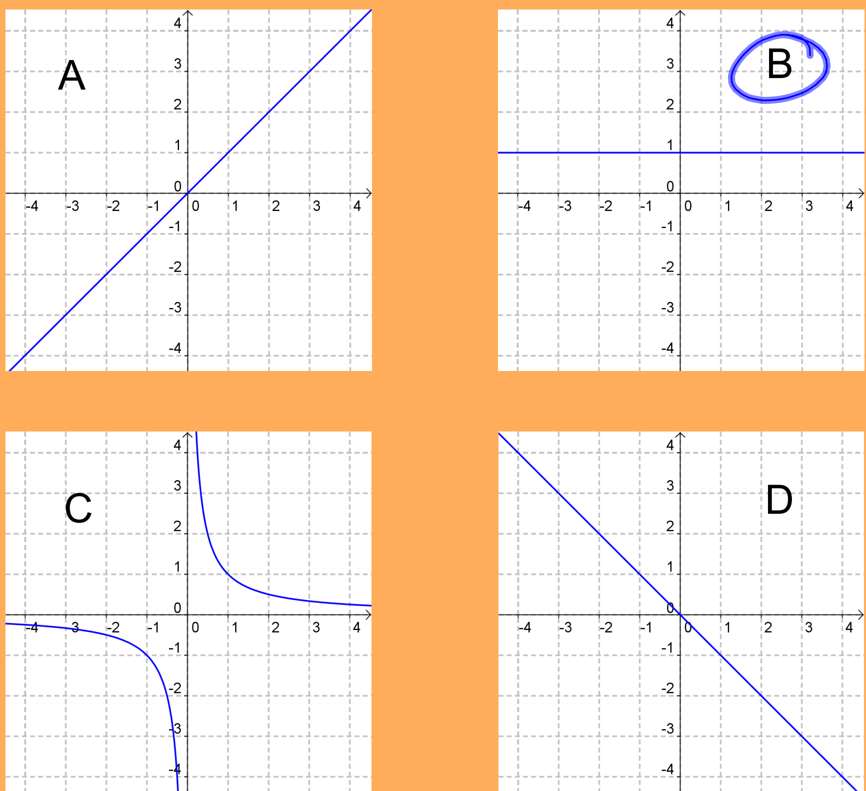
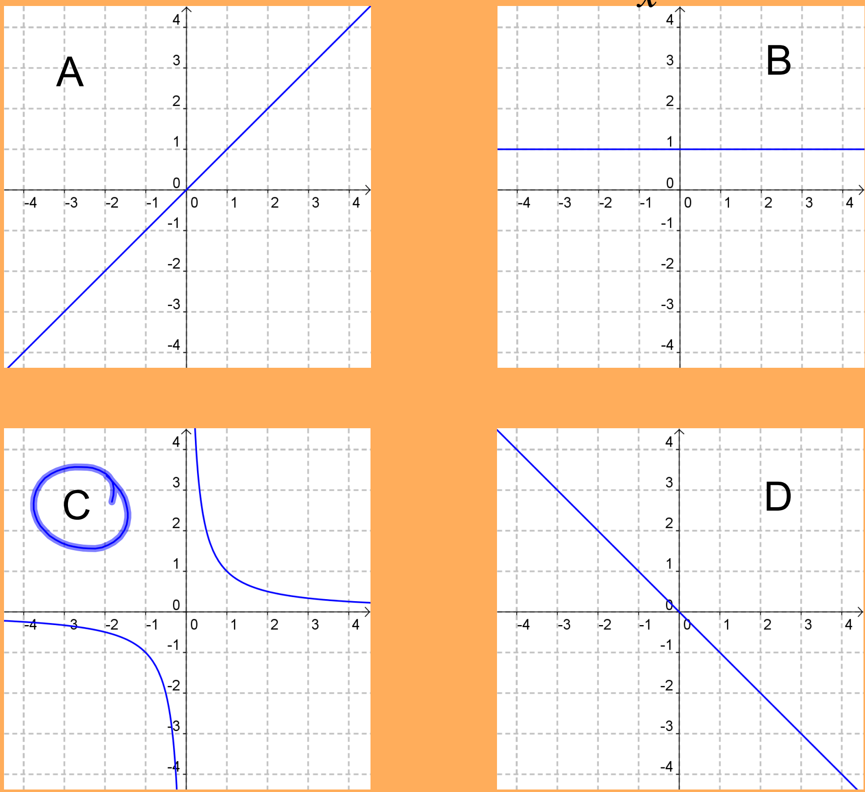
Unit 3 - Rational Expressions

