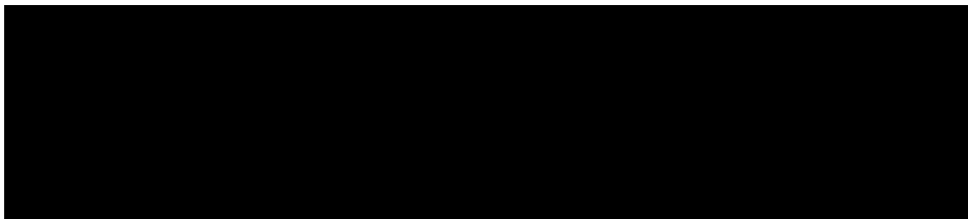
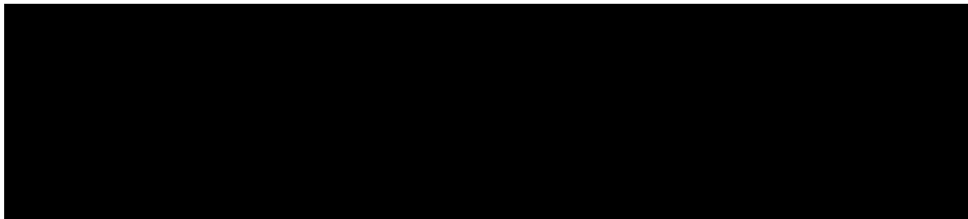


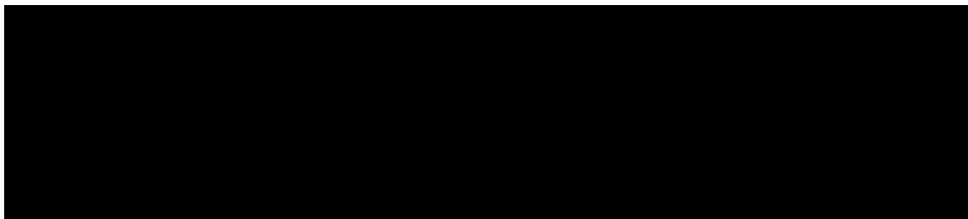
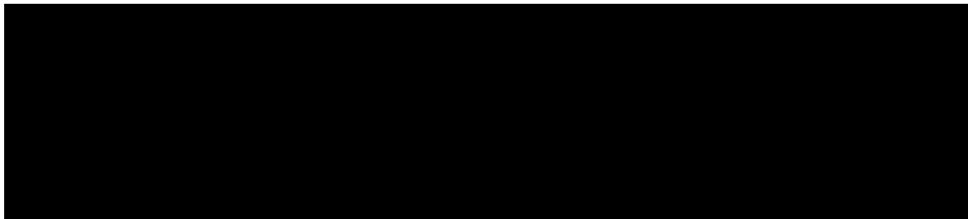


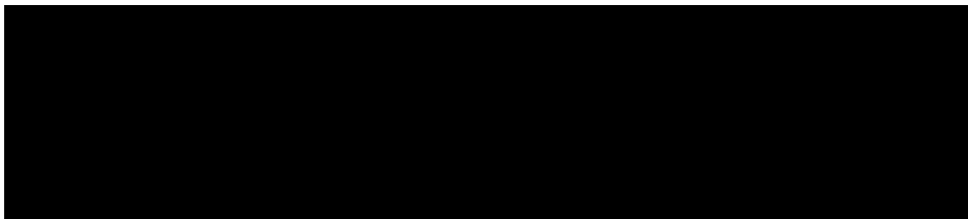
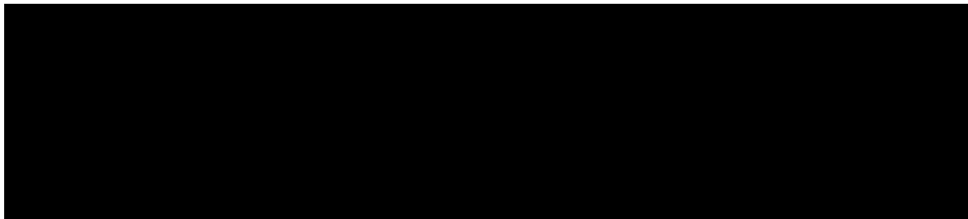


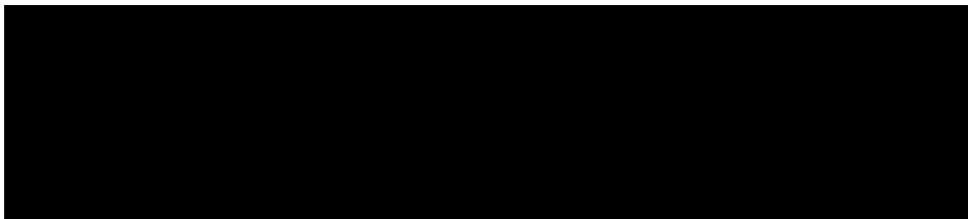
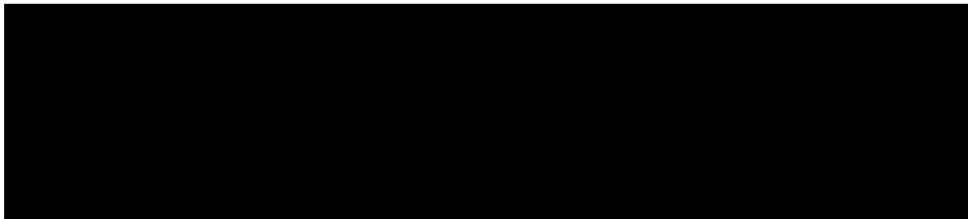


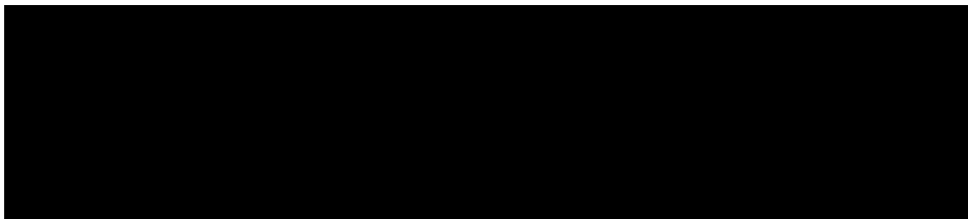
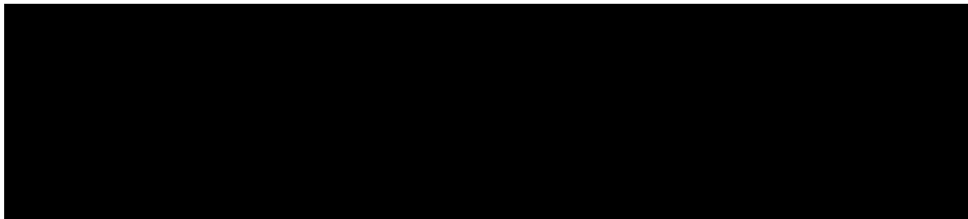


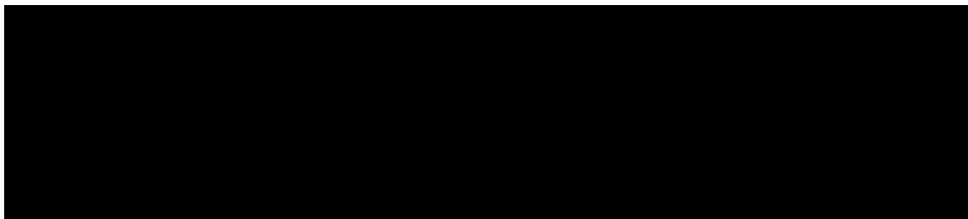
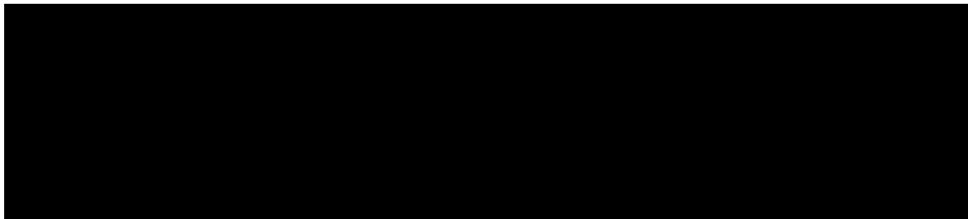


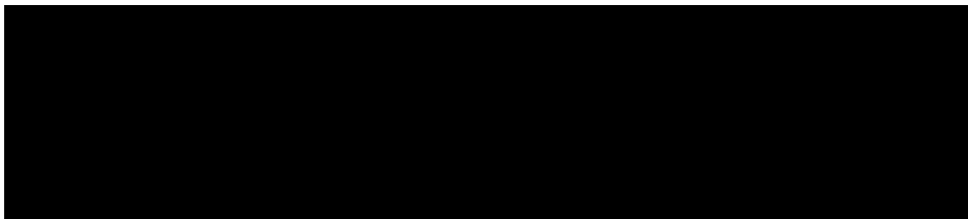
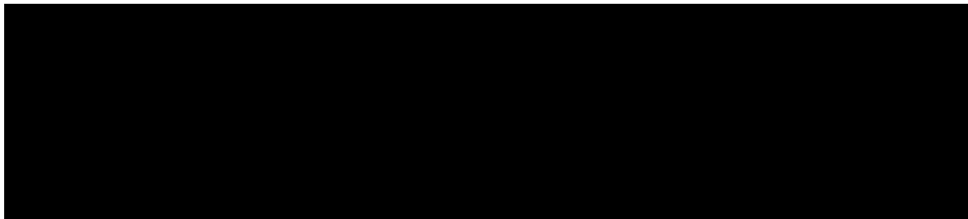


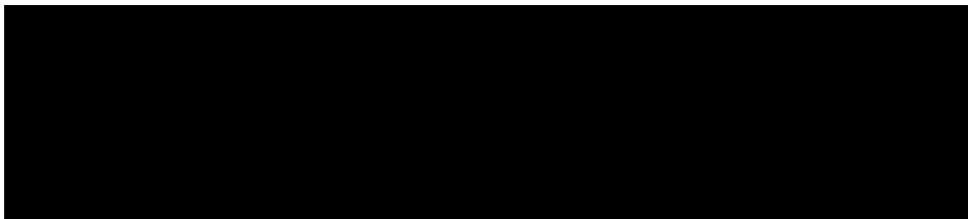
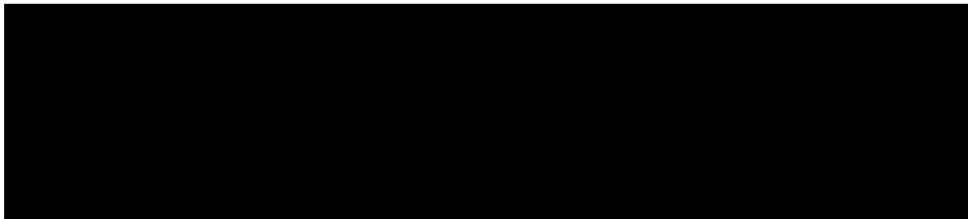


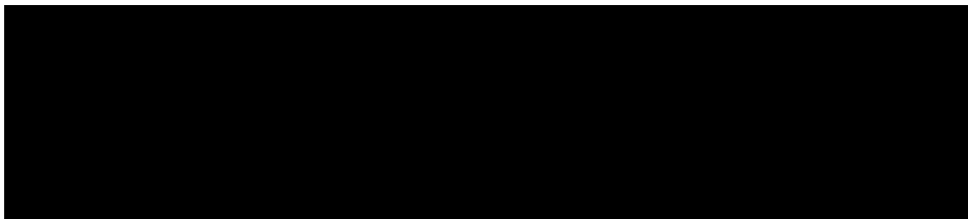
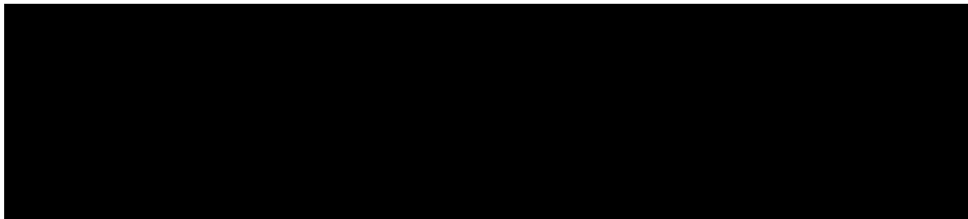


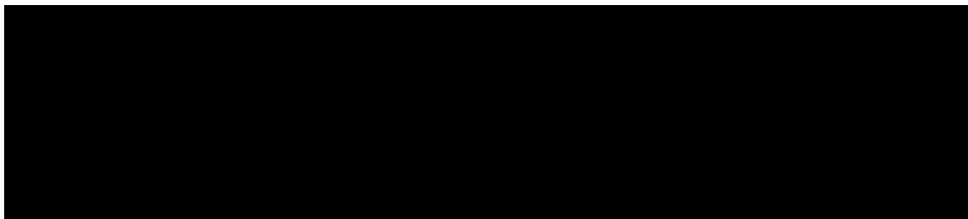
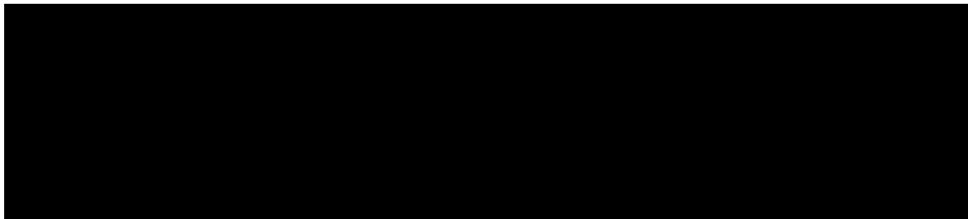


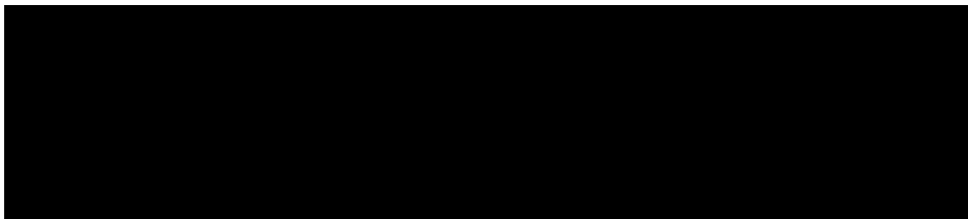
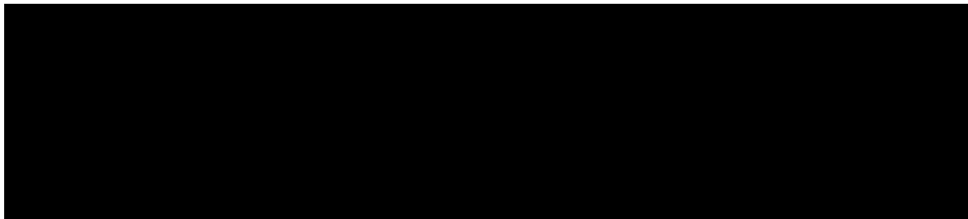


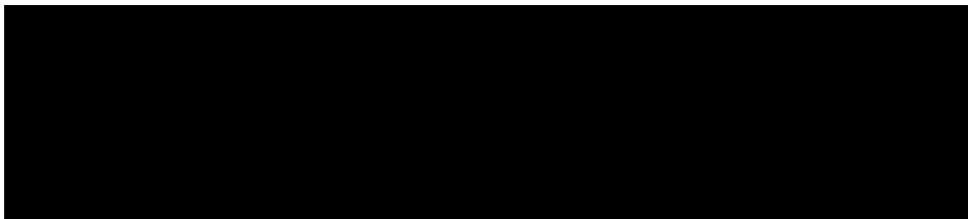
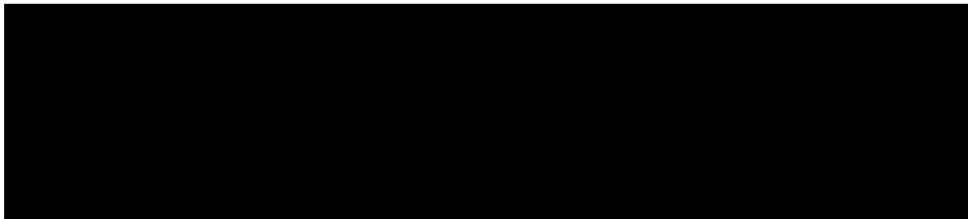


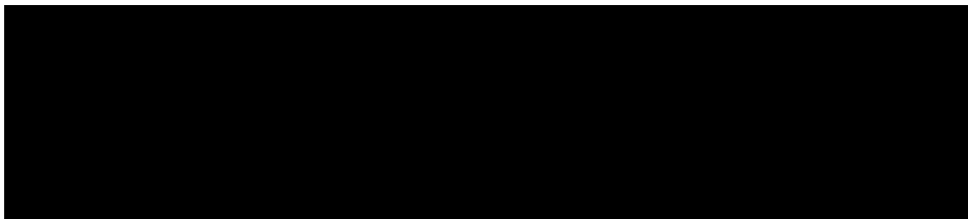
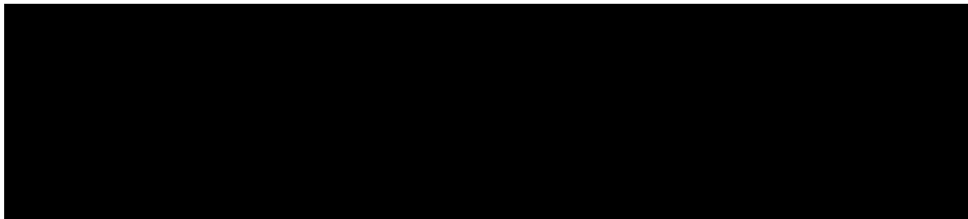


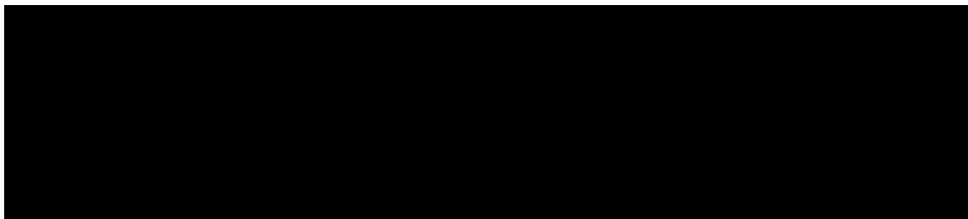
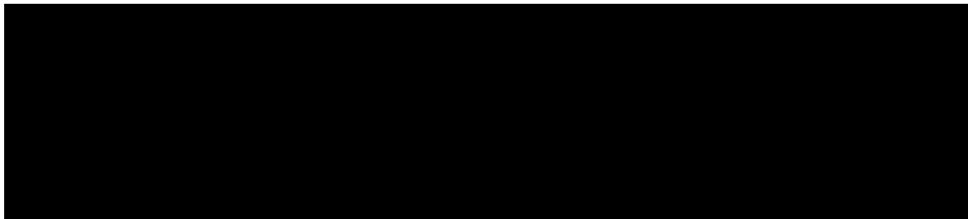


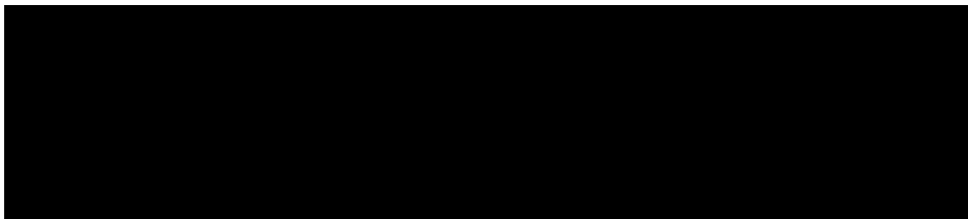
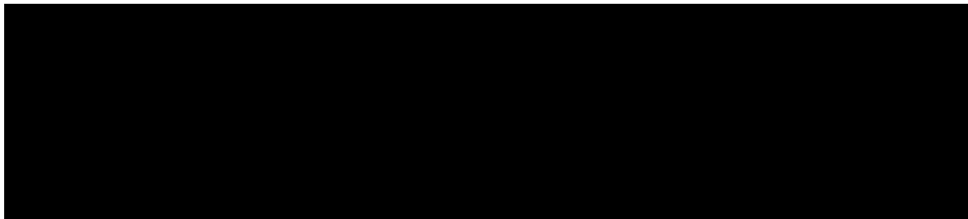


