

$$* \boxed{y = \textcircled{x} + 2}$$

$$1) f(x) = \frac{x^2 - 4}{x - 2} = \frac{(x+2)\cancel{(x-2)}}{\cancel{x-2}} = x + 2$$

$$x - 2 = 0 \quad \text{cancelled}$$

$$\textcircled{x = 2}$$

factor

Hole!

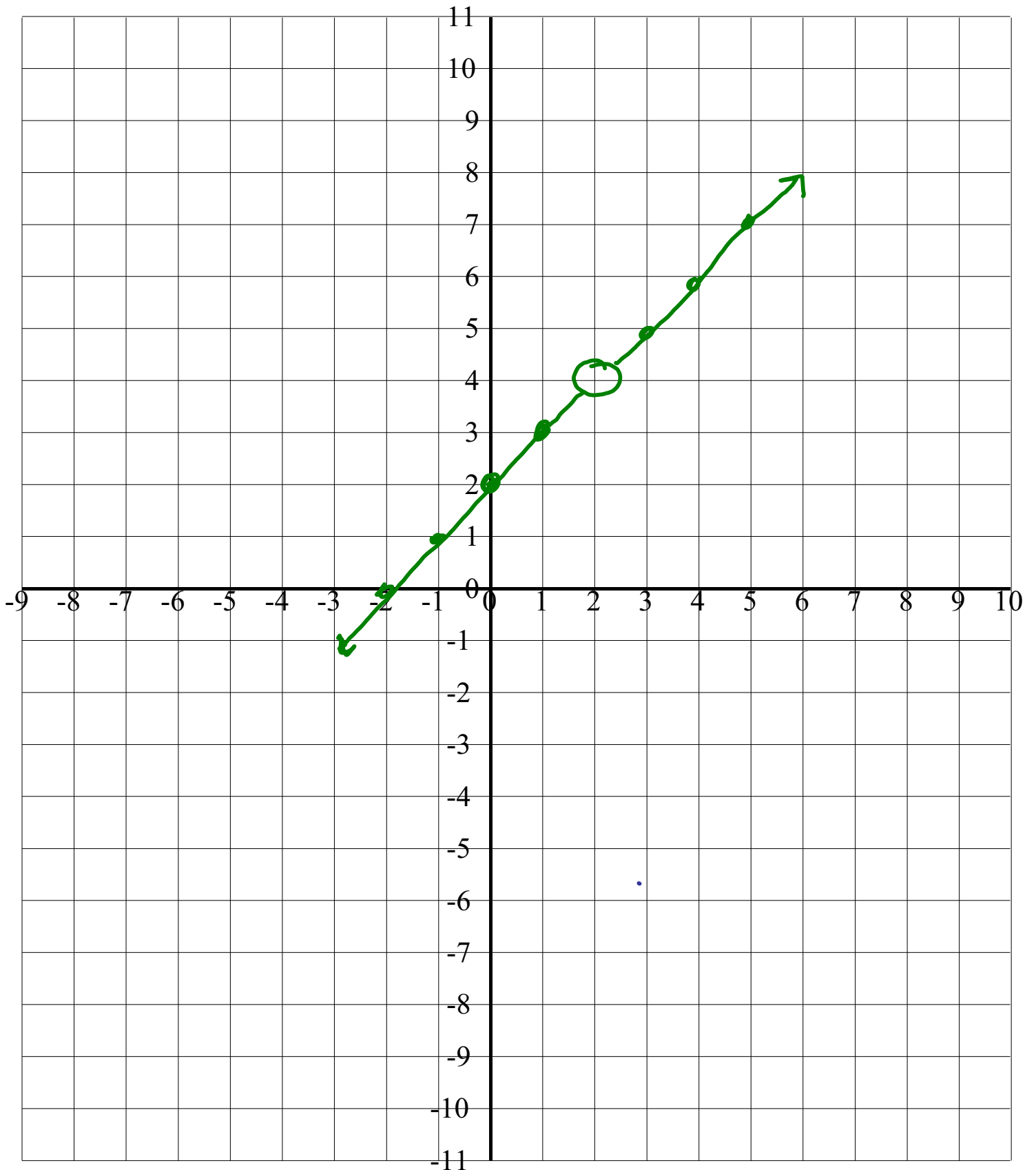
(2, 4)

$$y = \textcircled{2} + 2 = 4$$

VA: no HA: no SA: no

No denom. = No asymp.