Equivalent Rational Expressions

1. Which graph shows the relation $y = 1$?



2. Which graph shows the relation $y = \dfrac{1}{x}$?



3. Consider the relation: $y = \dfrac{x}{x}$

If you compared the graph of $y = \dfrac{x}{x}$ to $y = 1$, they would be:

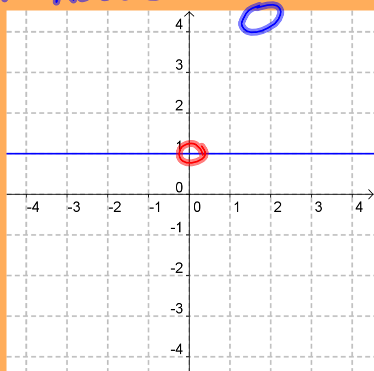
cannot have $\dfrac{0}{0}$

A) always the same

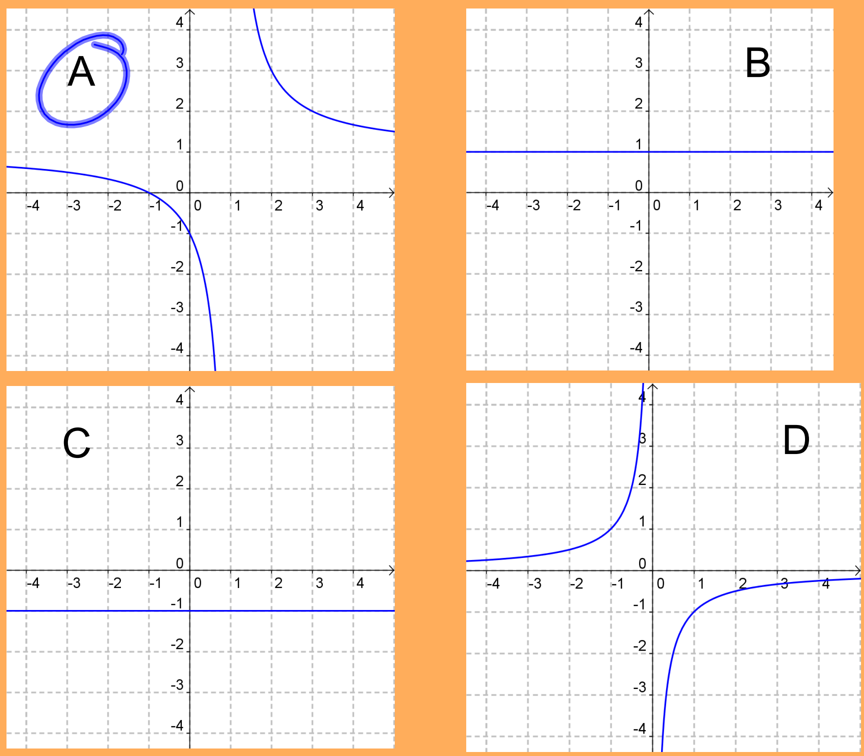
B) mostly the same $x \neq 0$

C) sometimes the same

D) never the same

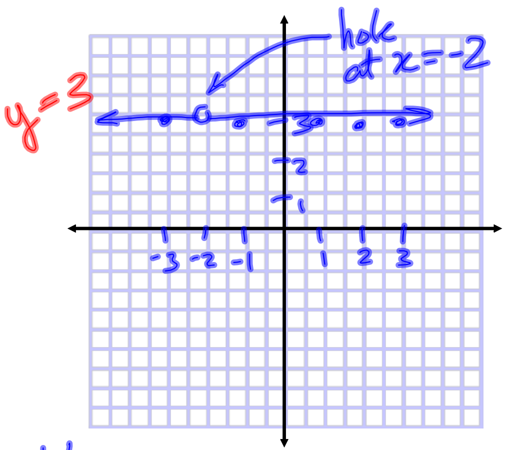


4. Which graph shows the relation $y = \dfrac{x+1}{x-1}$?



A. $y = \dfrac{3x+6}{x+2}$

x	y
-3	3
-2	$\frac{0}{0}$ undefined
-1	3
0	3
1	3
2	3
3	3
-1.97	3



$$y = \frac{3x+6}{x+2}$$

$$= \frac{3(x+2)}{(x+2)}$$

$$y = 3, \; x \neq -2$$

equivalent expression

with restrictions

$$\frac{3(-3)+6}{-3+2} = \frac{-3}{-1} = 3$$

B. $y=\frac{2x^2+10x}{3x+15}$

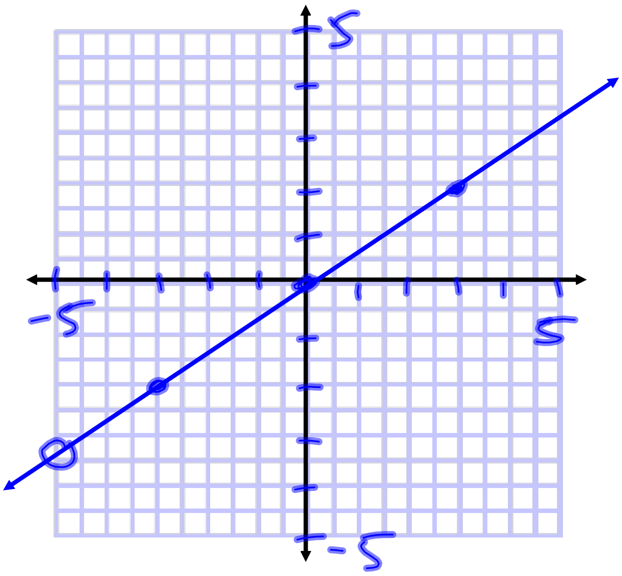
$=\frac{2x\cancel{(x+5)}}{3\cancel{(x+5)}}$

$=\frac{2x\cancel{7}}{3\cancel{7}}$

$=\frac{2x}{3}, \quad x\neq -5$

$y=\frac{2}{3}x+0, \quad x\neq -5$

