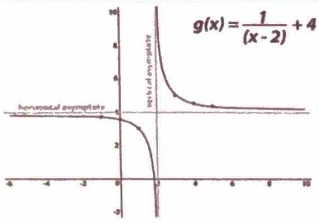
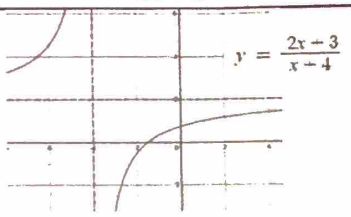
Day 05 Graphing Rational Functions

Master Eq

	Reciprocal Function *Transformation of the parent function*	Rational Function *The degree of the numerator and denominator are equal*
Formula/Equation	$y = \frac{a}{x-h} + k$	$y = \frac{ax+b}{cx+d}$
Example		
Vertical Asymptote *Set denominator equal to zero & solve!*	x = h *Shifts horizontally h units*	cx + d = 0
Horizontal Asymptote	y = k *Shifts vertically k units*	$y = \frac{a}{c}$
Domain	(-∞, h) U (h,∞)	(-∞,-d/c) U (-d/c,∞)
Range	(-∞, k) U (k,∞)	(-∞, a/c) U (a/c,∞)
	a > 1 Function stretches vertically *0 <a < 1 Function compresses vertically* *a < 1 Function reflects over the x-axis*	

1-6: State the horizontal asymptote, vertical asymptotes, domain, and range of each function.

1. $f(x) = \frac{7}{x-2} - 1$

H.A. $y = -1$

V.A. $x = 2$

Domain: $(-\infty, 2) \cup (2, \infty)$

Range: $(-\infty, -1) \cup (-1, \infty)$

2. $f(x) = \frac{1}{x-2} + 7$

H.A. $y = 7$

V.A. $x = 2$

Domain: $(-\infty, 2) \cup (2, \infty)$

Range: $(-\infty, 7) \cup (7, \infty)$

3. $f(x) = \frac{-1}{x-3}$

H.A. $y = 0$

V.A. $x = 3$

Domain: $(-\infty, 3) \cup (3, \infty)$

Range: $(-\infty, 0) \cup (0, \infty)$

4. $f(x) = \frac{-3}{2x+1}$

$2x + 1 = 0$

$2x = -1$

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

H.A. $y = 0$

V.A. $x = -\frac{1}{2}$

Domain: $(-\infty, -\frac{1}{2}) \cup (-\frac{1}{2}, \infty)$

Range: $(-\infty, 0) \cup (0, \infty)$

5. $f(x) = \frac{3x-1}{6x-12}$ $y = \frac{3}{6}$

$6x - 12 = 0$

$6x = 12$

$x = 2$

H.A. $y = \frac{1}{2}$

V.A. $x = 2$

Domain: $(-\infty, 2) \cup (2, \infty)$

Range: $(-\infty, \frac{1}{2}) \cup (\frac{1}{2}, \infty)$

6. $f(x) = \frac{2x-1}{x+7}$ $y = \frac{2}{1}$

H.A. $y = 2$

V.A. $x = -7$

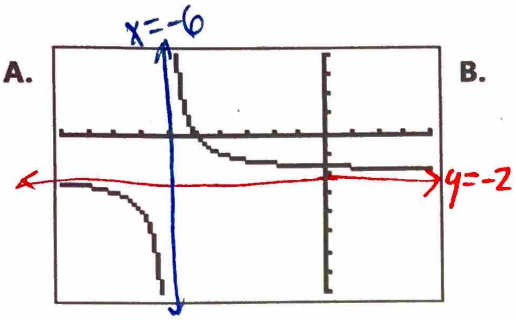
Domain: $(-\infty, -7) \cup (-7, \infty)$

Range: $(-\infty, 2) \cup (2, \infty)$

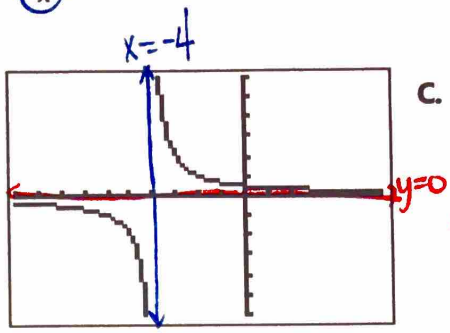
7-9: Match the function with its graph.