Coordinate Grid Paper



$$y = \frac{x+3}{x+7}$$

* choose 3 x-values
on each side of
every vertical
asymptote!

x	y
-8	$\frac{-5}{-1} = 5$
-9	$\frac{-6}{-1} = 6$
-10	$\frac{-7}{-3} = \frac{7}{3} = 2\frac{1}{3}$

x	y
-6	$\frac{-3}{-1} = -3$
-5	$\frac{-2}{2} = -1$
-4	$-\frac{1}{3}$ hole

$$f(x) = \frac{x+3}{x+7} \leftarrow$$

$$9) f(x) = \frac{x^2 + 7x + 12}{x^2 + 11x + 28} = \frac{(x+4)(x+3)}{(x+7)(x+4)}$$

Hole!
 $(-4, -\frac{1}{3})$

$$x+4=0$$

$$x=-4$$

$$y = \frac{-4+3}{-4+7}$$

$$y = -\frac{1}{3}$$

VA: denom = 0

$$x+7=0$$

$$x = -7$$

HA: $N = \text{num. degree}$ $D = \text{denom degree}$

① $N < D$ $y = 0$

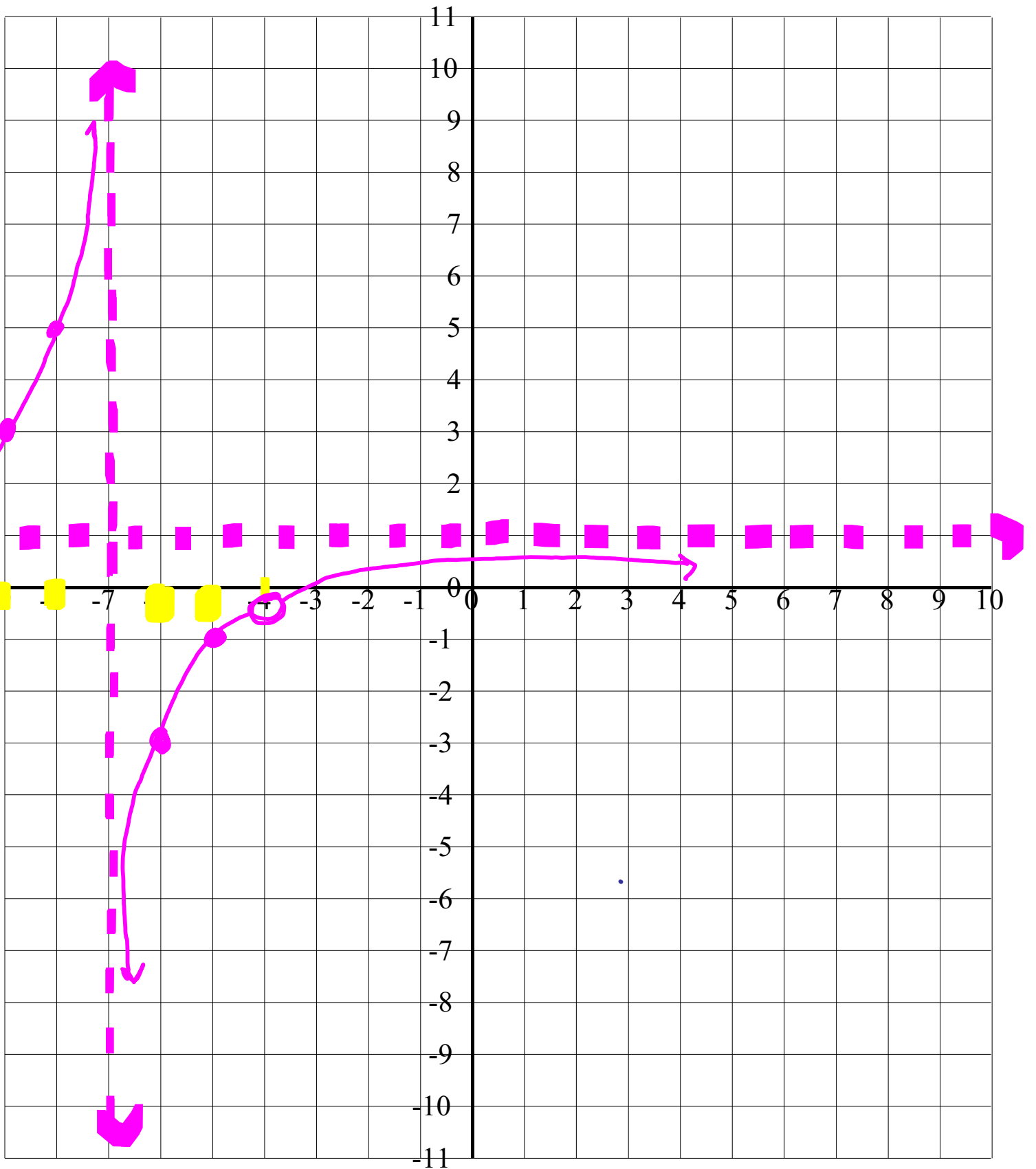
② $N > D$ no HA

③ $N = D$ $y = \text{ratio of coefficients}$

$$\text{HA: } y = 1$$

SA: none

Coordinate Grid Paper



$$10) f(x) = \frac{1x^{\textcircled{2}} - 2x + 1}{x^{\textcircled{1}} + 1} = \frac{(x-1)(x-1)}{x+1}$$

No hole!

VA: $x+1=0$
 $x=-1$ *

HA: $N > D$
 none

SA: numerator degree ONE bigger than denominator degree

VA

<u>-1</u>		1	-2	1
		:	-1	3
		1	-3	*
		m	b	

* Divide num. by denom.