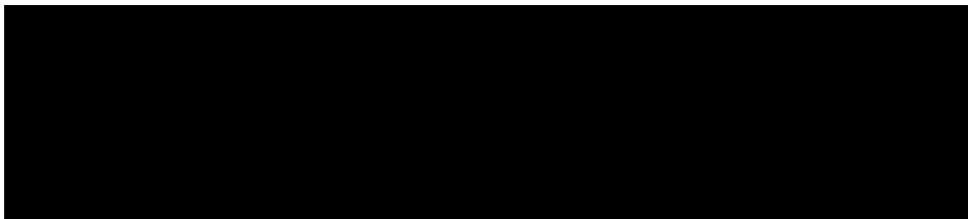
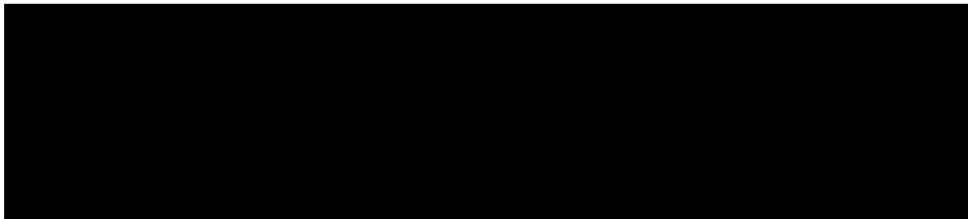


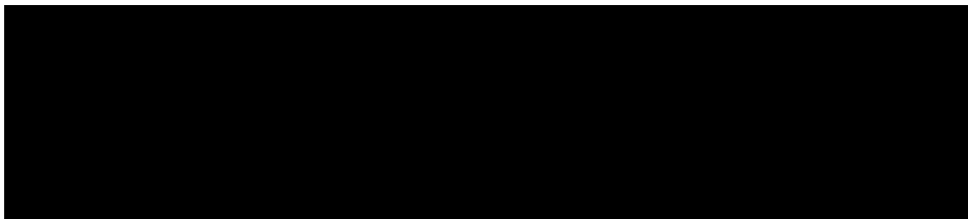
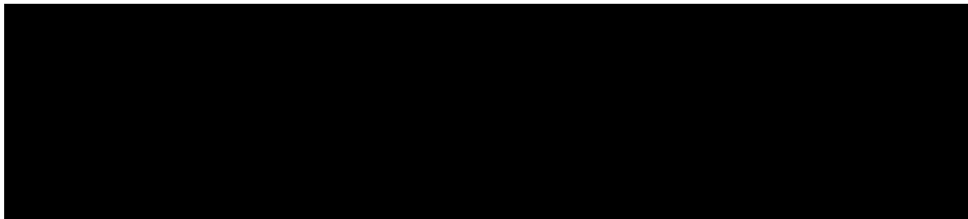


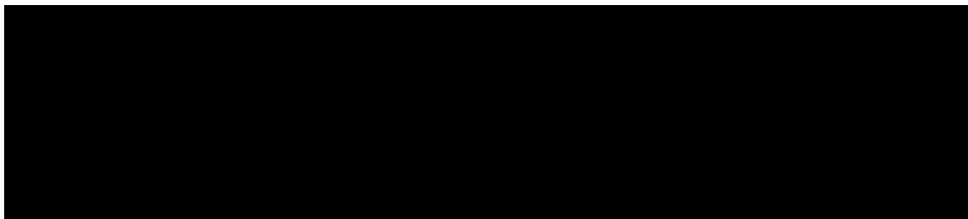
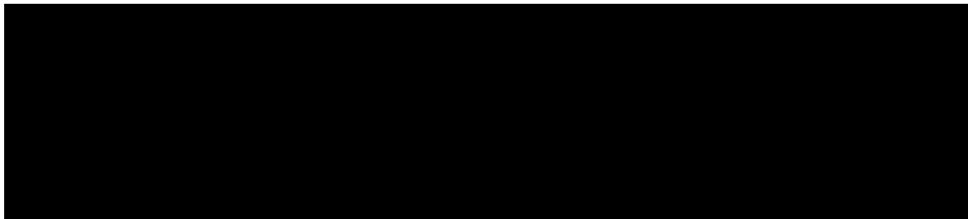


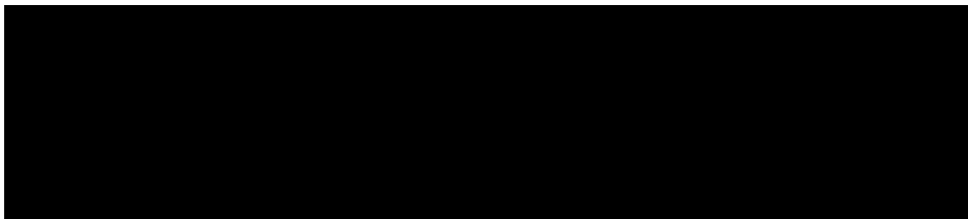
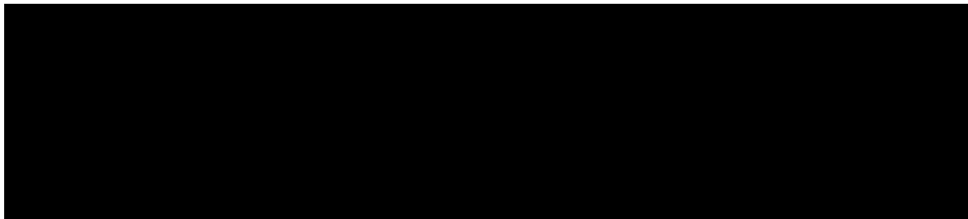


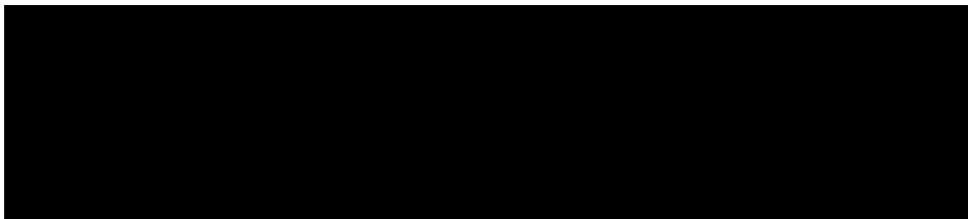
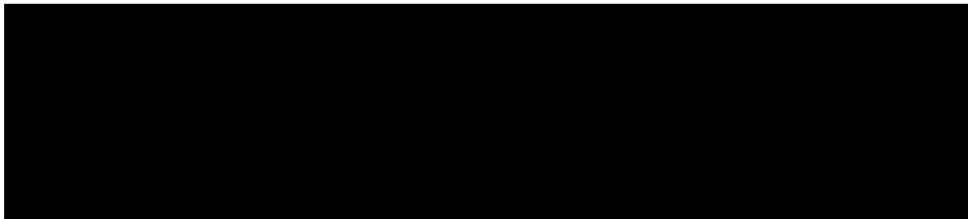


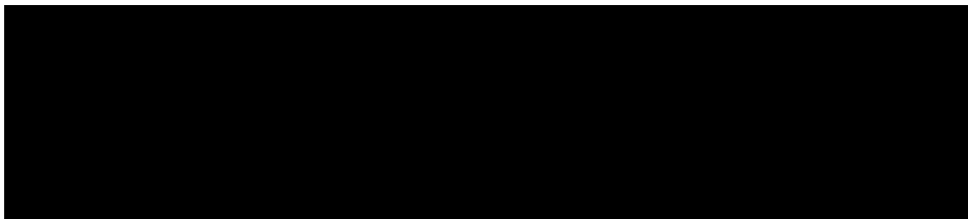
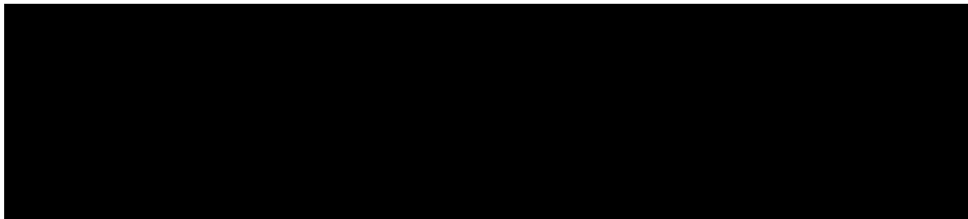








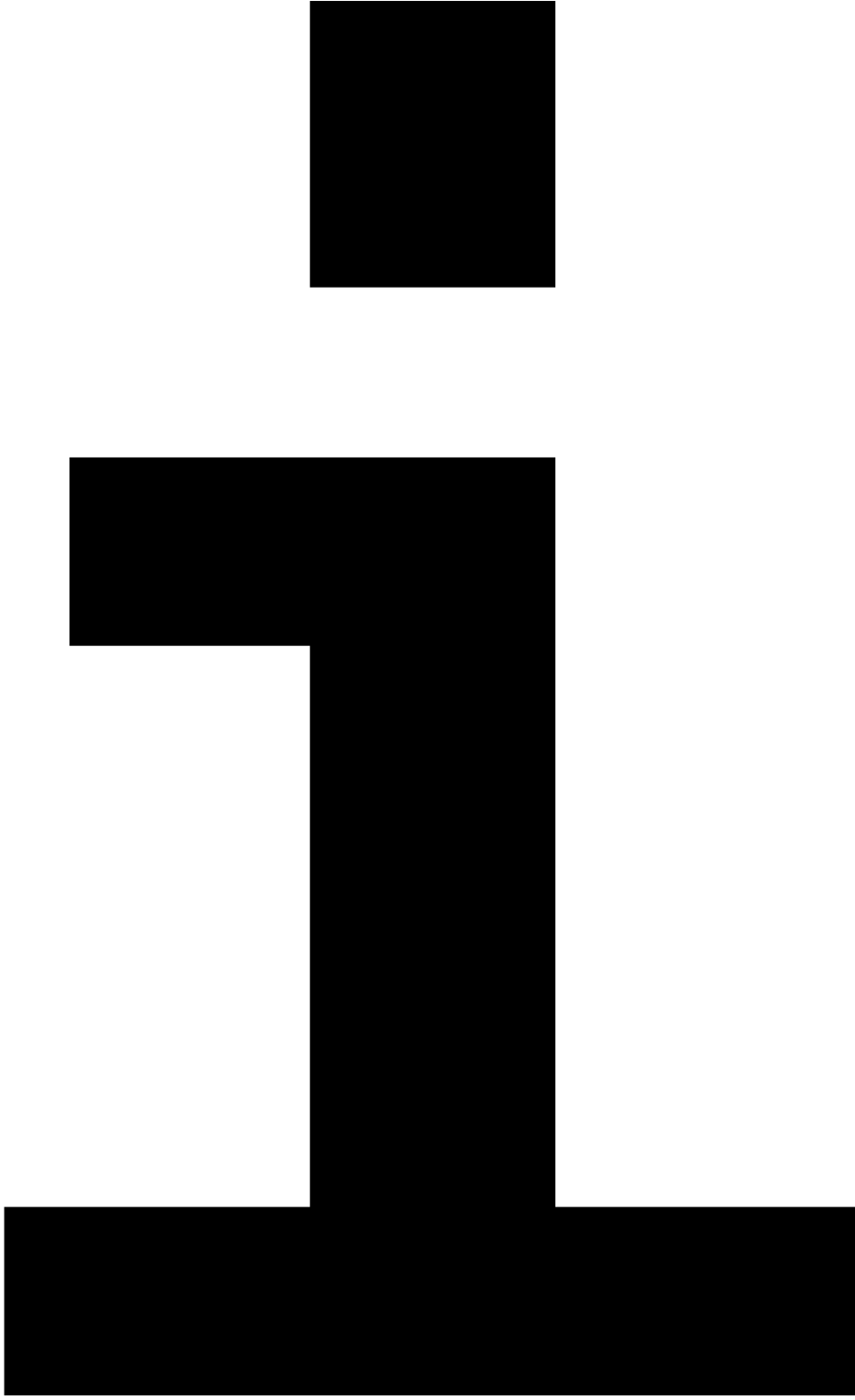




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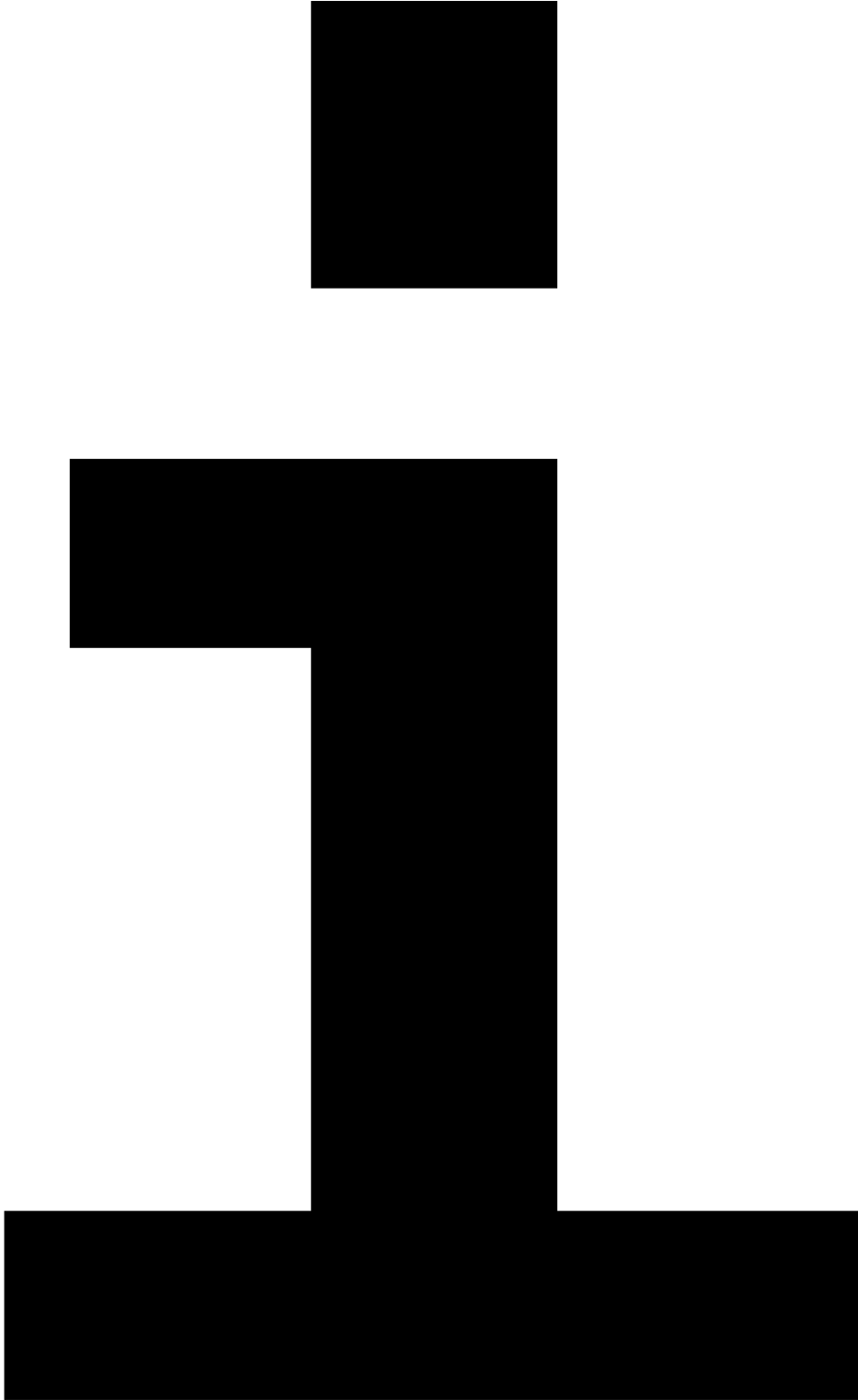
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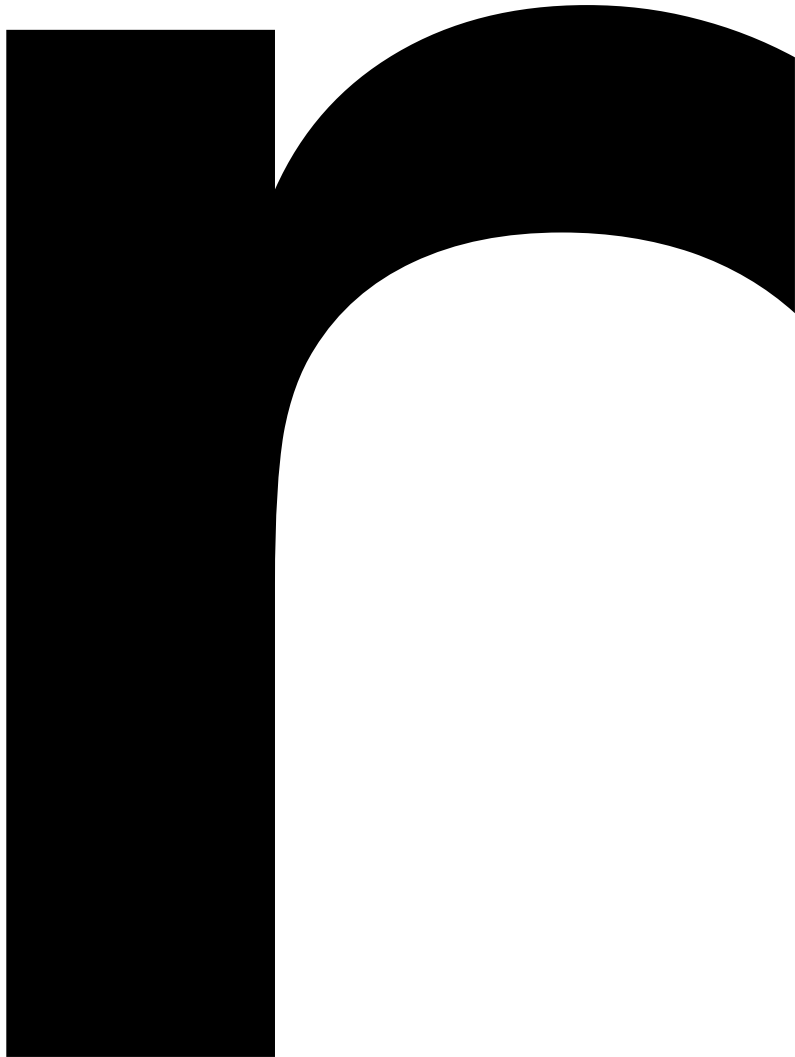
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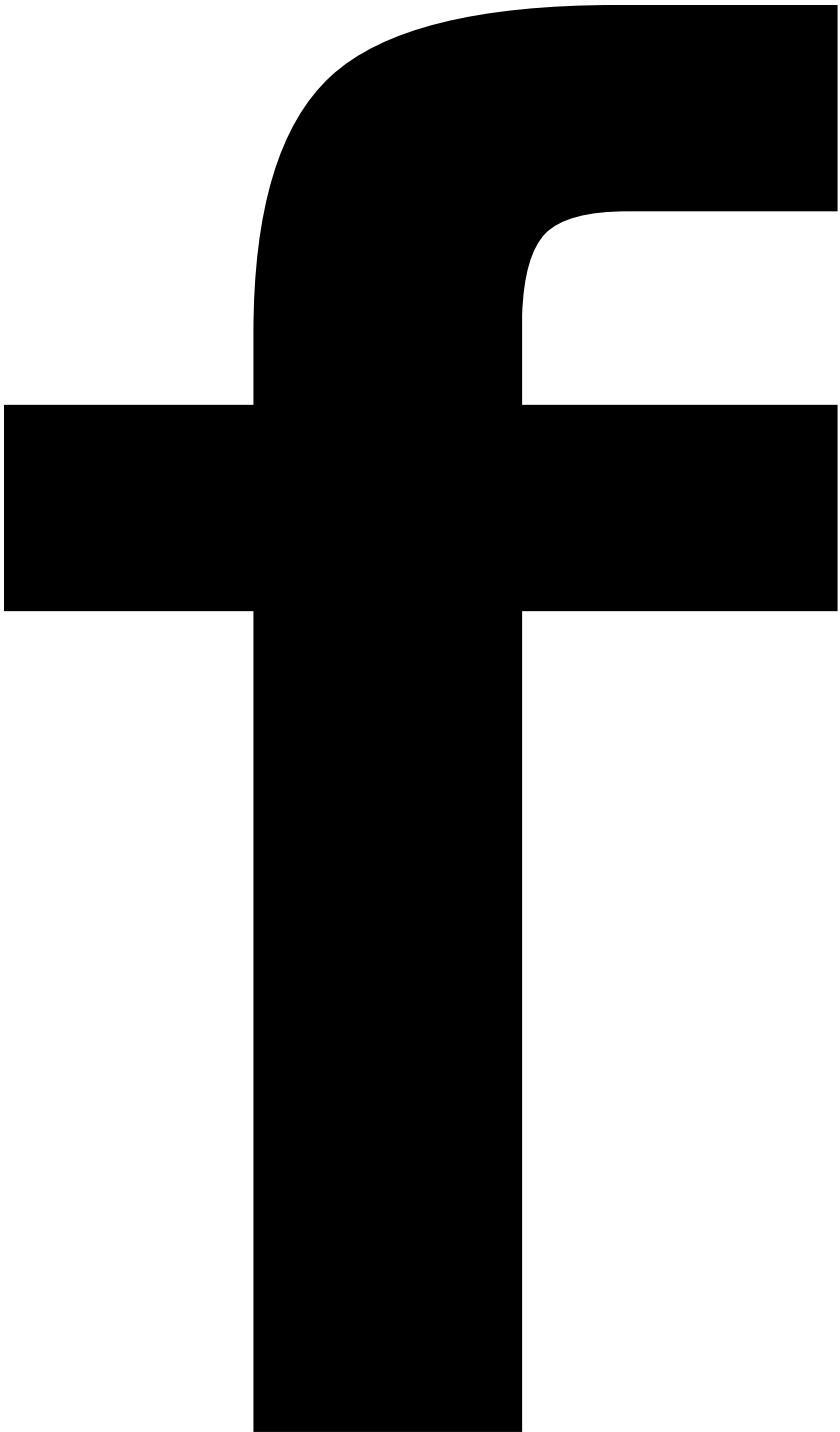
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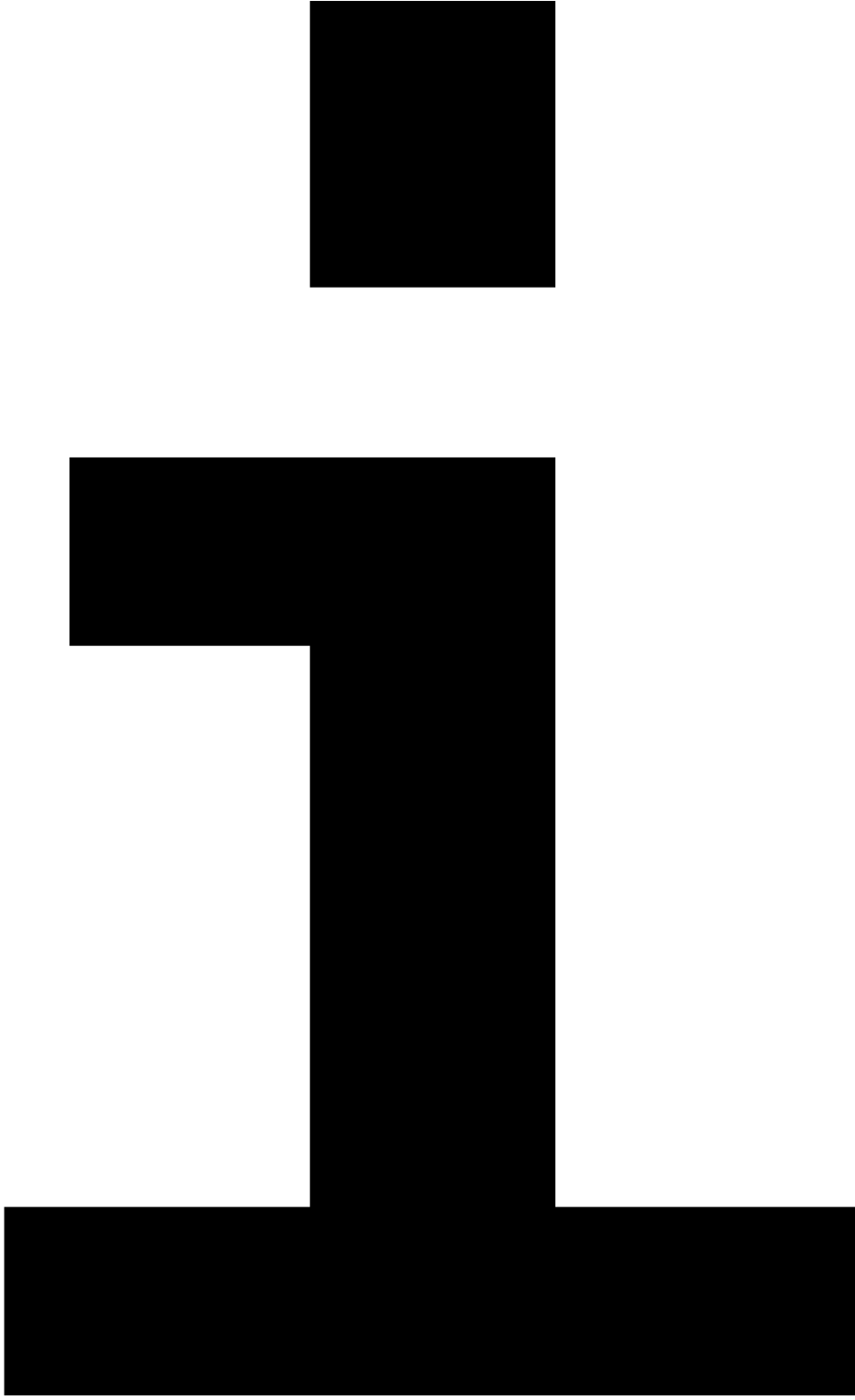
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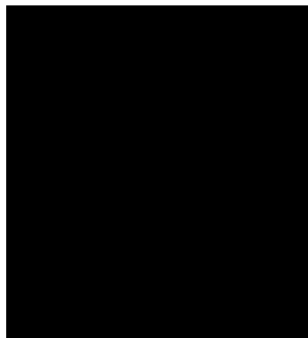




