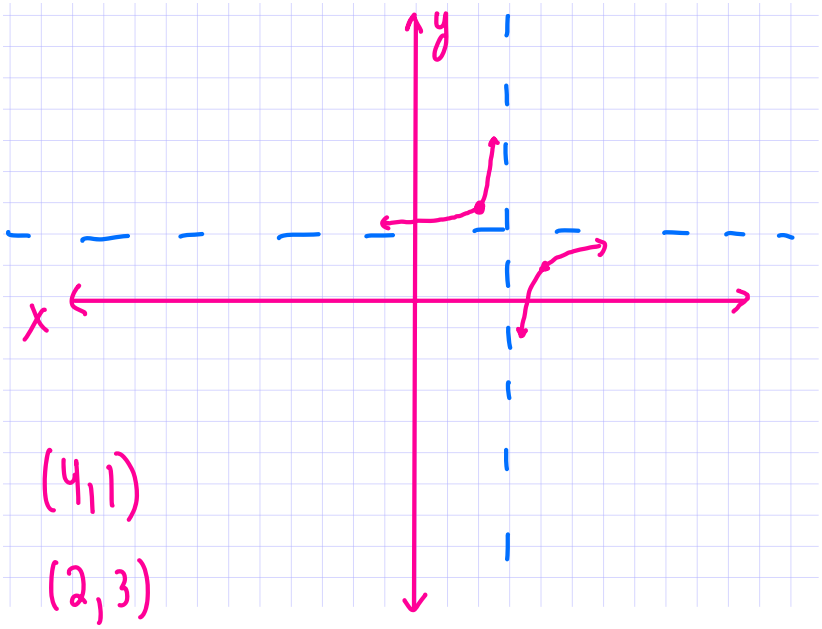
Name: _____ Date: _____
PC Ms. Loughran

Do Now:

1. Sketch the graph of $y = -\frac{1}{x-3} + 2$. (Be sure to included a minimum of 2 points and any and all asymptotes.) State the domain, range, intercepts and equations of any asymptotes.

$\frac{1}{x}$ right 3, reflect over x-axis, ↑2



(1,1) (4,1) (4,-1) (4,1)
(-1,-1) (2,-1) (2,1) (2,3)

D: $(-\infty, 3) \cup (3, \infty)$
R: $(-\infty, 2) \cup (2, \infty)$

VA: $x = 3$
HA: $y = 2$

Cross? no $-\frac{1}{x-3} + 2 = 2$

$-\frac{1}{x-3} = 0$

$\frac{1}{x-3} = 0$

$0 \neq 1$

y-int: $(0, \frac{7}{3})$

x-int: $(\frac{7}{2}, 0)$

$-\frac{1}{x-3} + 2 = 0$

$-\frac{1}{x-3} = -\frac{2}{1}$

$-2x + 6 = -1$

$-2x = -7$

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

Name:_____ Date:_____

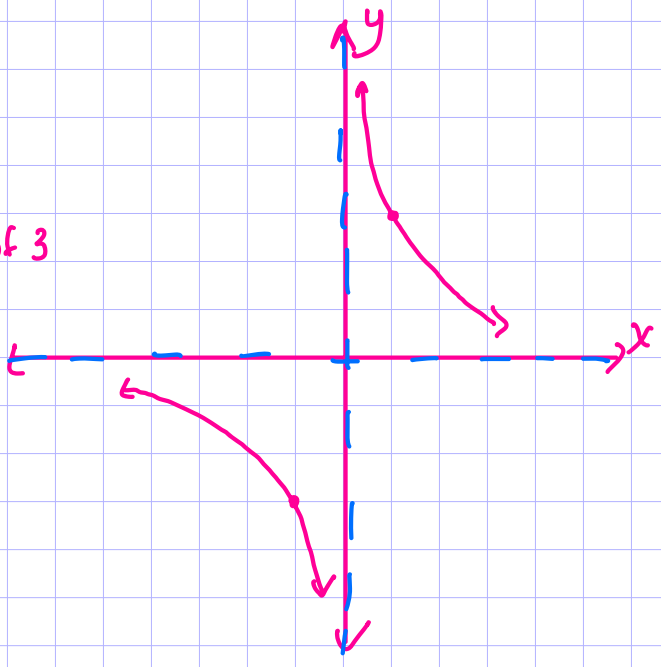
PC: More Hyperbolas and Volcanoes

Sketch each function using a minimum of 2 points and including any and all asymptotes. For each graph, state the domain, range, intercepts and equations of any asymptotes.