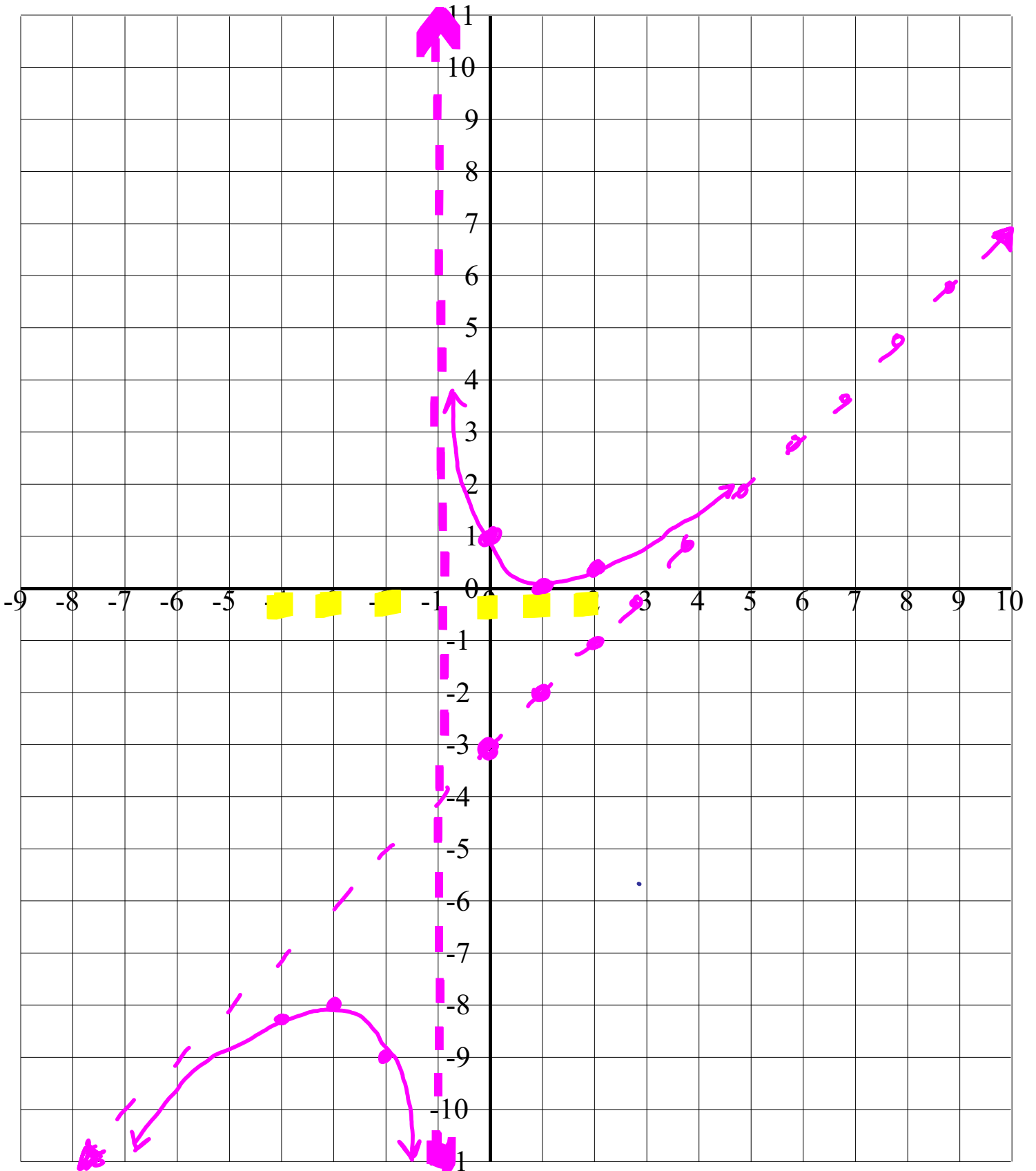
$$y = mx + b$$

SA: $y = \frac{1}{1}x - 3$

$$y = \frac{(x-1)(x-1)}{x+1}$$

X	y
-4	$\frac{-5 \cdot -5}{-3} = \frac{25}{-3} = -8\frac{1}{3}$
-3	$\frac{-4 \cdot -4}{-2} = \frac{16}{-2} = -8$
-2	$\frac{-3 \cdot -3}{-1} = \frac{9}{-1} = -9$
0	$\frac{-1 \cdot -1}{1} = \frac{1}{1} = 1$
1	$\frac{0 \cdot 0}{2} = 0$
2	$\frac{1 \cdot 1}{3} = \frac{1}{3}$

Coordinate Grid Paper



$$15) f(x) = \frac{x^2 - 6x - 7}{x^2 + 3x - 4} = \frac{(x-7)(x+1)}{(x+4)(x-1)}$$

No hole!

VA:

$$x+4=0$$

$$x=-4$$

$$x-1=0$$

$$x=1$$

HA:

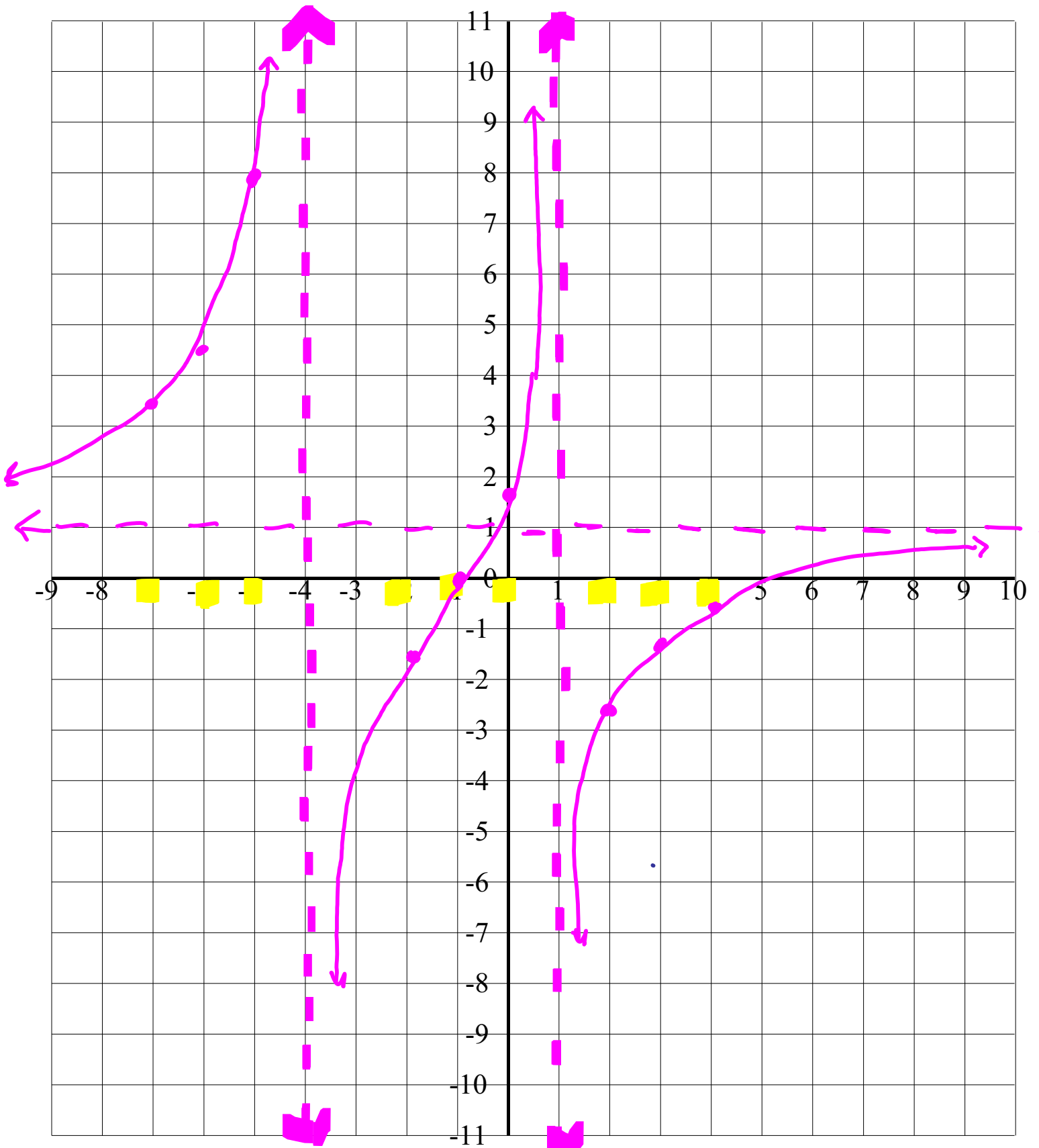
N=D
ratio

$$y=1$$

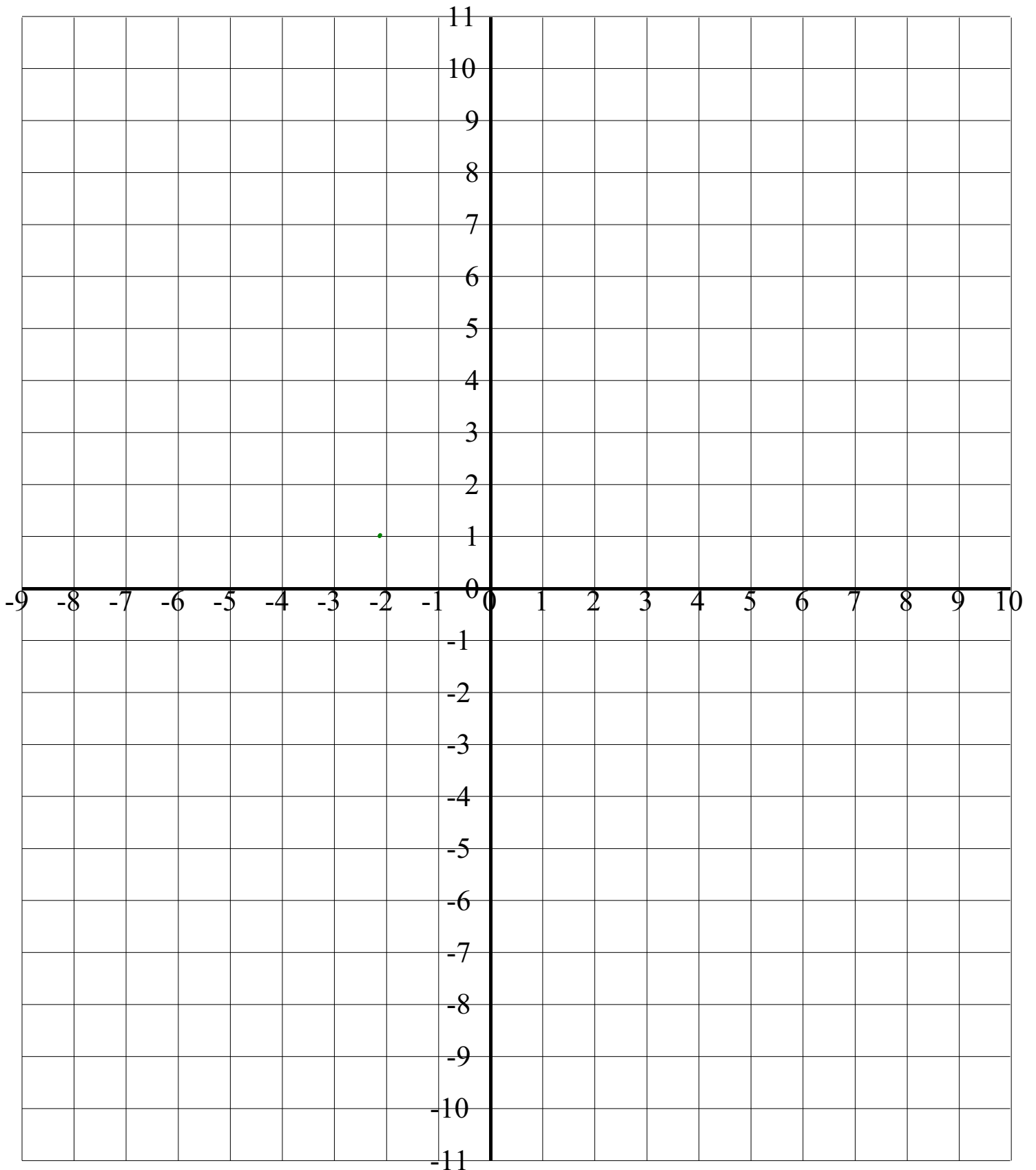
SA: none

x	y	x	y
-7	$\frac{-4 \cdot -6}{-3 \cdot -8} = \frac{24}{24} = 3\frac{1}{2}$	2	$\frac{-5 \cdot 3}{6 \cdot 1} = -2\frac{1}{2}$
-6	$\frac{-13 \cdot -5}{-2 \cdot -7} = \frac{65}{14} = 4\frac{9}{14}$	3	$\frac{-4 \cdot 4}{7 \cdot 2} = \frac{-16}{14} = 1\frac{1}{7}$
-5	$\frac{-12 \cdot -4}{-1 \cdot -6} = \frac{48}{6} = 8$	4	$\frac{-3 \cdot 5}{8 \cdot 3} = \frac{-15}{24}$
-2	$\frac{-9 \cdot -1}{2 \cdot -3} = \frac{-9}{-6} = 1\frac{1}{2}$		$\frac{-5}{8}$
-1	$\frac{-8 \cdot 0}{3 \cdot -2} = 0$		
0	$\frac{-7 \cdot 1}{4 \cdot -1} = \frac{7}{4} = 1\frac{3}{4}$		