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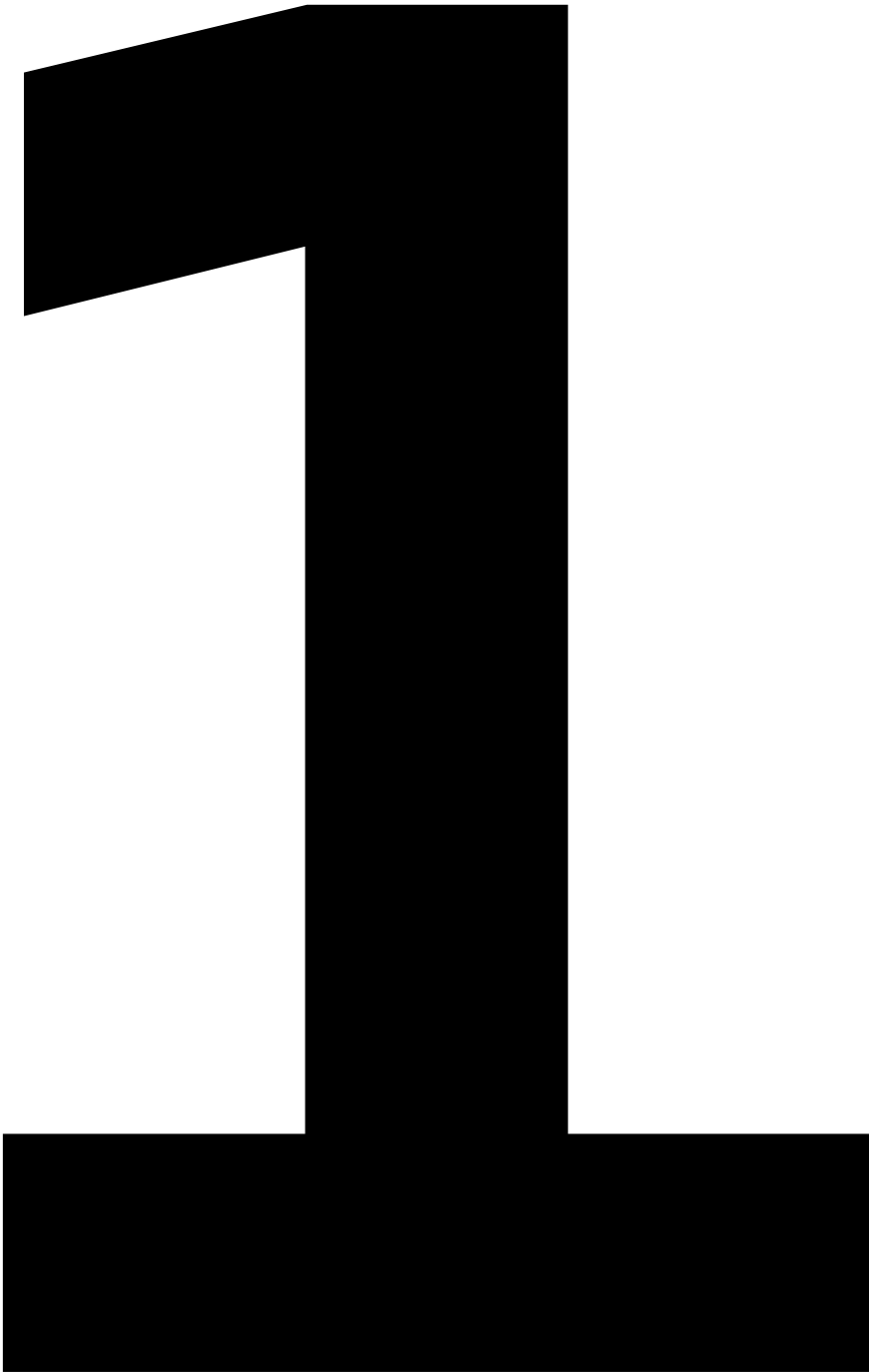
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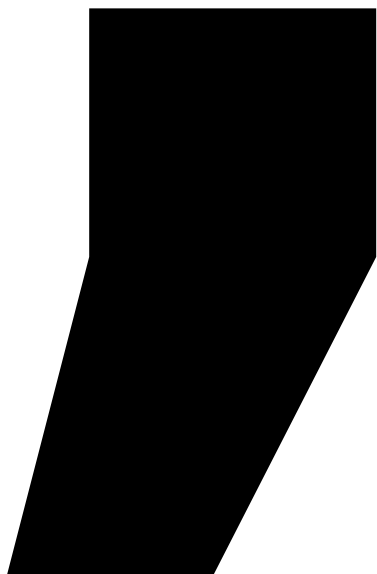


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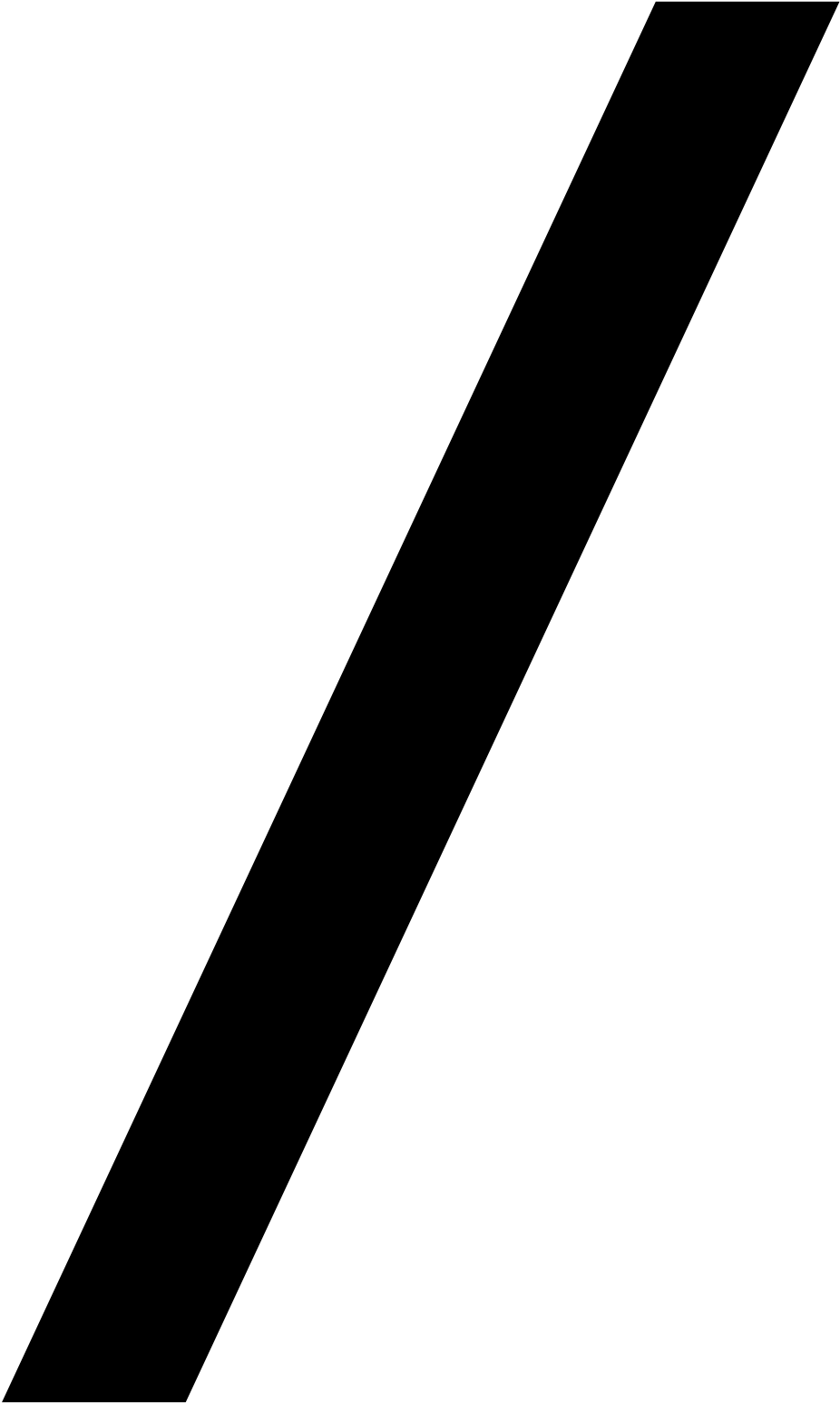
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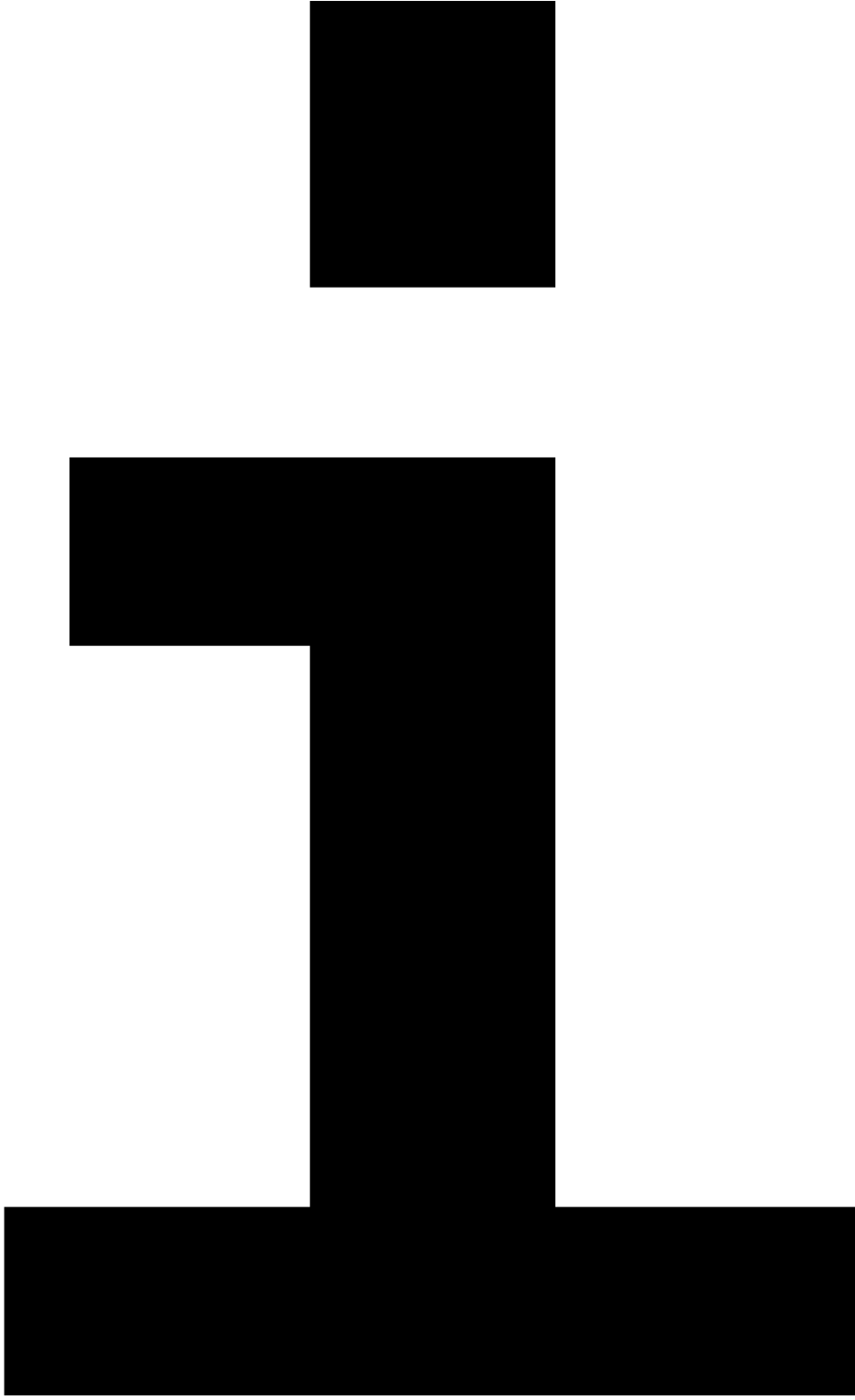
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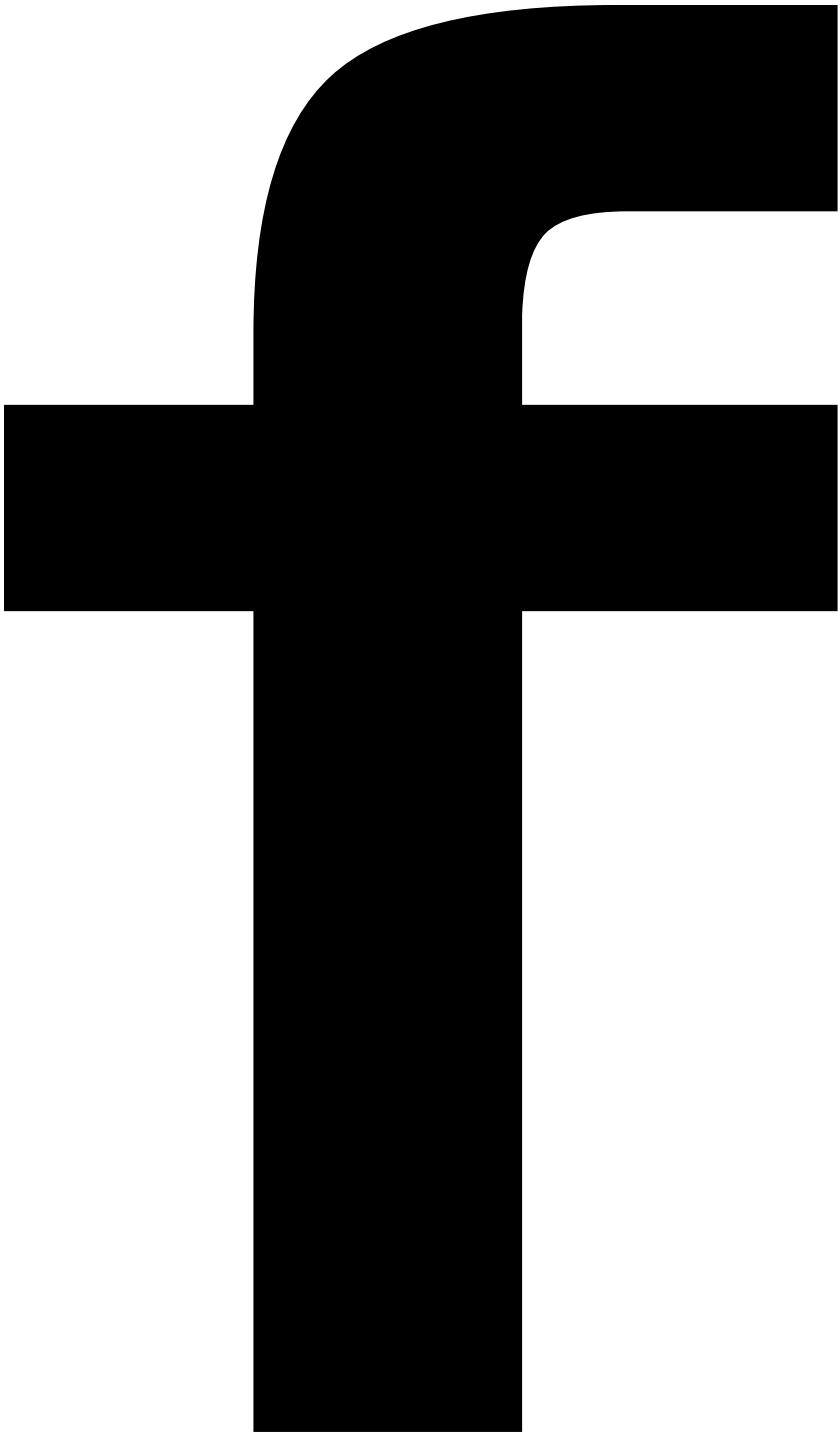




