Applications of Rational Functions

$R = \frac{D}{T}$ $R \cdot T = D$ $\boxed{T = \frac{D}{R}}$

r = speed of river

b - 5

	D	÷ R	= T
Upstream	35	$15-r$	$\frac{35}{15-r}$
down	140	$15+r$	$\frac{140}{15+r}$

$r \neq 15, -15$

$$(15+r)(\cancel{15-r})\left[\frac{35}{\cancel{15-r}} = \frac{140}{\cancel{15+r}}\right](15-r)(\cancel{15+r})$$

$$35(15+r) = 140(15-r)$$

$$525 + 35r = 2100 - 140r$$

$$+140r \quad -525$$

$$\frac{175r}{175} = \frac{1575}{175}$$

$$\boxed{r = 9\ \frac{Km}{h}}$$

The total trip took 4 hrs.

	D	÷ R	= T
upstream	140	$15-r$	$\frac{140}{15-r}$
down	140	$15+r$	$\frac{140}{15+r}$

$$\frac{140}{15-r} + \frac{140}{15+r} = 4$$

The trip upstream was 2 hrs longer than the trip downstream.

up = 2 + down

$$\underset{\text{up}}{\frac{140}{15-r}} - \underset{\text{down}}{\frac{140}{15+r}} = 2$$

2/

	D	÷ R	= T
normal speed	270	x	$\frac{270}{x}$
increased speed	270	$x+9$	$\frac{270}{x+9}$

$x =$ avg speed

$x \neq 0, -9$

Longer — Shorter

$$\cancel{x}(x+9)\left[\frac{270}{\cancel{x}} - \frac{270}{\cancel{x+9}}x\cancel{(x+9)} = 1\right]x(x+9)$$

$$270(x+9) - 270x = x(x+9)$$

$$\cancel{270}x + 2430 - \cancel{270}x = x^2 + 9x$$

$$0 = \underset{\uparrow a}{x^2} + \underset{\uparrow b}{9}x \underset{\uparrow c}{-2430}$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

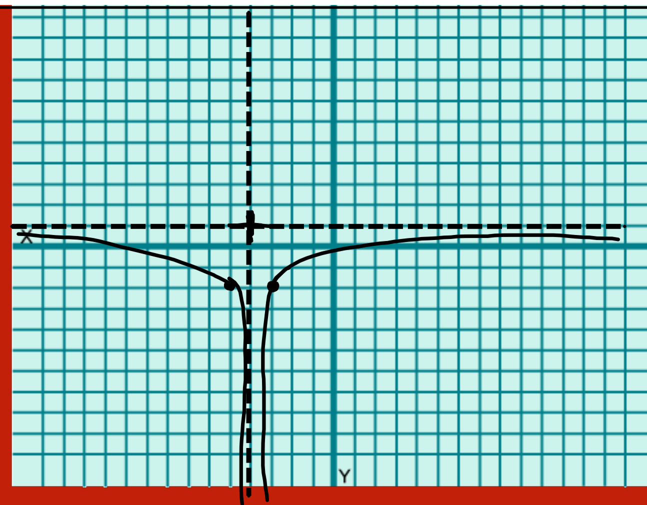
$$y = \frac{-3}{(x+4)^2} + 1$$

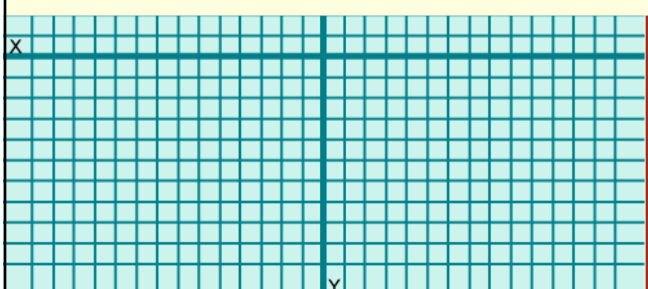
Left 4

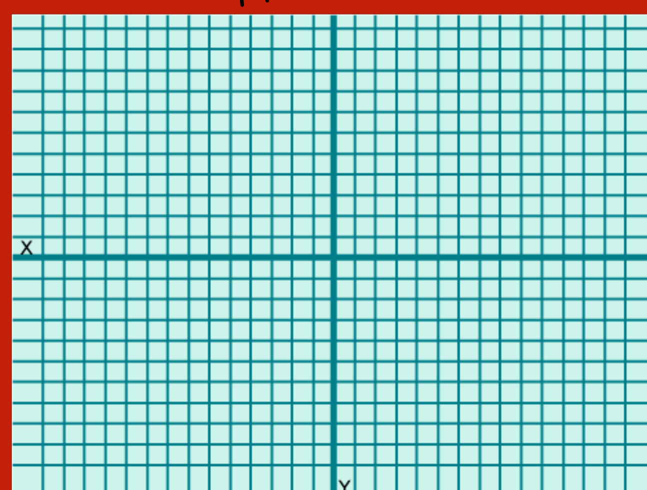
Up 1

$1 \overline{)\, x^{-3}}$

$$y = \frac{1}{x^2}$$







$y = \frac{1}{x}$

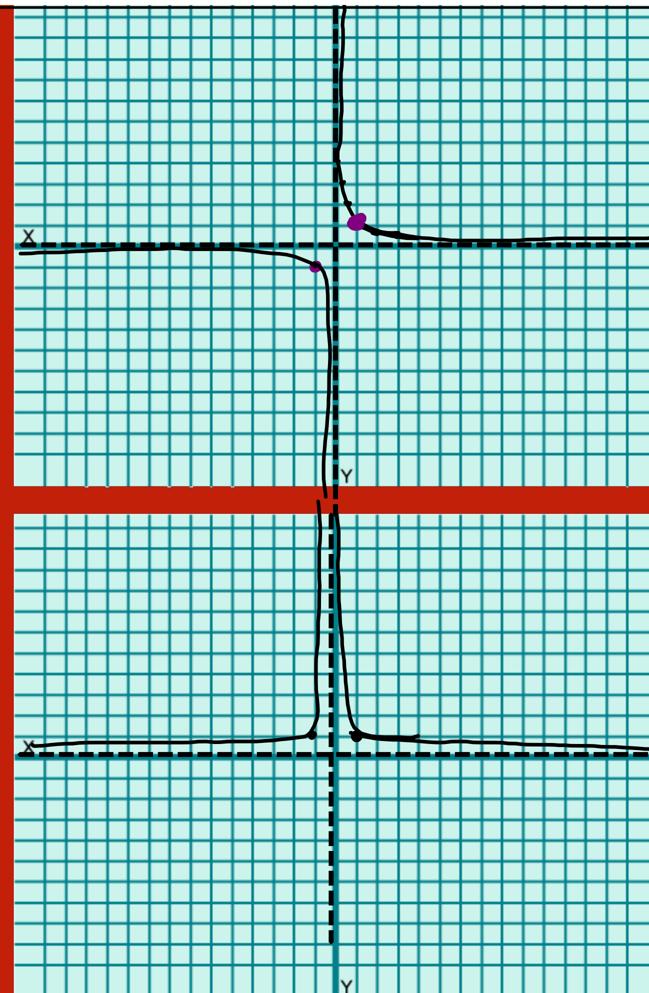
butterfly

x	y
0	Undef.
-1	$\frac{1}{1} = -1$
-2	$-1/2$
-3	$-1/3$
$1/2$	$\frac{1}{1/2} = 2$
$1/3$	$1/_{1/3} = 3$

$y = \frac{1}{x^2}$

1	1

butt crack



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