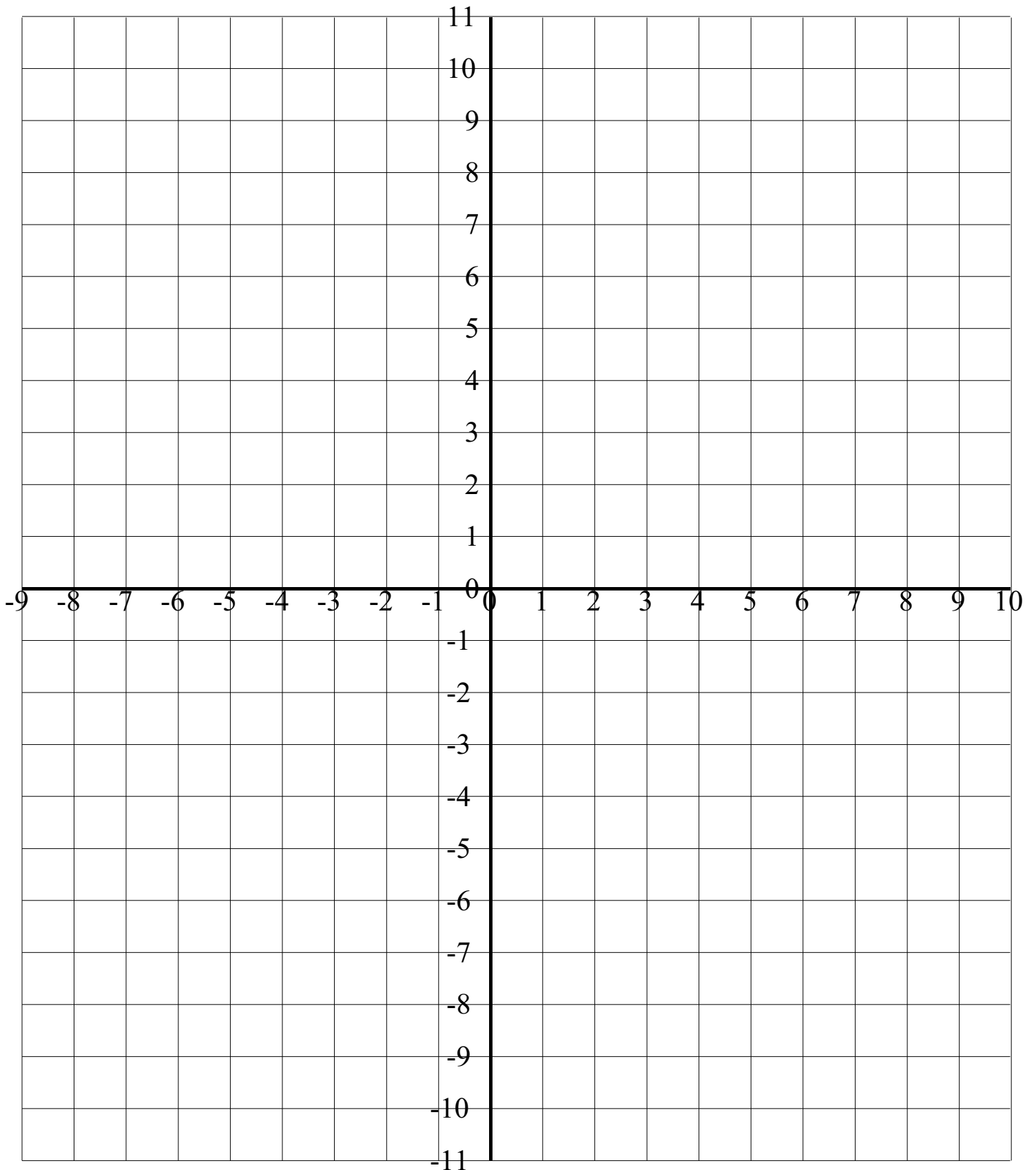
Coordinate Grid Paper



Coordinate Grid Paper



Coordinate Grid Paper



Coordinate Grid Paper