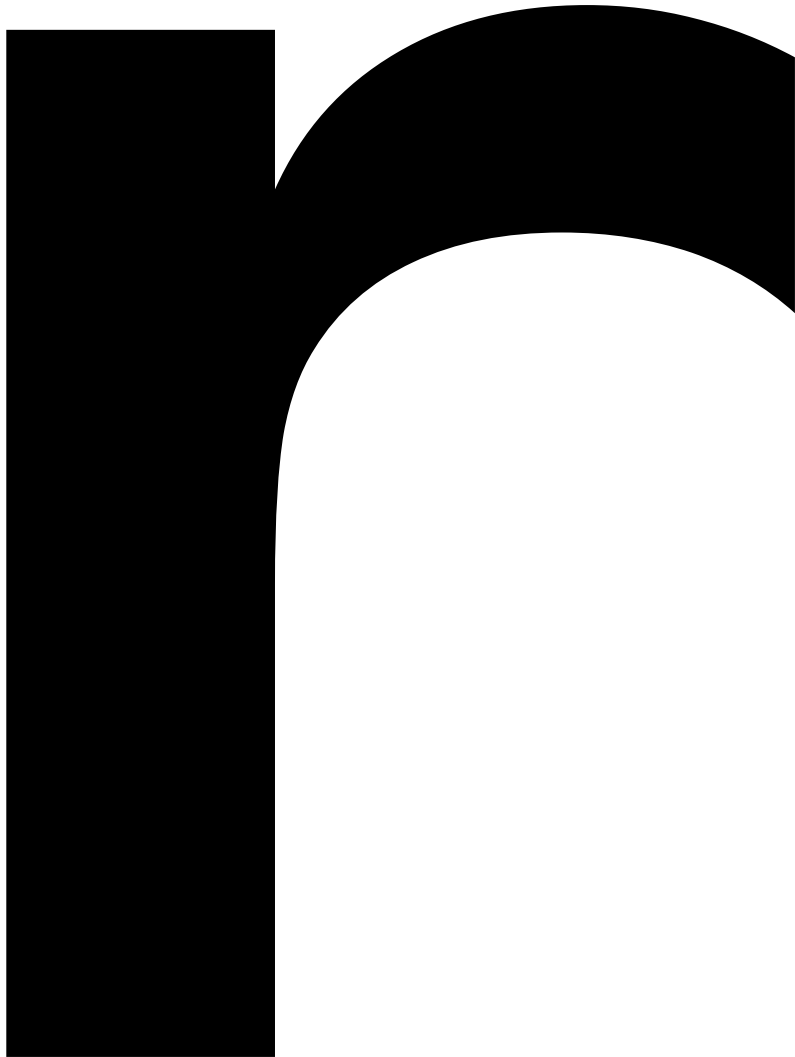
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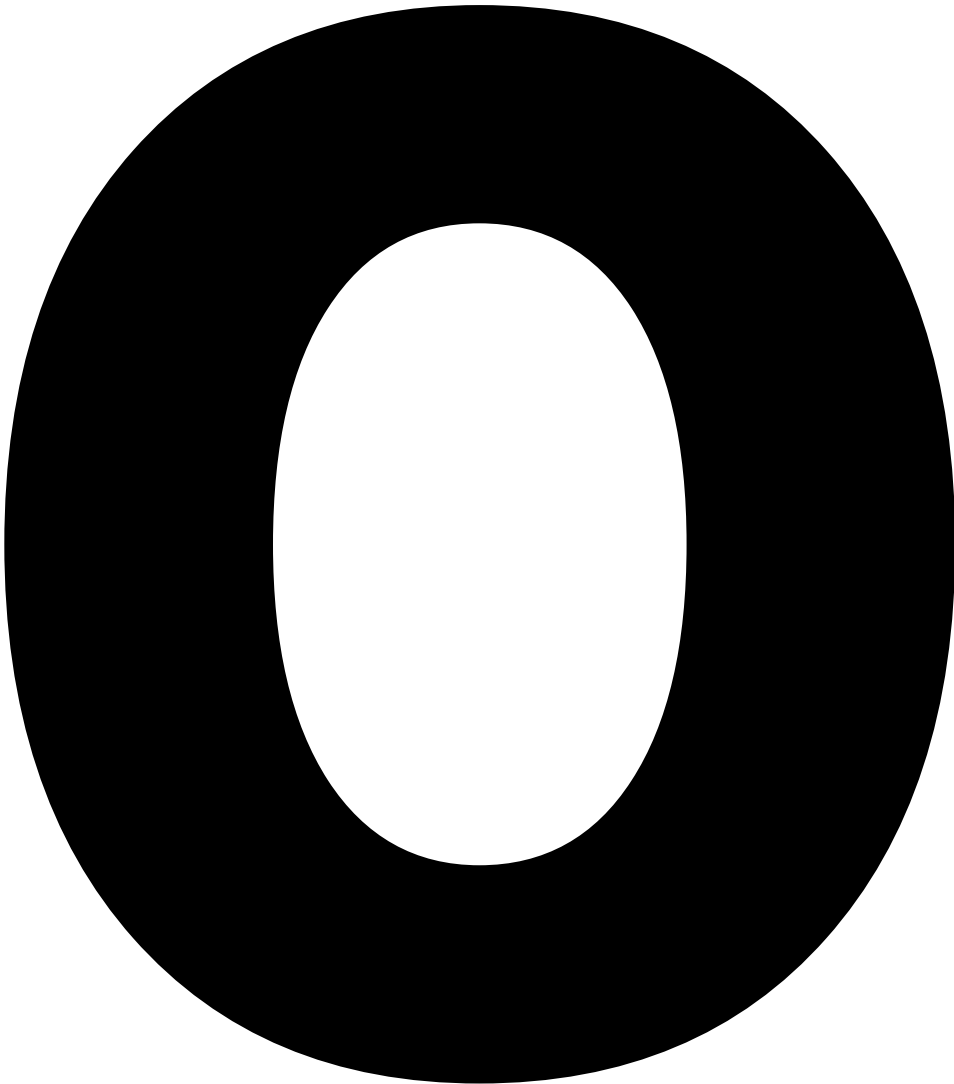
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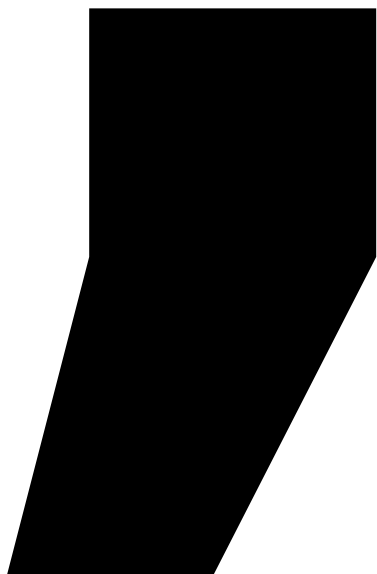




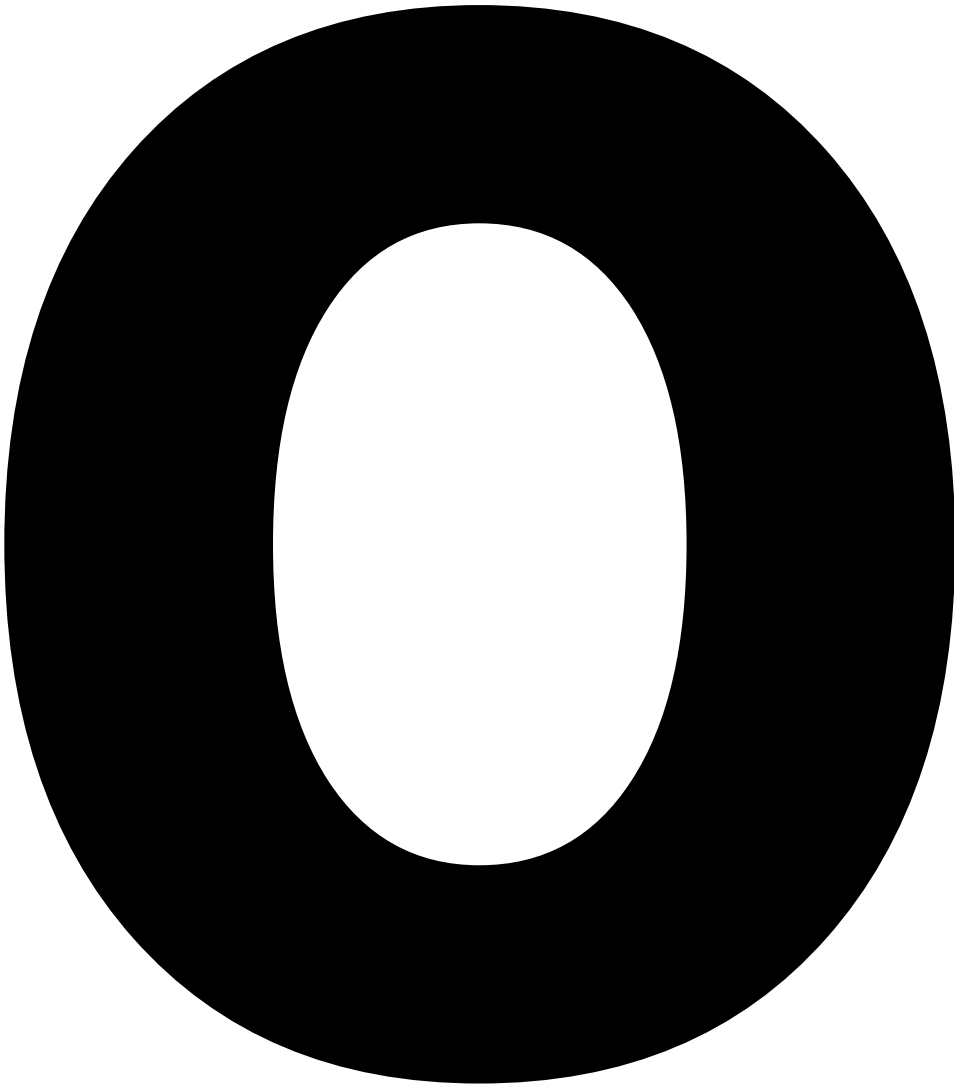
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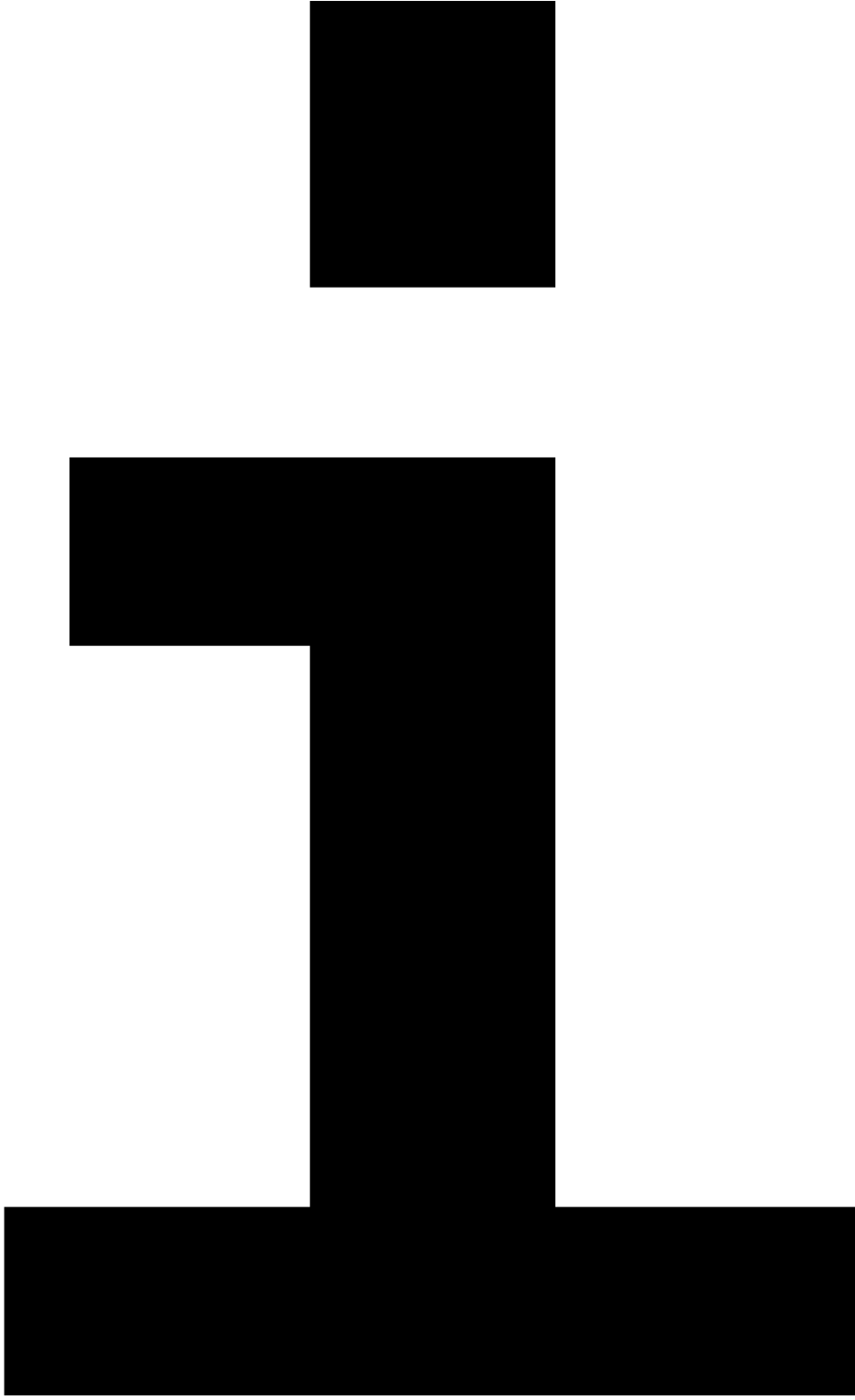
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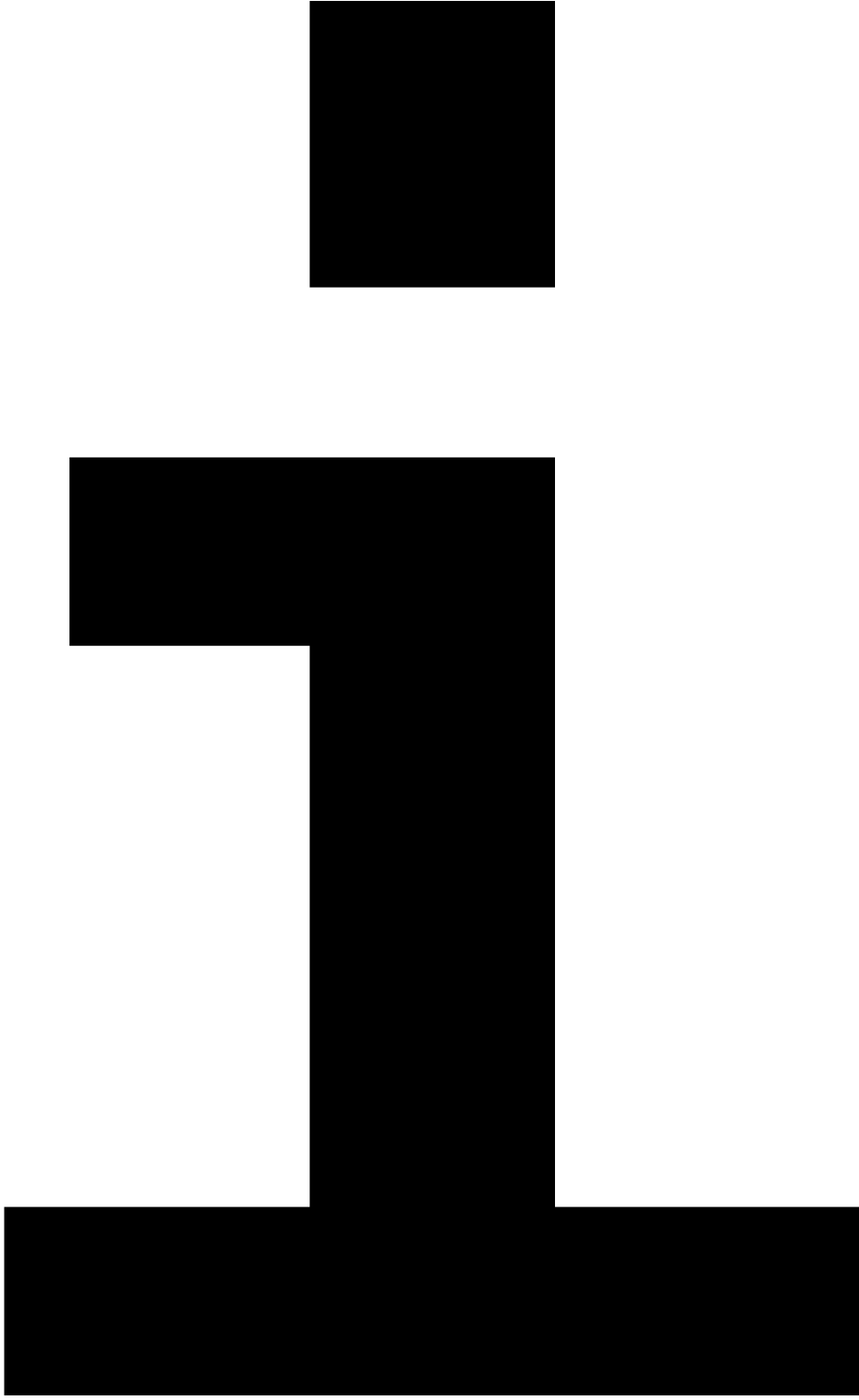
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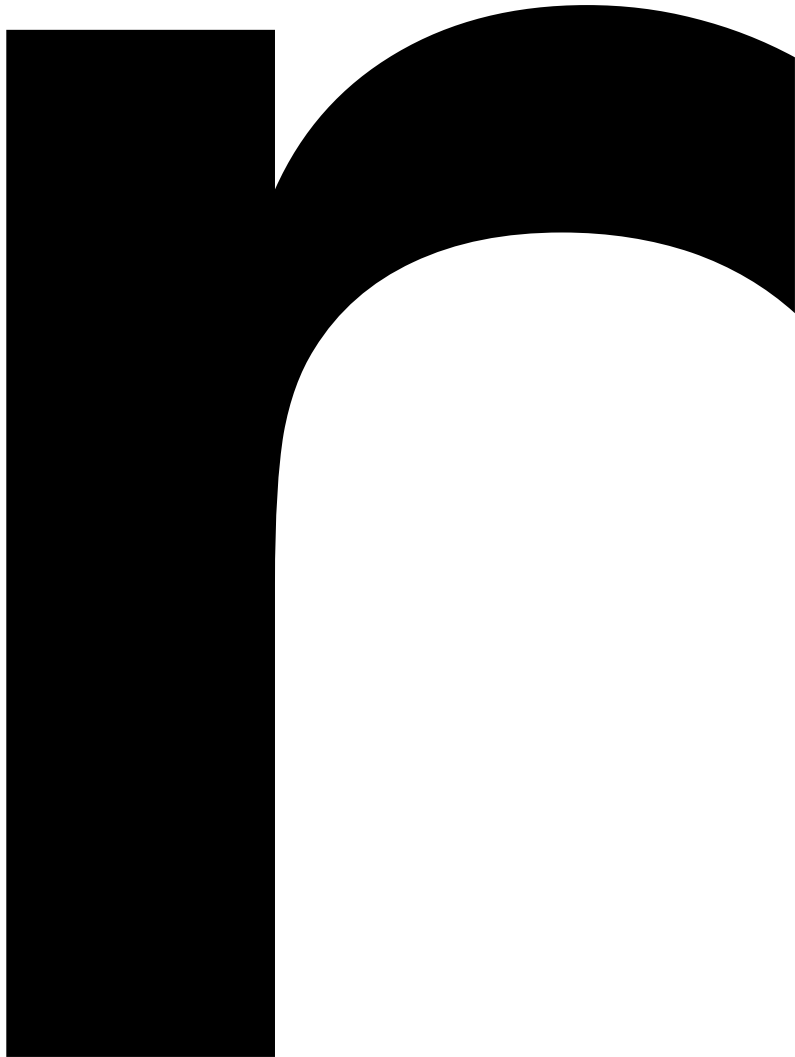