$y=mx+b$



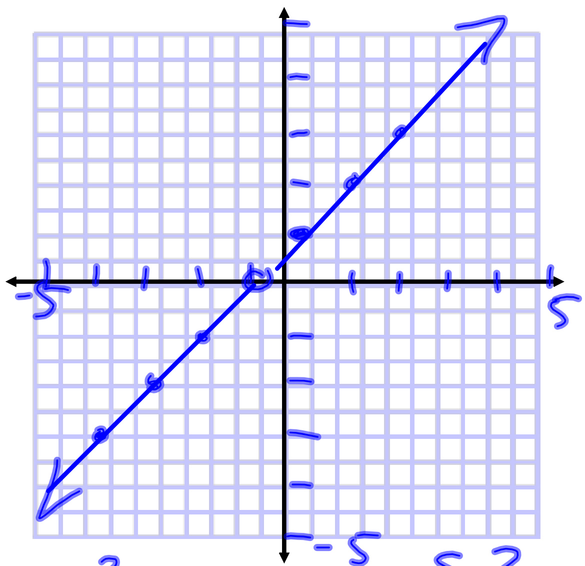
$x+5=0$

$x=-5$

C. $y=\frac{x^2+2x+1}{x+1}$

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

$=x+1, \quad x\neq -1$



x^2+2x+1

$=\underbrace{x^2+x}\underbrace{+x+1}$

$=x(x+1)+1(x+1)$

$=(x+1)(x+1)$

S 2
P 1
I 1,1

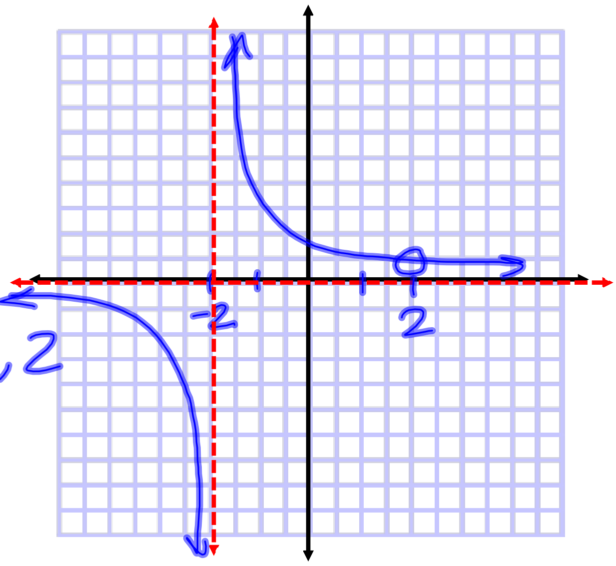
D. $y = \dfrac{x-2}{x^2-4}$

$= \dfrac{\cancel{(x-2)}}{\cancel{(x-2)}(x+2)}$

$= \dfrac{1}{x+2}, \quad x \neq -2, 2$

$|x| \neq 2$

$x \neq \pm 2$



x^2-4

$= x^2+0x-4$

S 0

P −4

I 2, −2

$x-2=0$

$x=2$

$x+2=0$

$x=-2$

List some mathematical techniques used when determining equivalent expressions for rational functions:

When graphing rational functions, what noteworthy features may appear on the graph?

The graphs of our equivalent expressions look the same, yet they are also different. How can we tell the graphs apart?

How can we distinguish between the original and equivalent relations using some written notation?

Homework:

p.40 # 1 - 3 (odd) (fundamentals - optional)
4 - 6 (odd), 8, 13, 15
16