11. $xy = 3$

$y = \frac{3}{x}$ or $3 \cdot \frac{1}{x}$

$\frac{1}{x}$ vertical stretch by a factor of 3 (multiply your y's by 3)



(1, 1) (1, 3)

(-1, -1) (-1, -3)

VA: $x = 0$

HA: $y = 0$

cross: no $\frac{3}{x} = 0$

$0 \neq 3$

D: $\{x \mid x \neq 0\}$

R: $\{y \mid y \neq 0\}$

x-int: none

y-int: none

5. $y = -\dfrac{1}{x-2} + 1$

7. $y = \dfrac{1}{(x-2)^2} + 3$

9. $y = \frac{4}{x}$

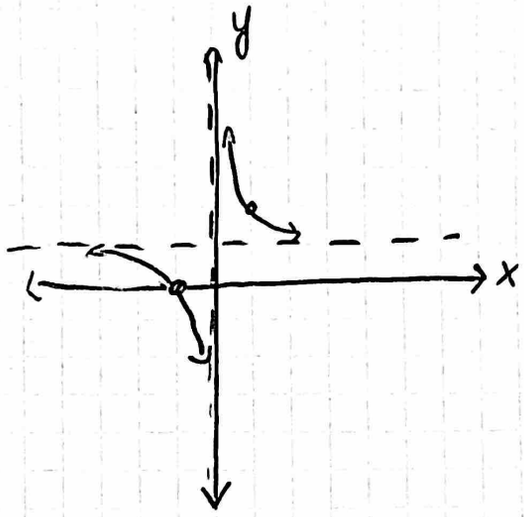
13. $xy - y = 1$

② $y = \frac{1}{x} + 1$

hyperbola shifted ↑ 1

(-1,1) (-1,0)

(1,1) (1,2)



VA: $x = 0$

HA: $y = 1$

Cross: no

D: $x \neq 0$

R: $y \neq 1$

x-int: (-1,0)

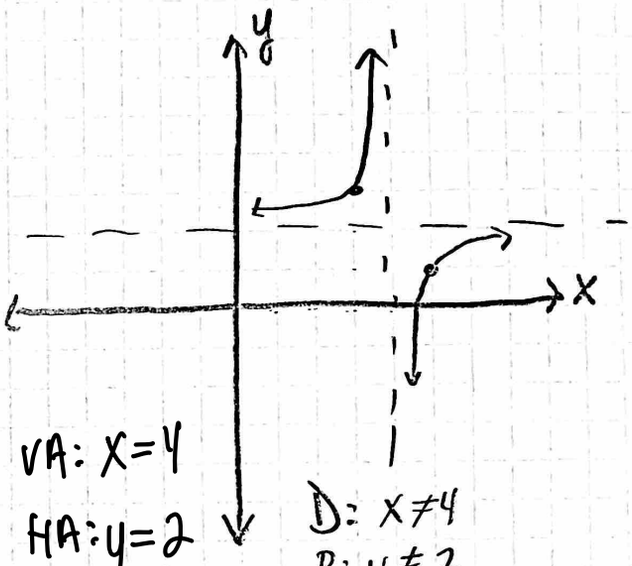
y-int: none

④ $y = -\frac{1}{x-4} + 2$

hyperbola right 4 reflected over x-axis ↑ 2

(-1,-1) (3,-1) (3,1) (3,3)

(1,1) (5,1) (5,-1) (5,1)



VA: $x = 4$

HA: $y = 2$

Cross? no

D: $x \neq 4$

R: $y \neq 2$

x-int: $(\frac{9}{2}, 0)$

y-int: $(0, \frac{9}{4})$

x-int: $y = 0$

$0 = \frac{-1}{x-4} + 2$

$-2 = -\frac{1}{x-4}$

$2 = \frac{1}{x-4}$

$2x - 8 = 1$

$2x = 9$

$x = \frac{9}{2}$

y-int: $x = 0$

$y = \frac{-1}{0-4} + 2$

$y = \frac{1}{4} + 2$

$y = \frac{9}{4}$

⑥ $y = \frac{1}{x^2} - 6$

volcano ↓ 6

(-1, 1) (-1, -5)