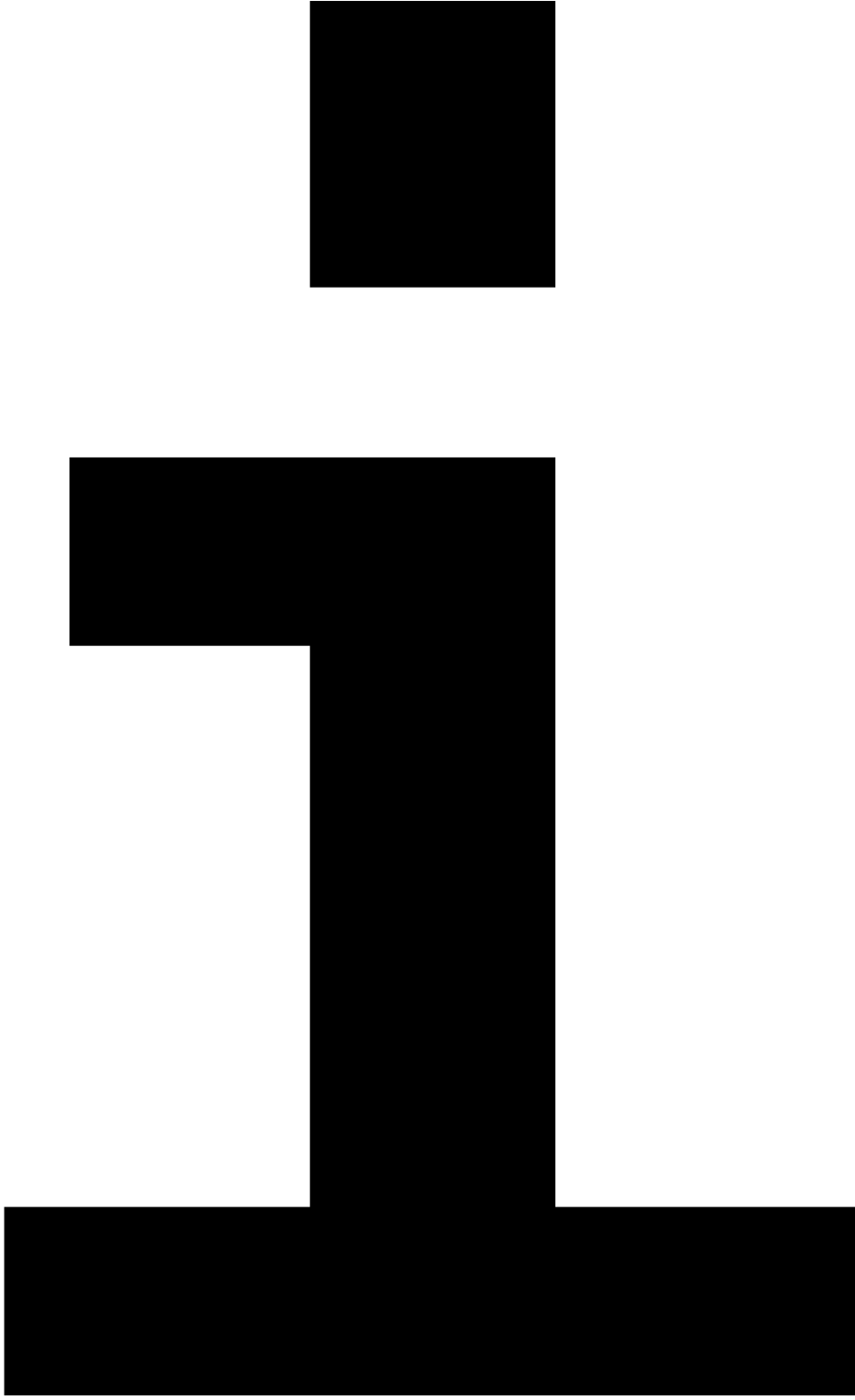
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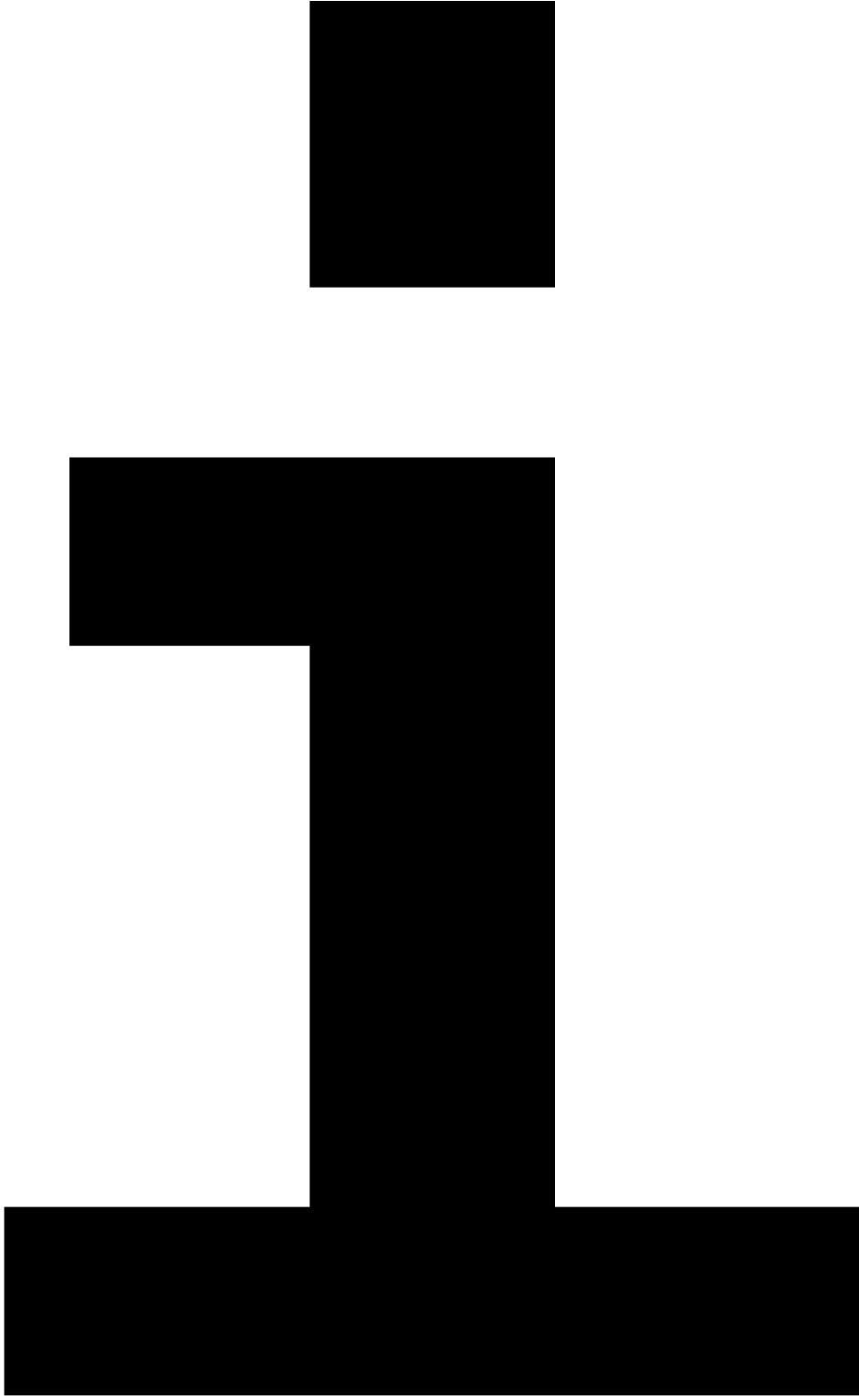
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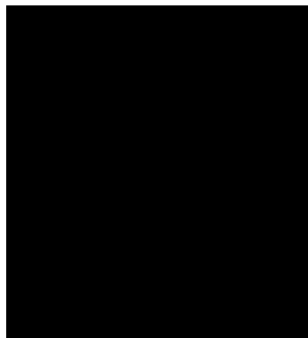
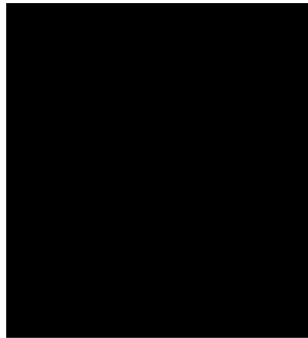


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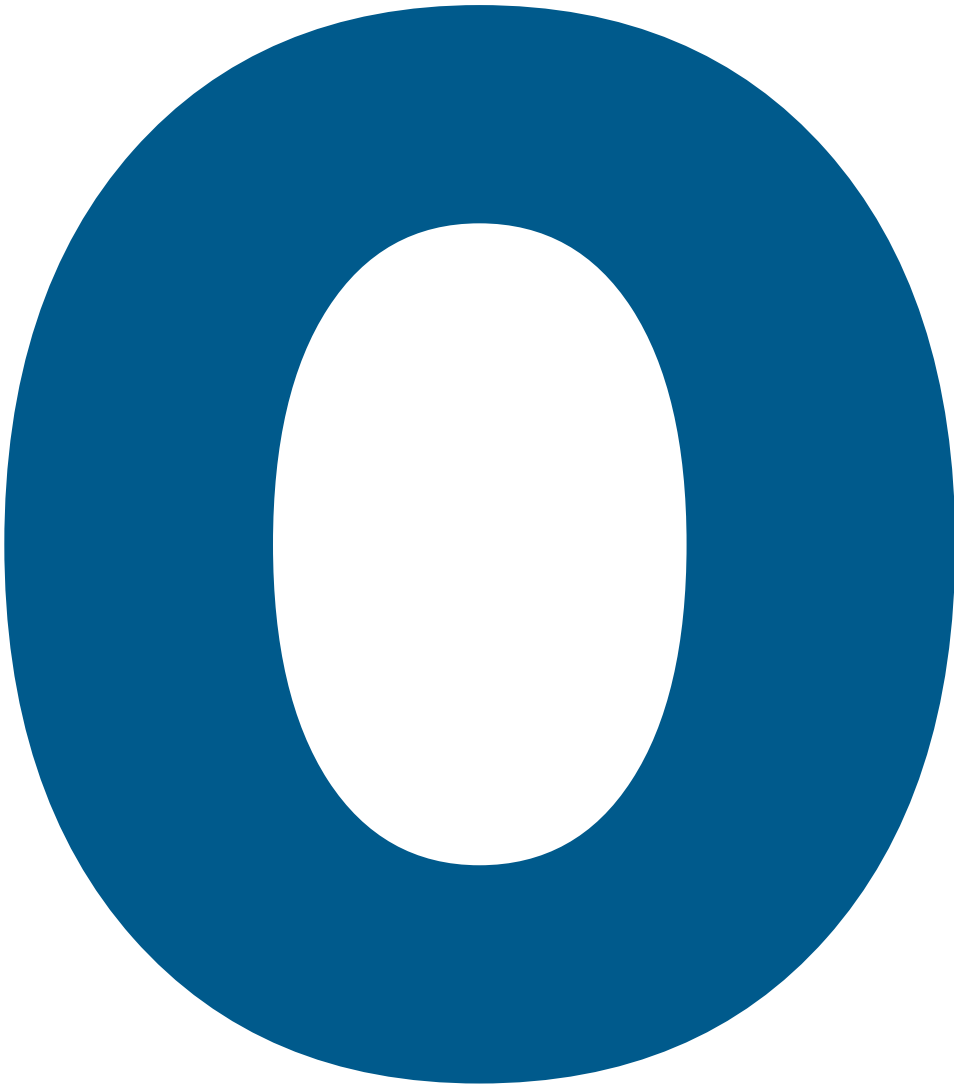
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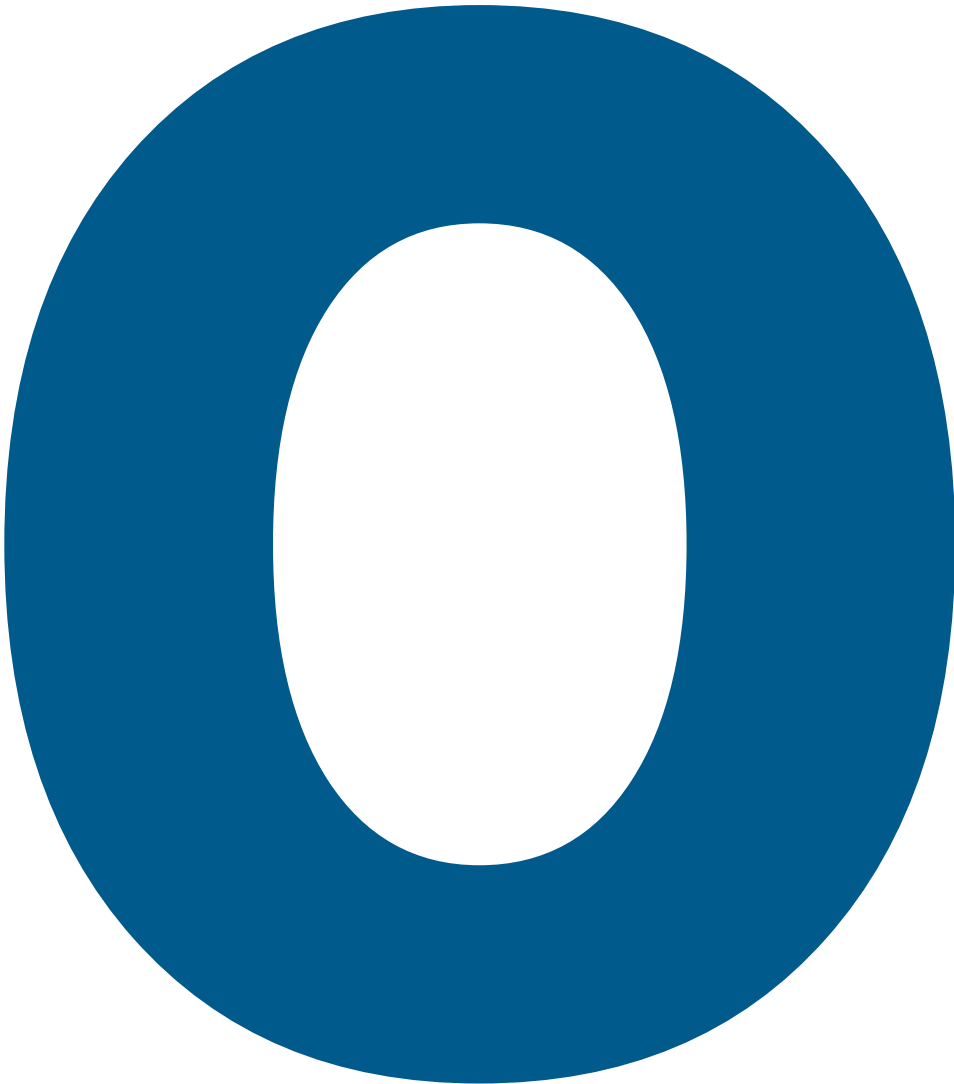


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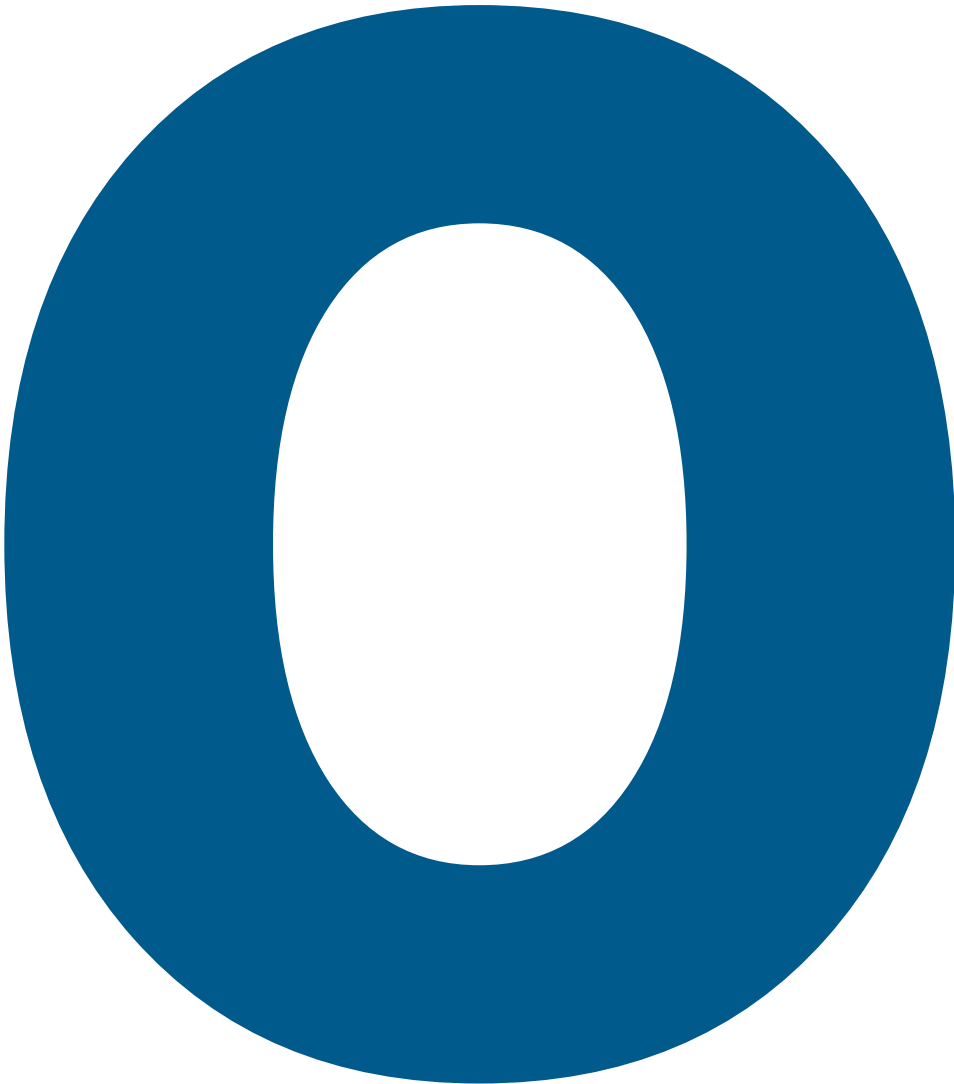
GAS	Pre-1750 tropospheric concentration ¹	Recent tropospheric concentration ²	GWP ³ (100-yr time horizon)	Atmospheric lifetime ⁴ (years)	Increased radiative forcing ⁵ (W/m ²)
Concentrations in parts per million (ppm)					
Carbon dioxide (CO ₂)	280 ⁶	390.5 ⁷	1	~ 100 ⁴	1.79
Concentrations in parts per billion (ppb)					
Methane (CH ₄)	700 ⁸	1871 ⁹ /1750 ⁹	25	12 ⁴	0.50
Nitrous oxide (N ₂ O)	270 ¹⁰	323 ⁹ /322 ⁹	298	114 ⁴	0.18
Tropospheric ozone (O ₃)	25 ¹	34 ^{4,1}	n.a. ⁴	hours-days	0.35 ⁴

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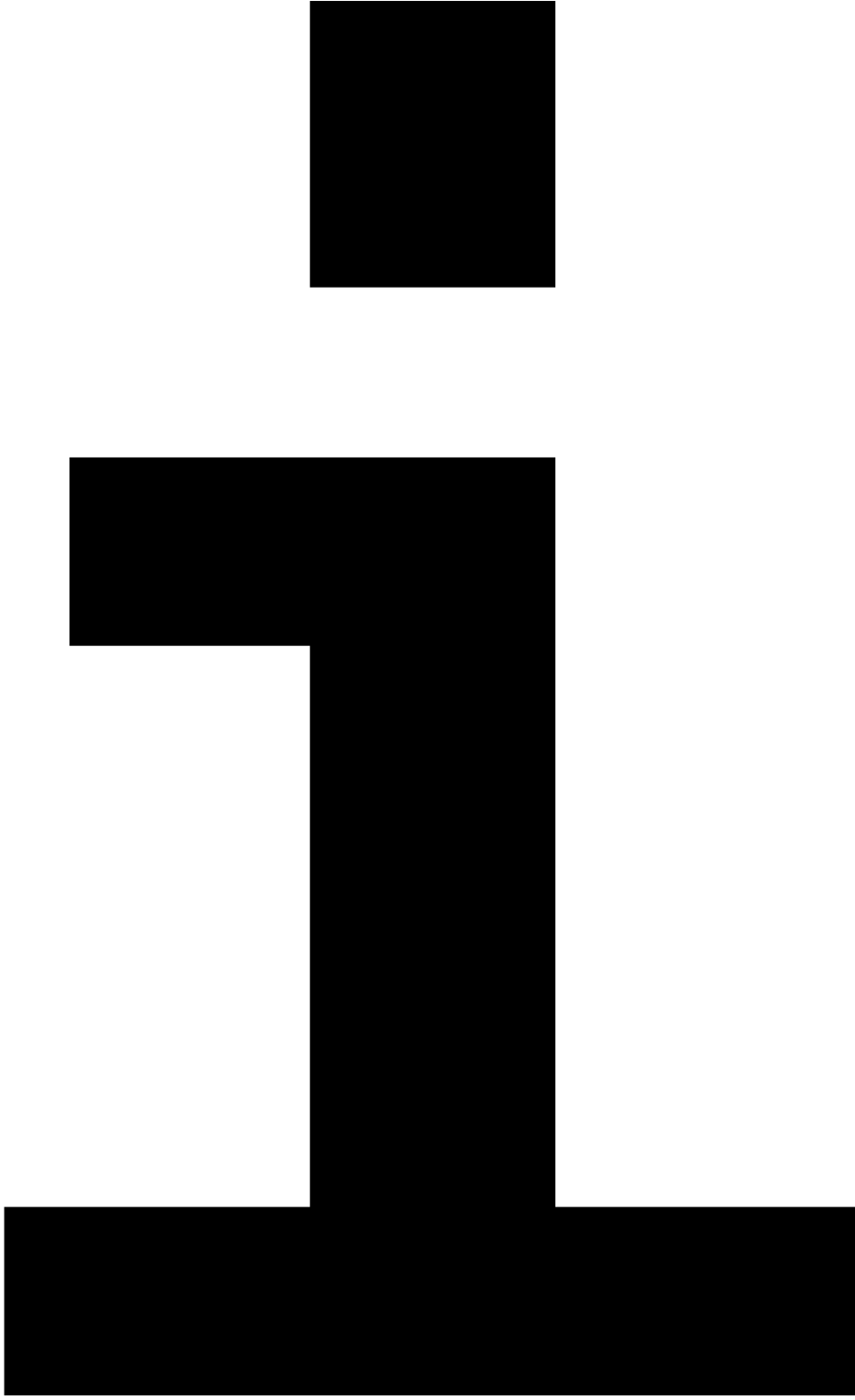
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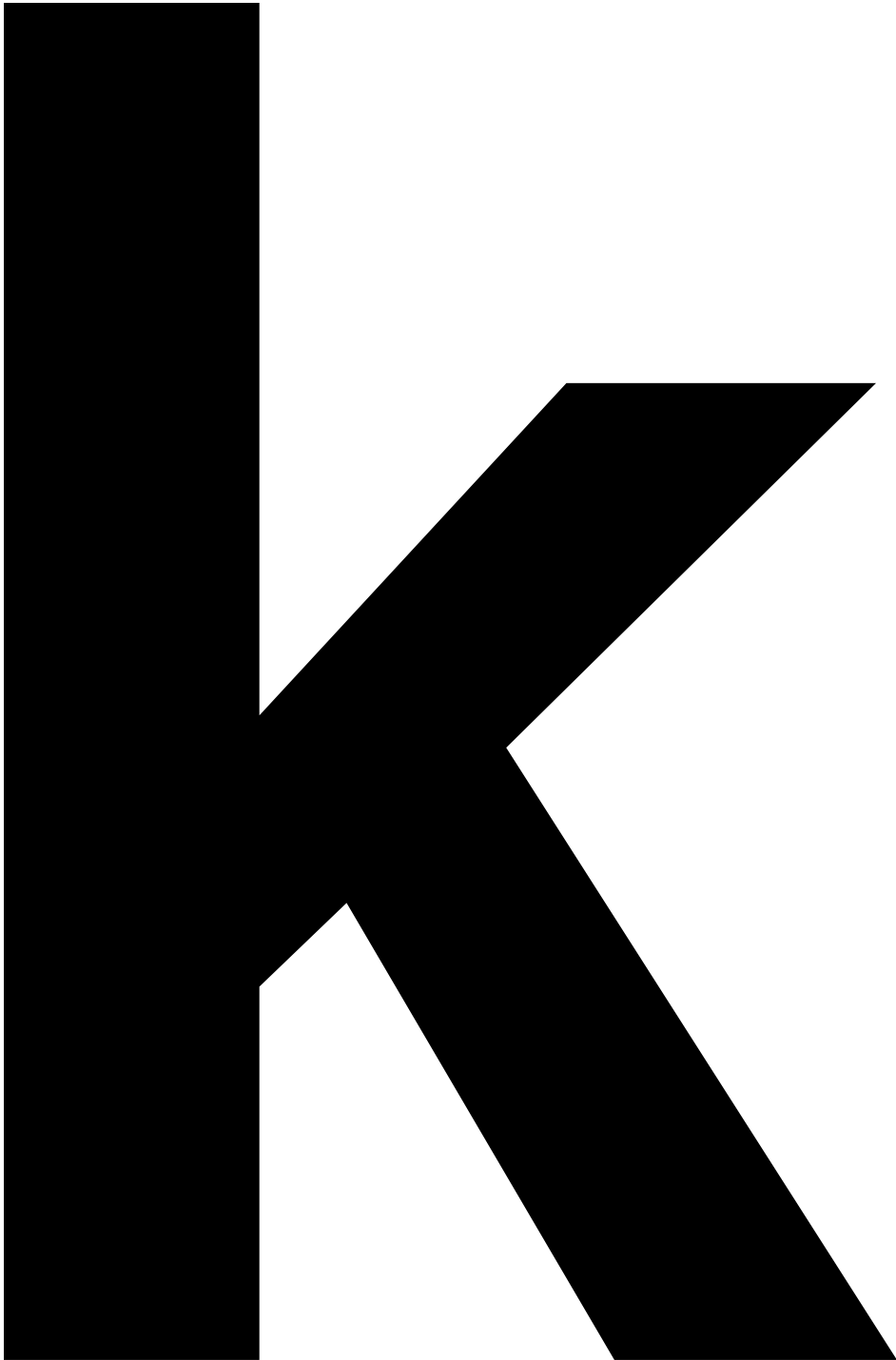


