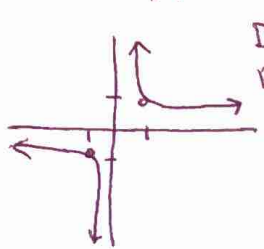


# rational equations graphing

PF  $\frac{1}{x}$



D:  $(-\infty, 0) \cup (0, \infty)$   
 R:  $(-\infty, 0) \cup (0, \infty)$   
 $x=0, y=0$   
 are the asymptotes

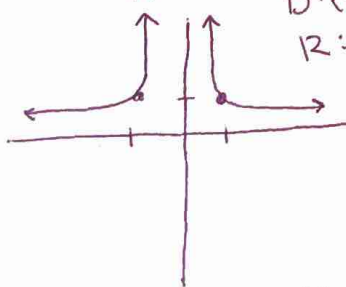
## transformations

$\frac{1}{x-h} + k$  Right H UP K  
 $\frac{1}{x+h} - k$  left H down K  
 } move the asymptotes (dashed lines)

$\frac{a}{x}$  VD by a (spaces off the horizontal asymptote)

$-\frac{1}{x}$  reflection over x-axis

PF  $\frac{1}{x^2}$



D:  $(-\infty, 0) \cup (0, \infty)$   
 R:  $(0, \infty)$   
 $x=0, y=0$   
 are the asymptotes

## transformations

$\frac{1}{(x-h)^2} + k$  right H UP K  
 $\frac{1}{(x+h)^2} - k$  left H down K  
 } moves asymptotes

$\frac{a}{x^2}$  VD by a

$-\frac{1}{x^2}$  reflection over x-axis

# application problems

\* hint write the problem in words first first

ex 60 mL of a solution is 35% lemons & 65% water. How much water would need to be added to reach 80% water?

$$\frac{\text{Water amount}}{\text{total}} = \frac{60(0.65) + x}{60 + x} = \frac{80}{100} \text{ goal}$$

Labels: 60 (current water), 60 (total), +x (added water)

$$100(39 + x) = 80(60 + x)$$

$$3900 + 100x = 4800 + 80x$$

$$20x = 900$$

$x = 45 \text{ mL}$