(1, 1) (+1, -5)

x-int: $y = 0$

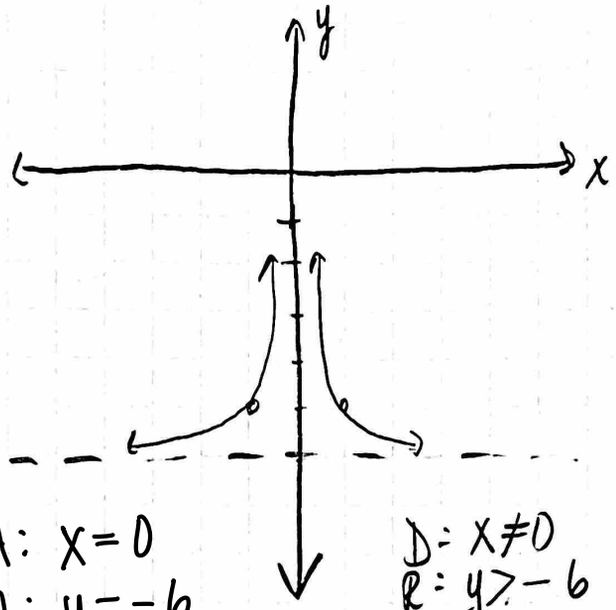
$0 = \frac{1}{x^2} - 6$

$6 = \frac{1}{x^2}$

$6x^2 = 1$

$x^2 = \frac{1}{6}$

$x = \pm\sqrt{\frac{1}{6}}$



VA: $x = 0$

HA: $y = -6$

cross? no

D: $x \neq 0$

R: $y > -6$

x-int $(\pm\sqrt{\frac{1}{6}}, 0)$

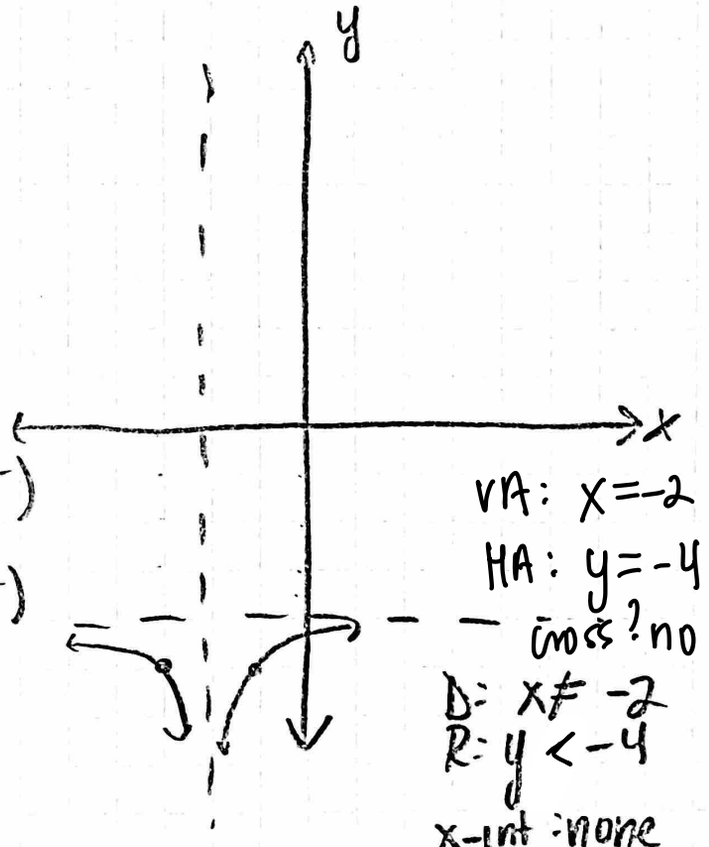
y-int: none

③ $y = \frac{-1}{(x+2)^2} - 4$

volcano left 2 reflect over x ↓ 4

(-1, 1) (-3, 1) (-3, -1) (-3, -5)

(1, 1) (-1, 1) (-1, -1) (-1, -5)



VA: $x = -2$

HA: $y = -4$

cross? no

D: $x \neq -2$

R: $y < -4$

x-int: none

y-int: $(0, -\frac{17}{4})$

$y = \frac{-1}{(0+2)^2} - 4$

$y = -\frac{1}{4} - 4 = -\frac{17}{4}$

(10) $y = \frac{1}{2x^2}$

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

vertical shrink by a factor of $\frac{1}{2}$

Volcano graph y values mult. by $\frac{1}{2}$

$(-1,1)$ $(-1,\frac{1}{2})$

$(1,1)$ $(1,\frac{1}{2})$