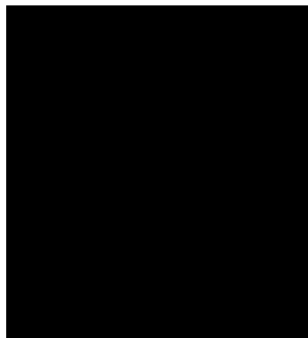
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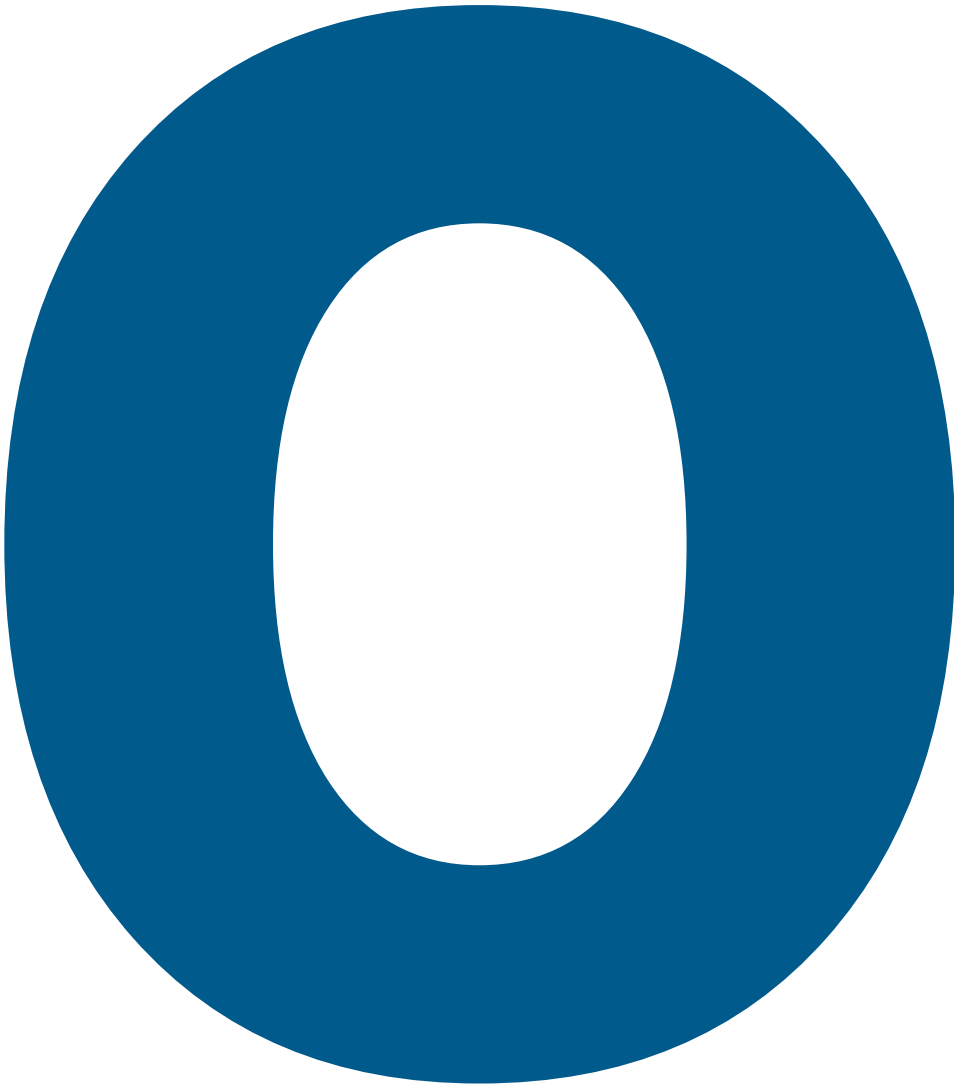
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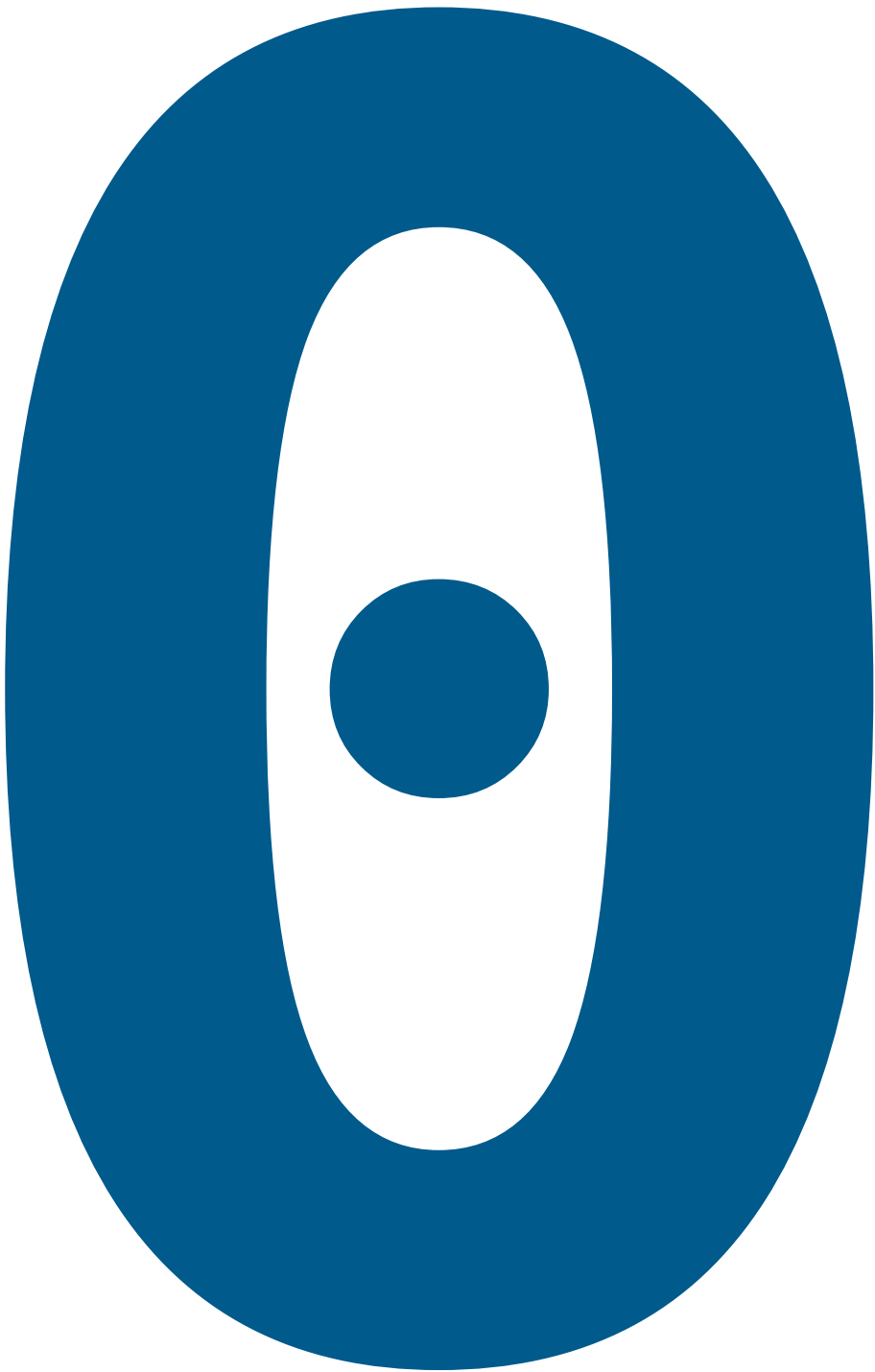




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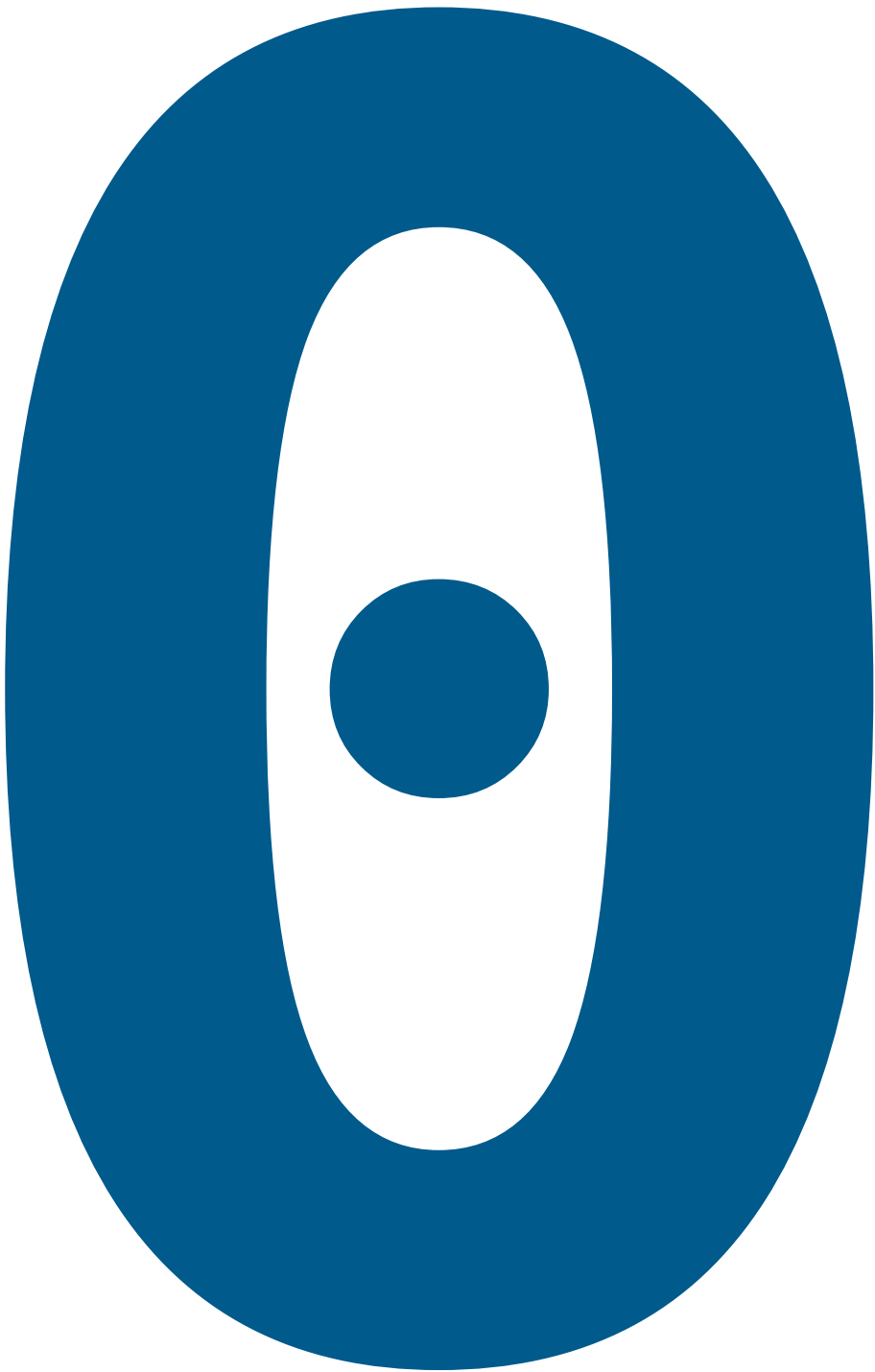
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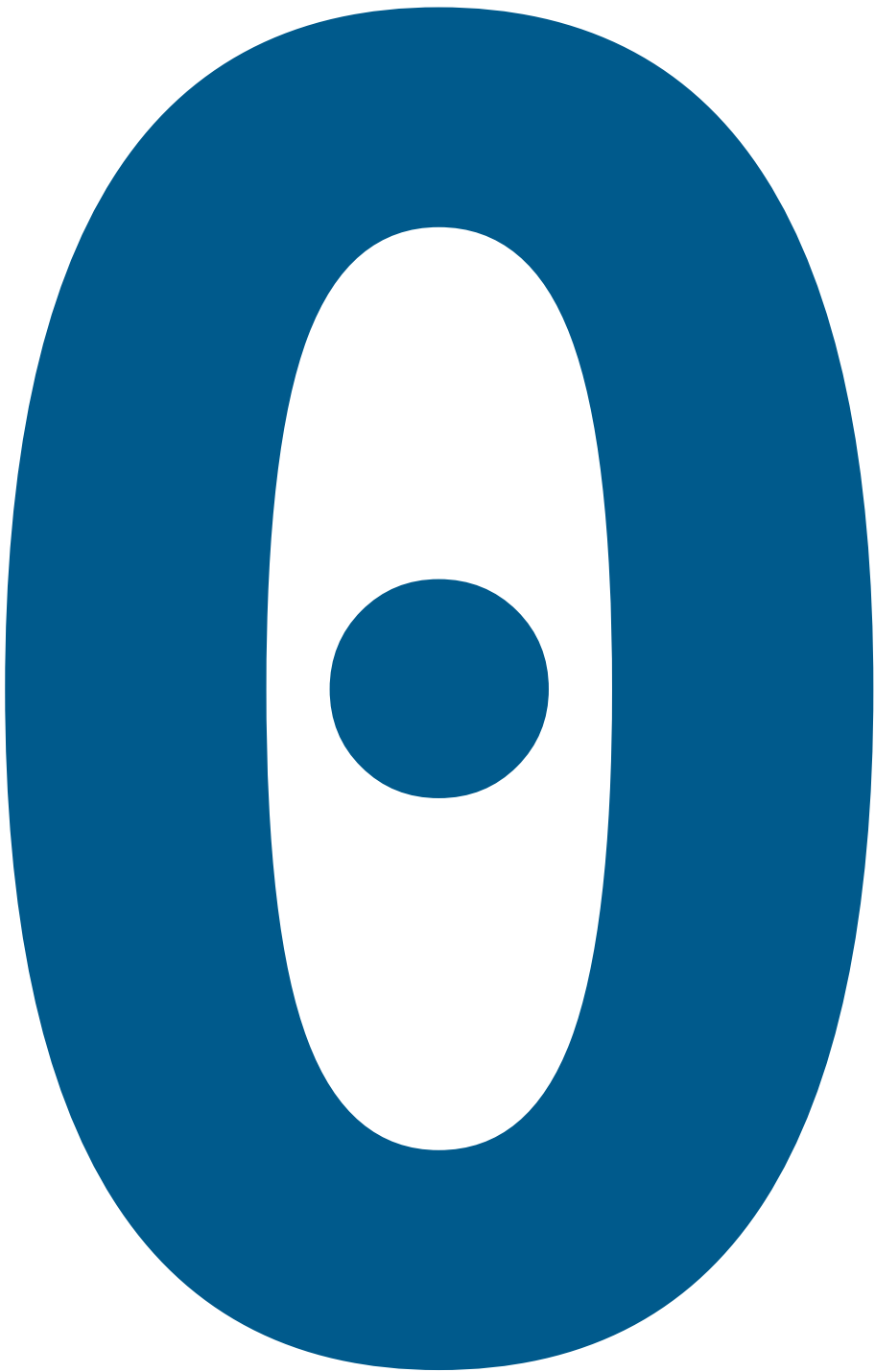
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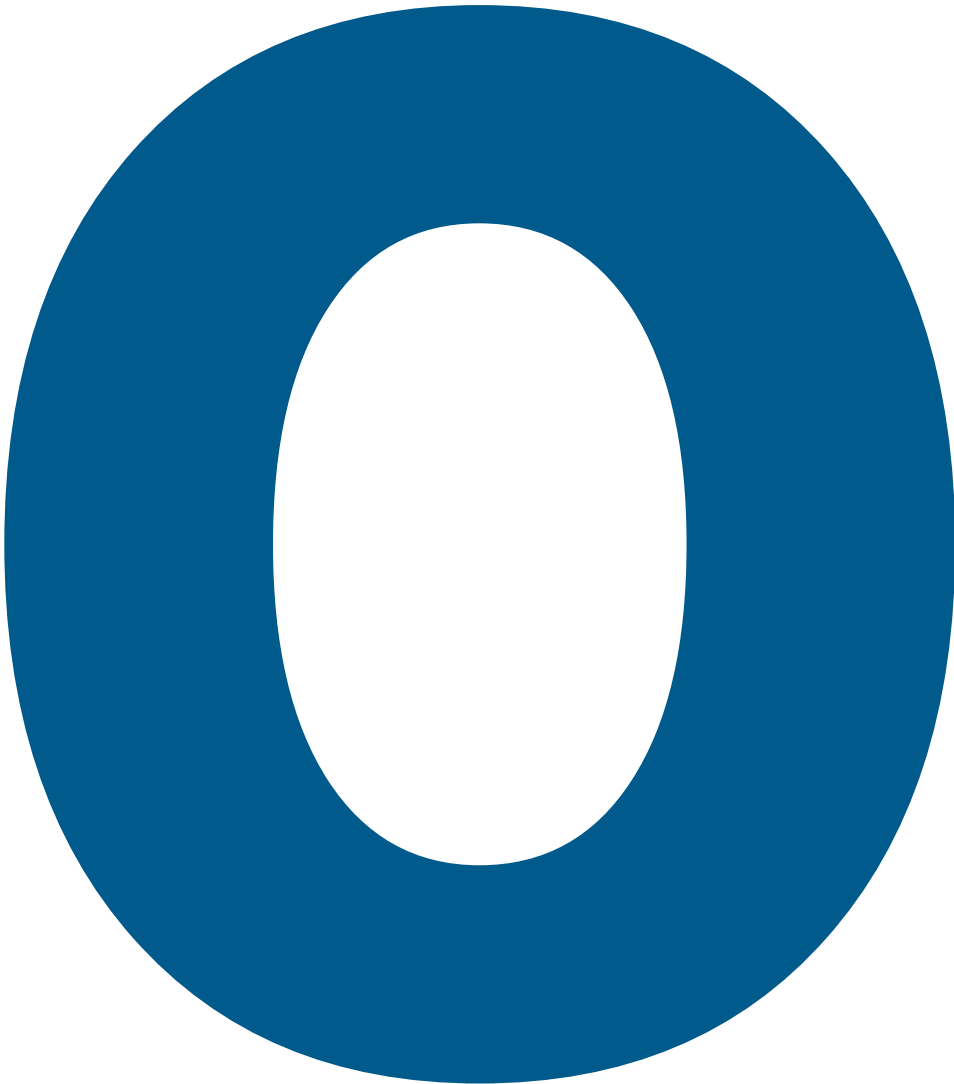




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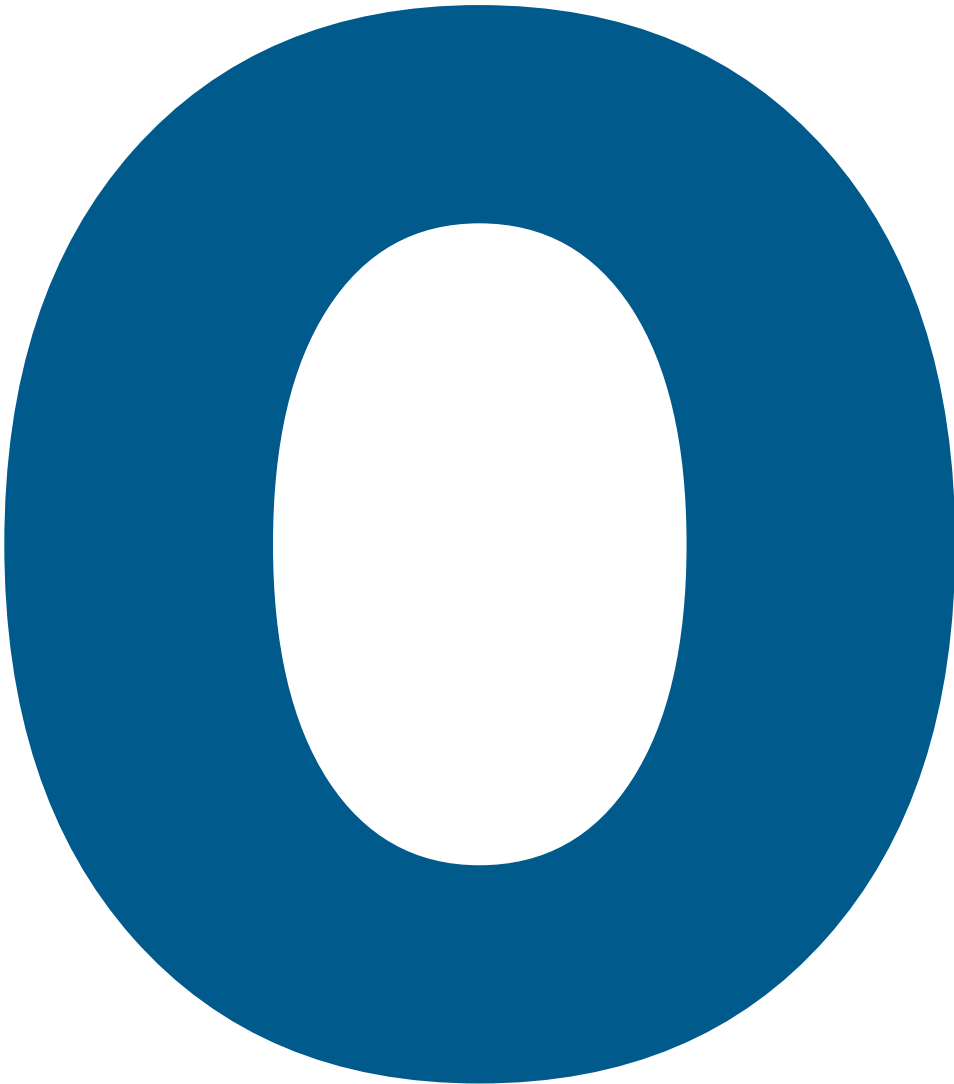




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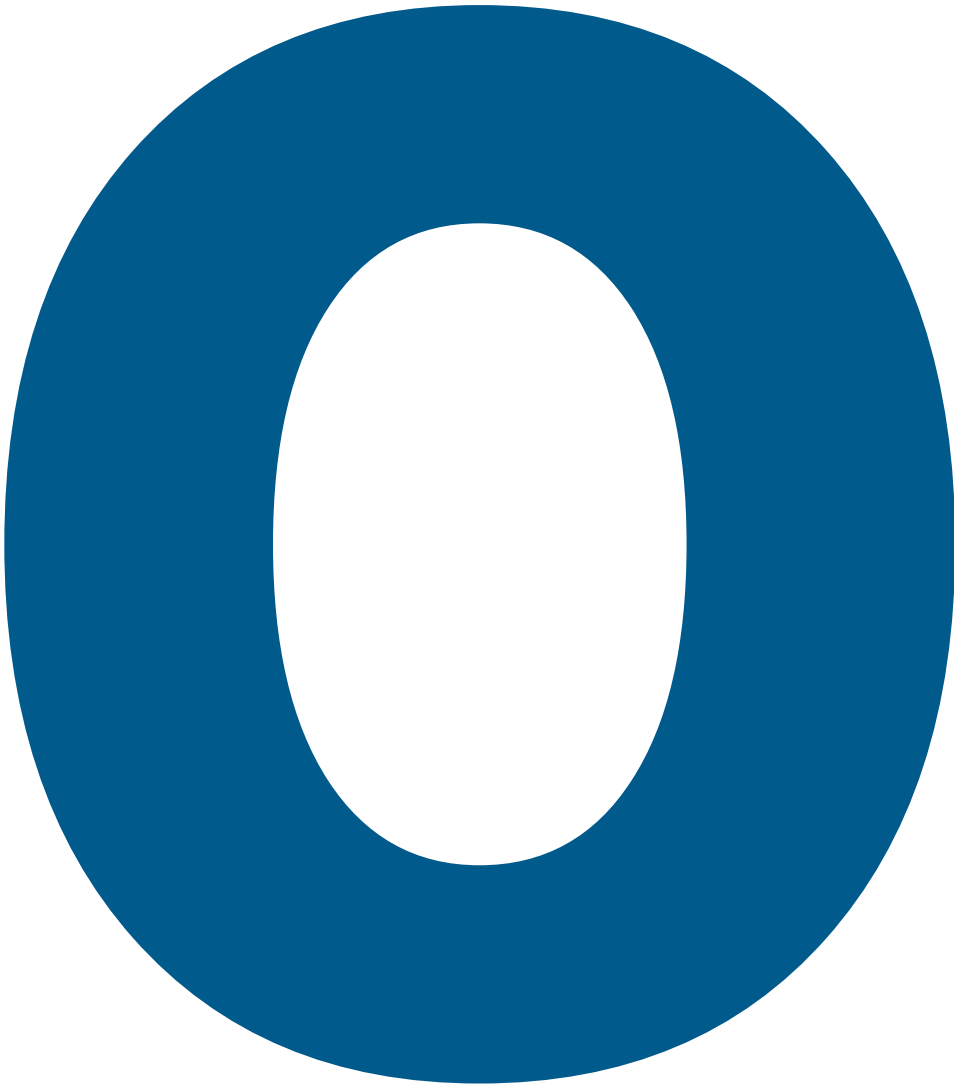
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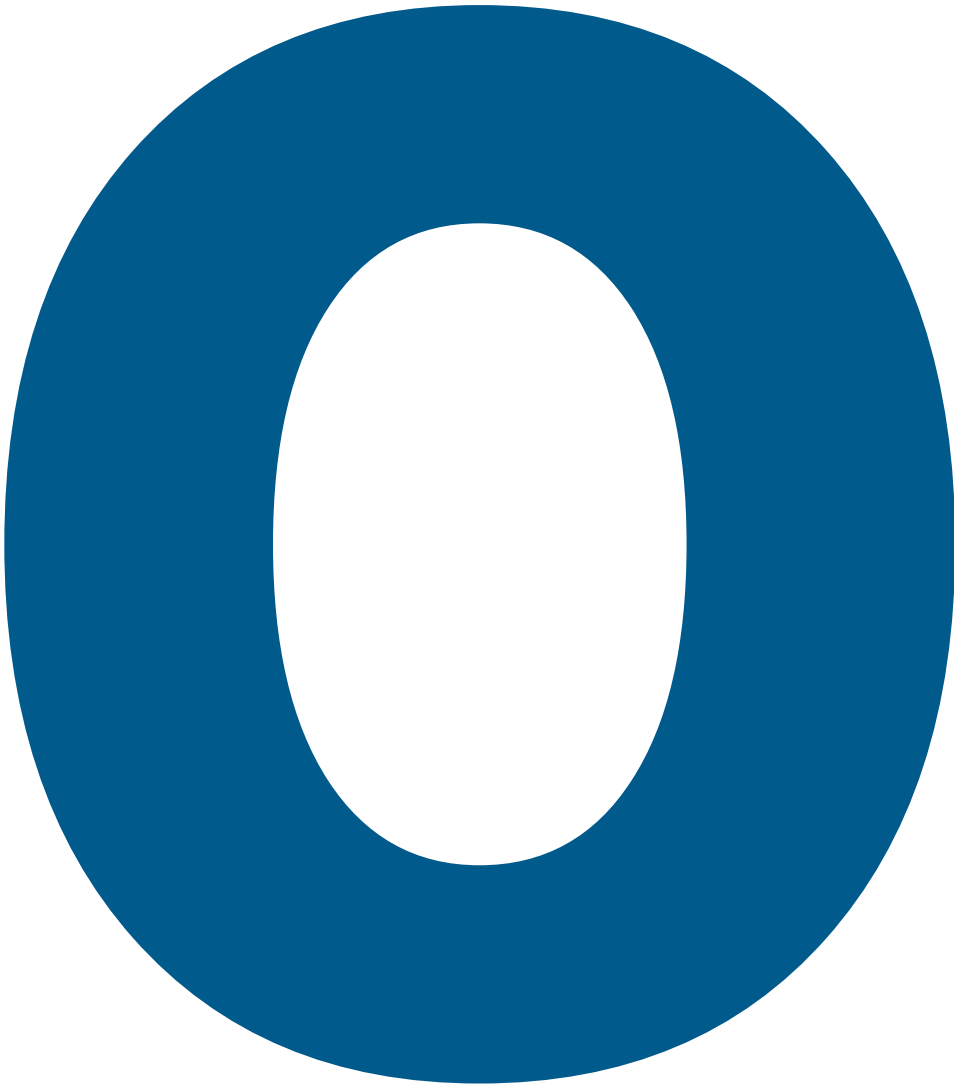






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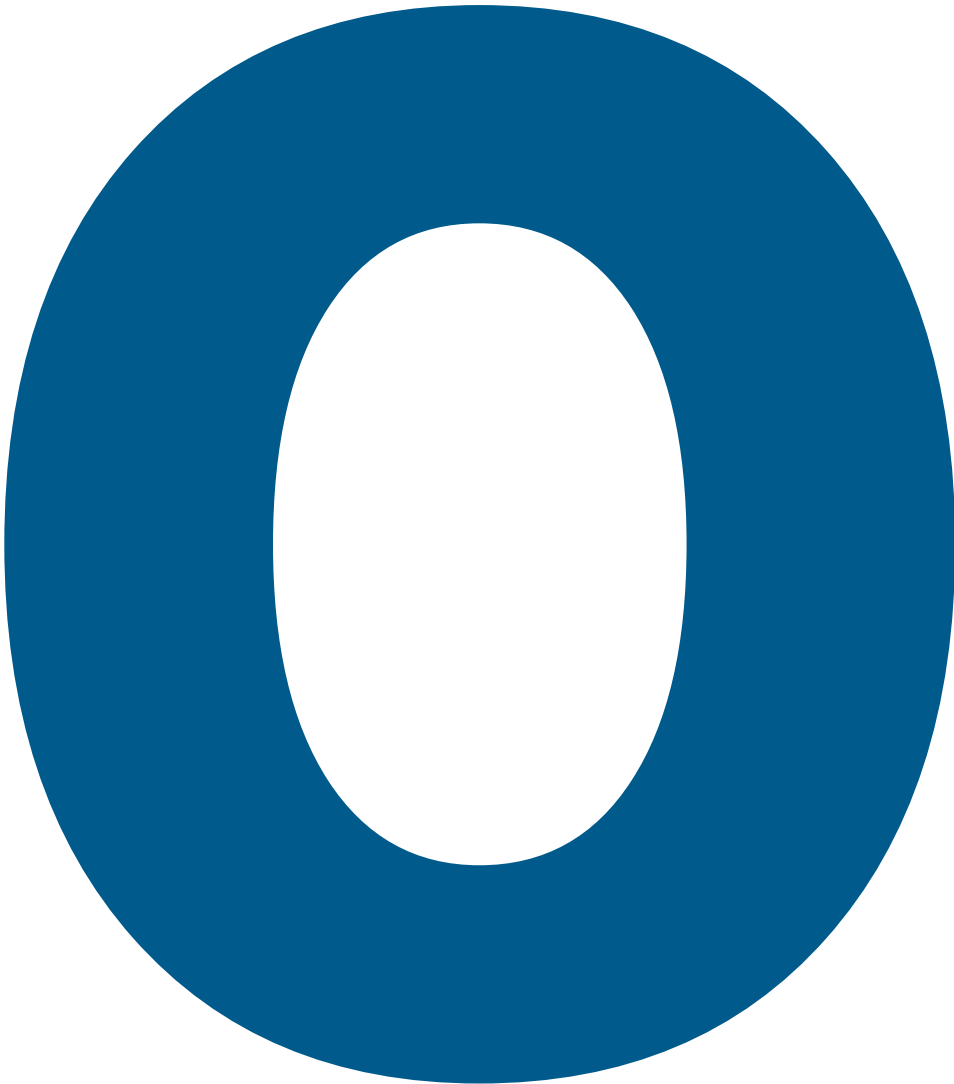
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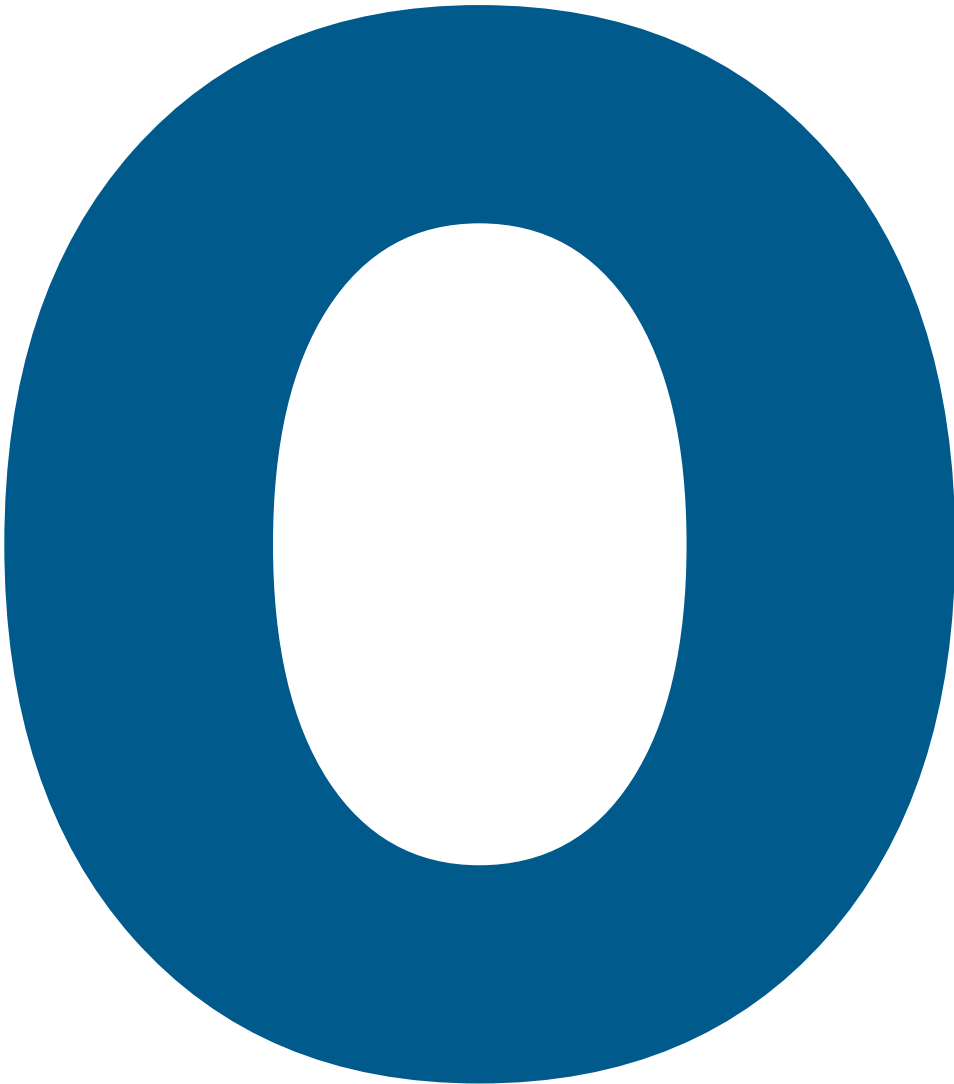




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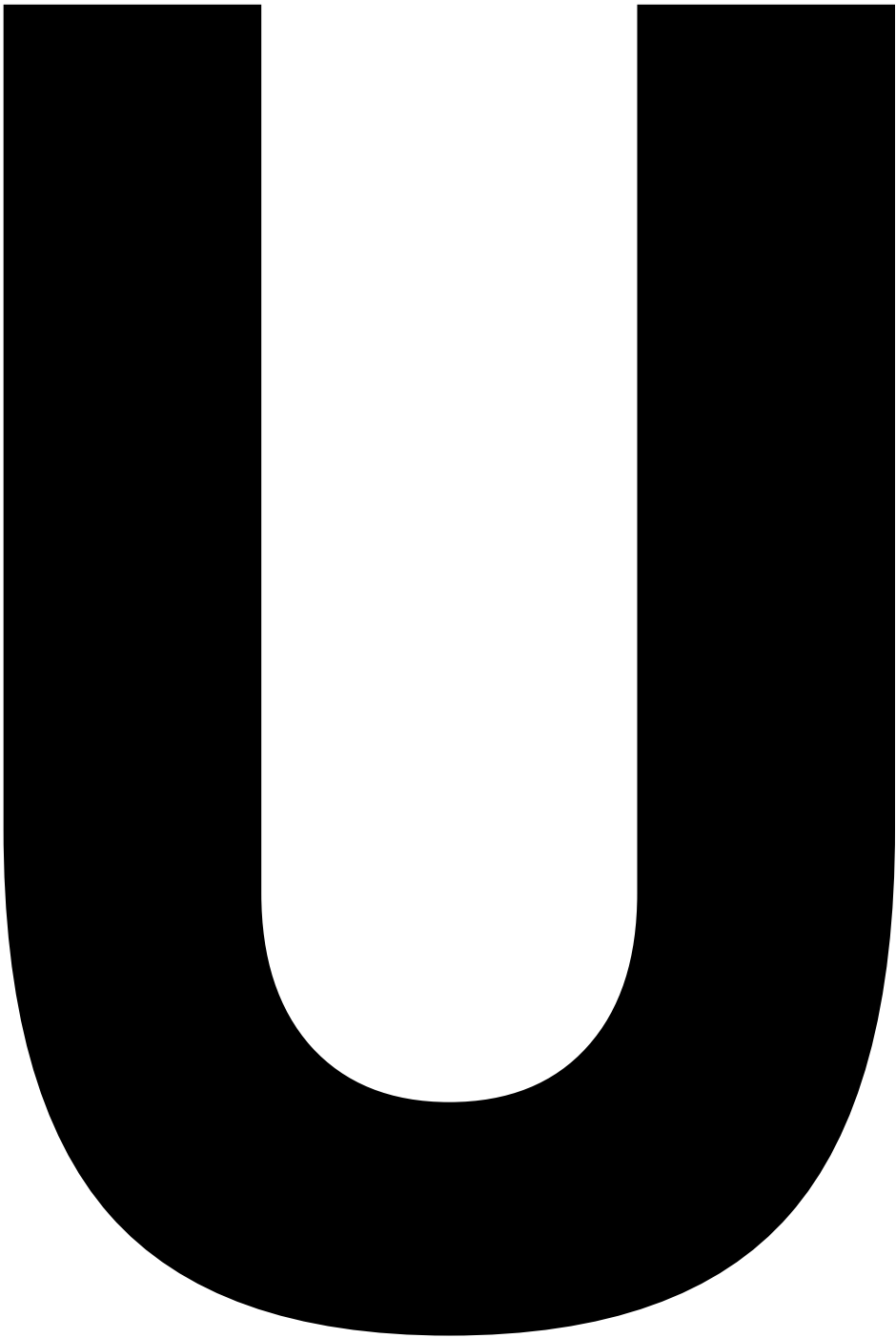
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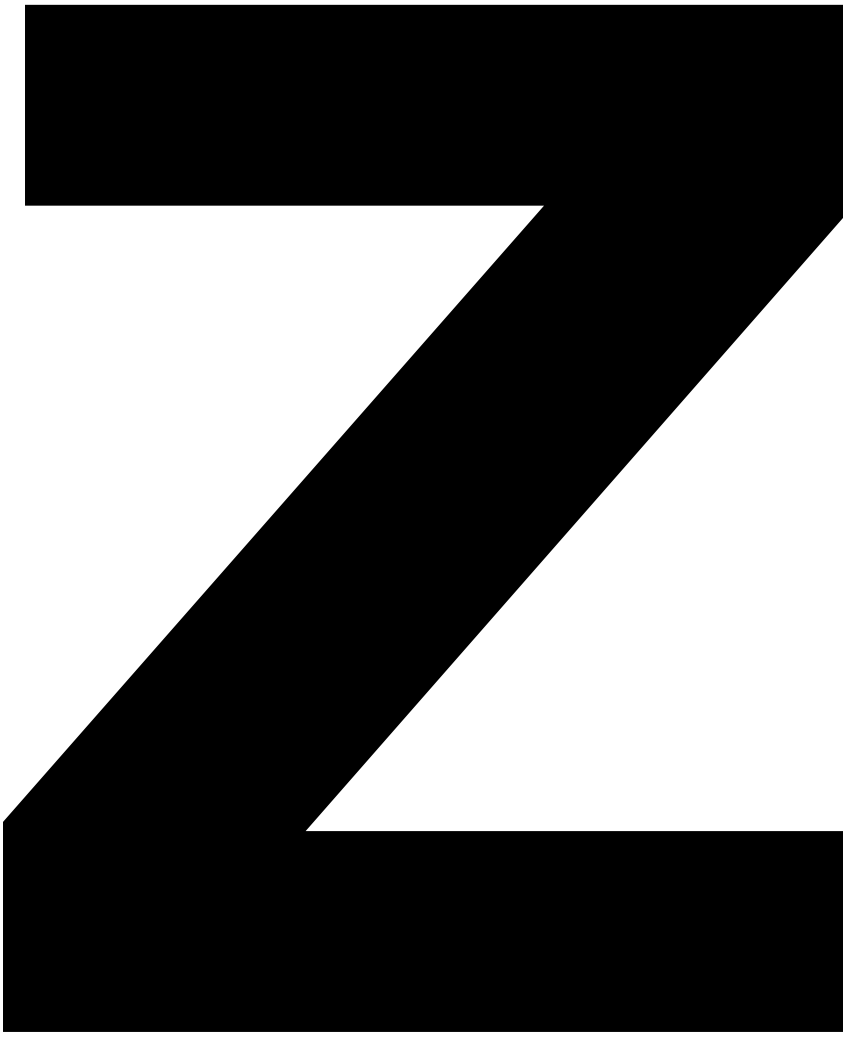
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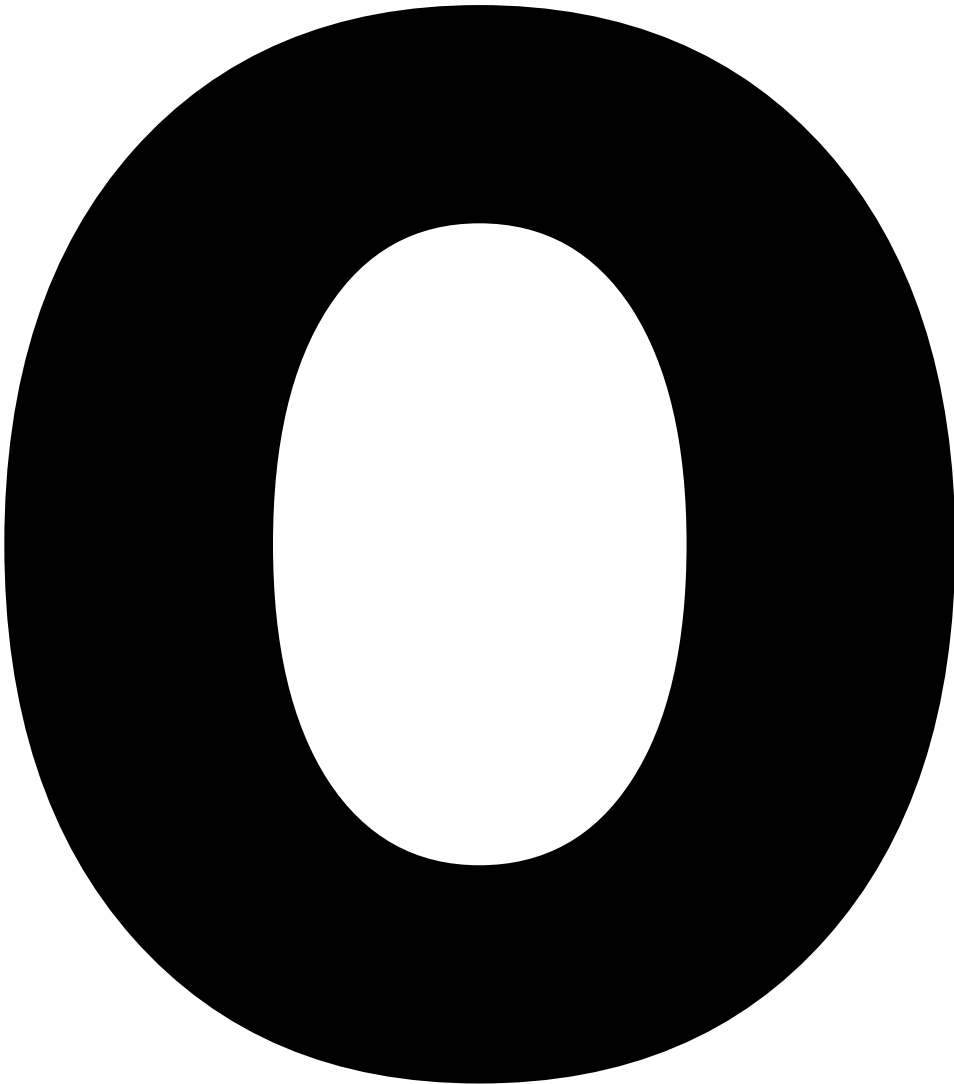
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V

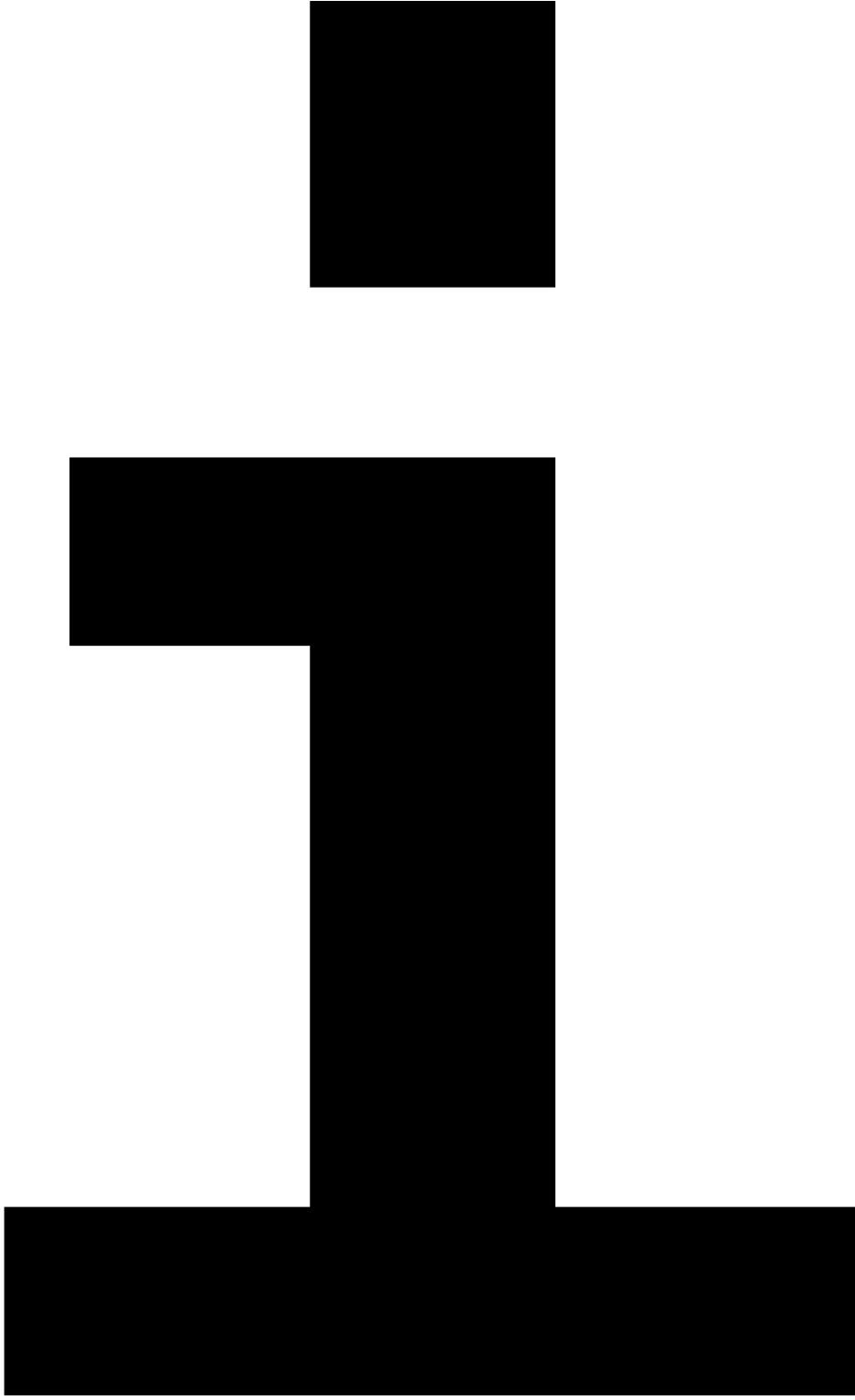


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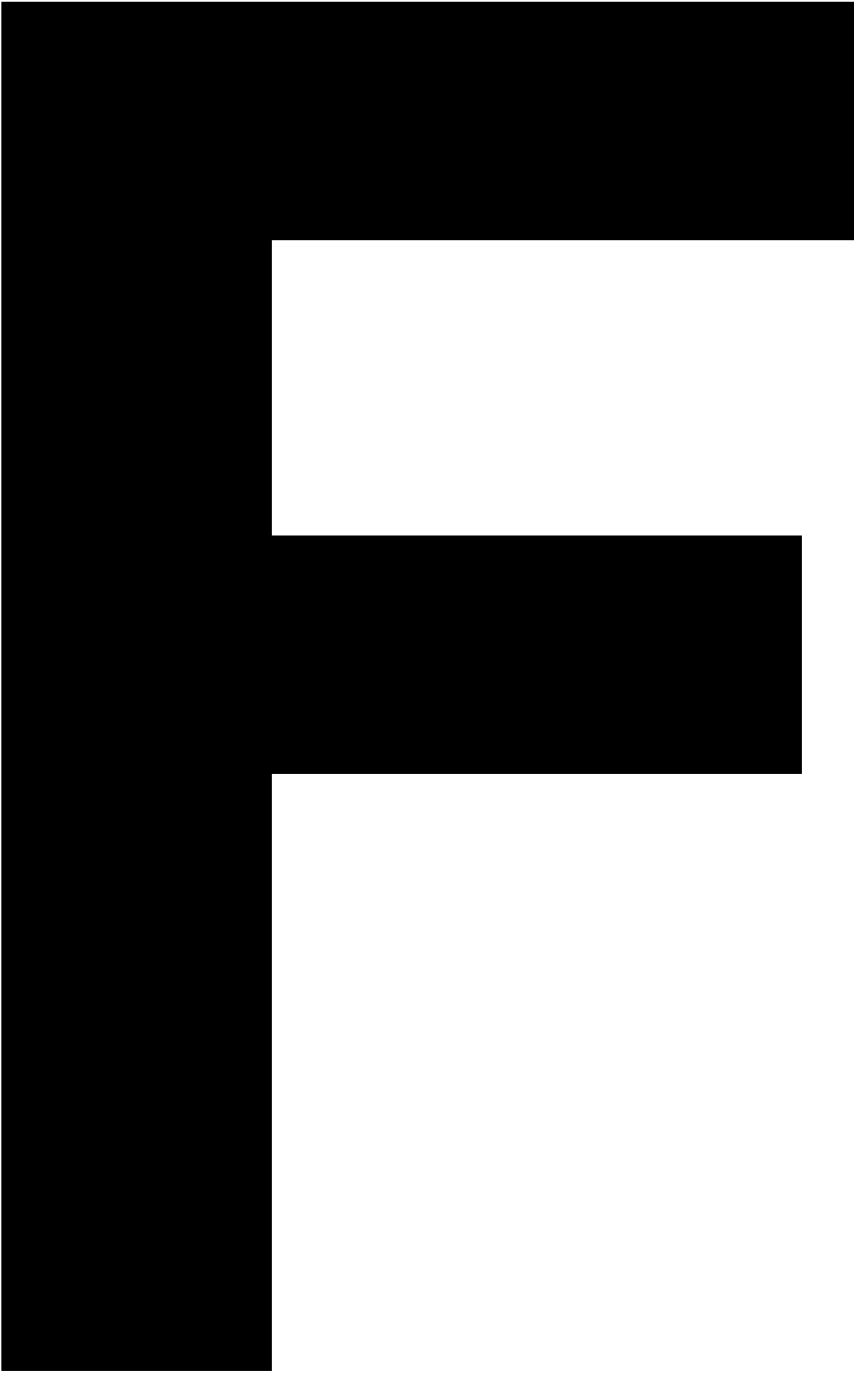
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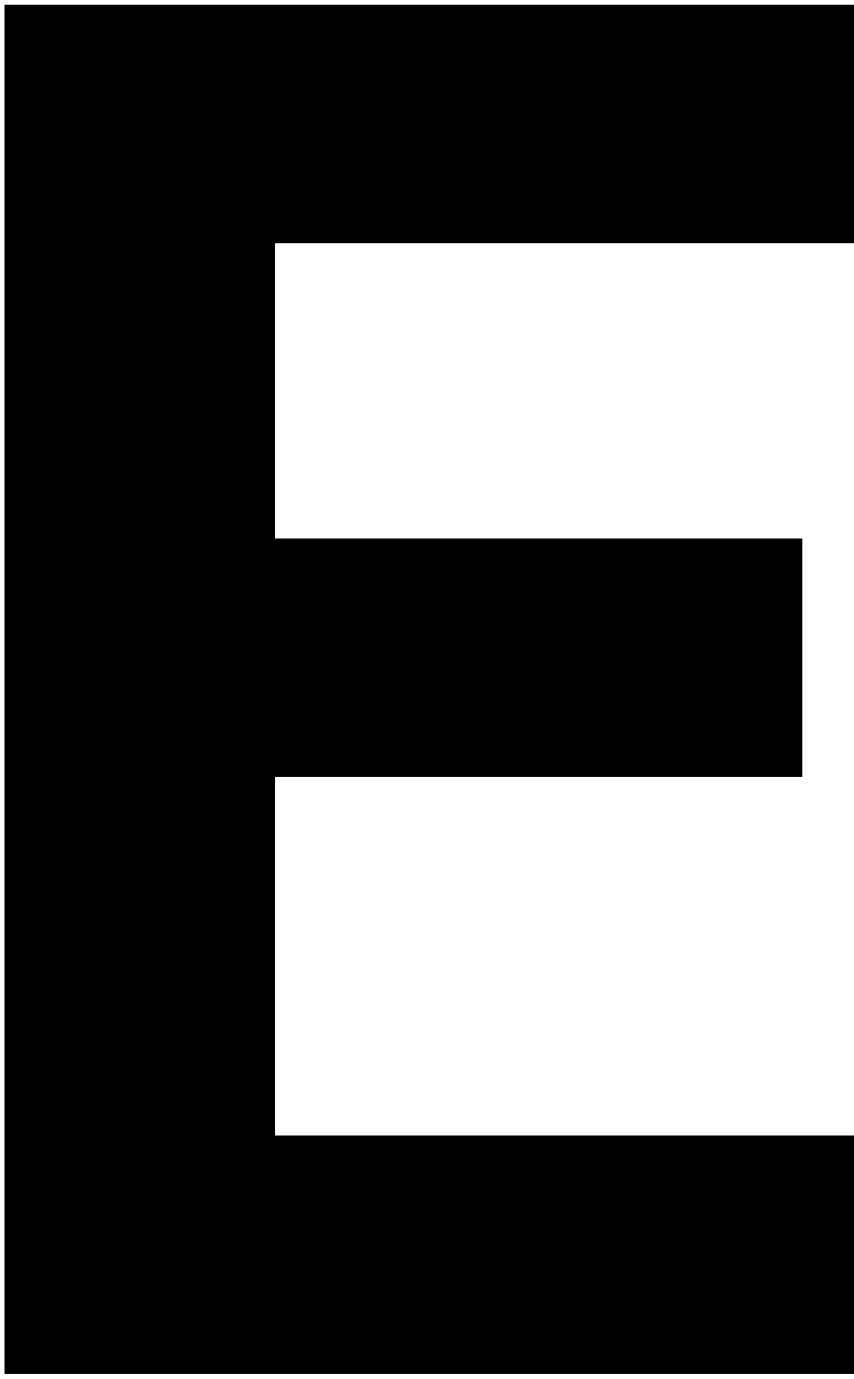
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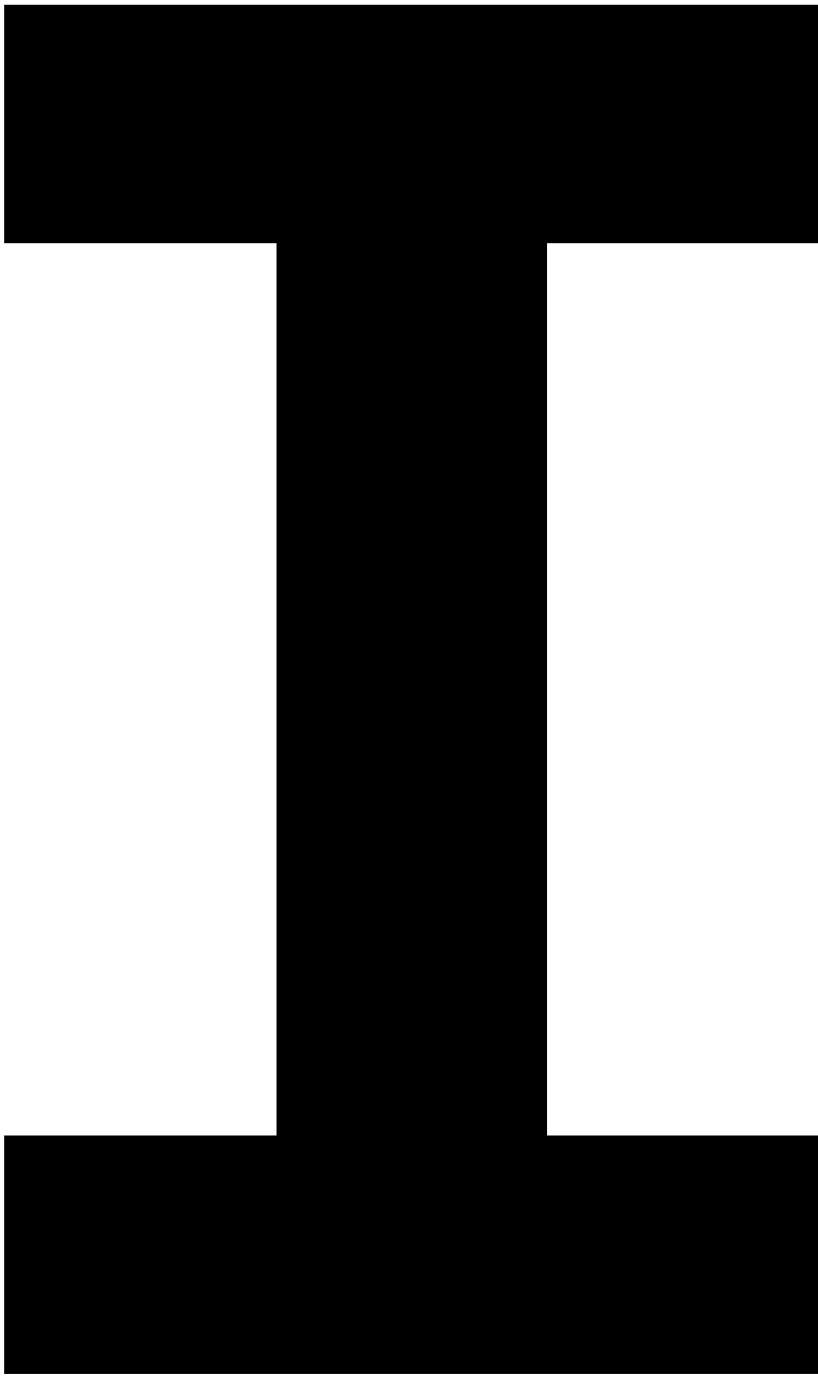




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