B 7. $f(x) = \frac{2}{x+4}$ C 8. $f(x) = \frac{6}{x} - 3$ A 9. $f(x) = \frac{2}{x+6} - 2$

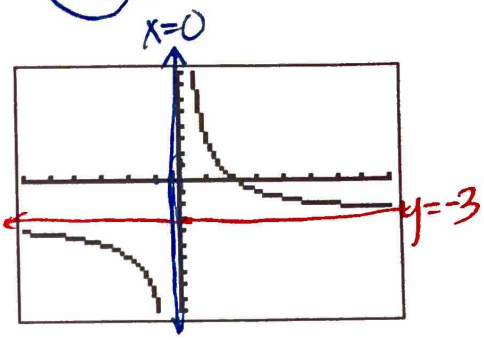
A.



B.

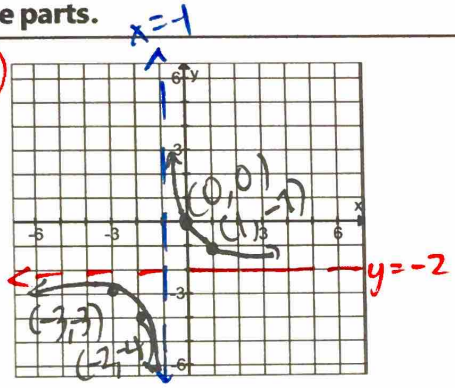


C.



10-13: Graph the following functions. Sketch the asymptotes and at least 2 points on each branch and state all of the parts.

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



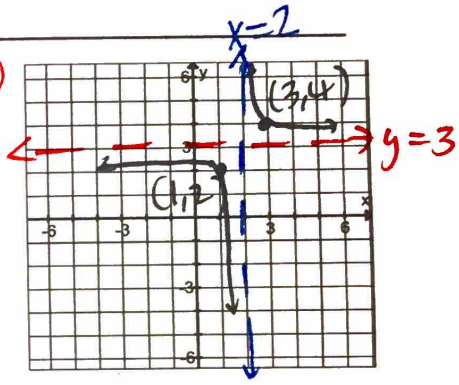
H.A. $y=-2$

V.A. $x=-1$

Domain: $(-\infty,-1)\cup(-1,\infty)$

Range: $(-\infty,-2)\cup(-2,\infty)$

11. $f(x) = \frac{1}{x-2} + 3$



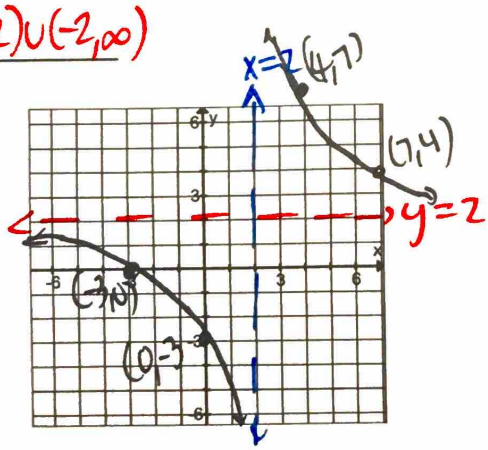
H.A. $y=3$

V.A. $x=2$

Domain: $(-\infty,2)\cup(2,\infty)$

Range: $(-\infty,3)\cup(3,\infty)$

12. $f(x) = \frac{2x+6}{x-2}$



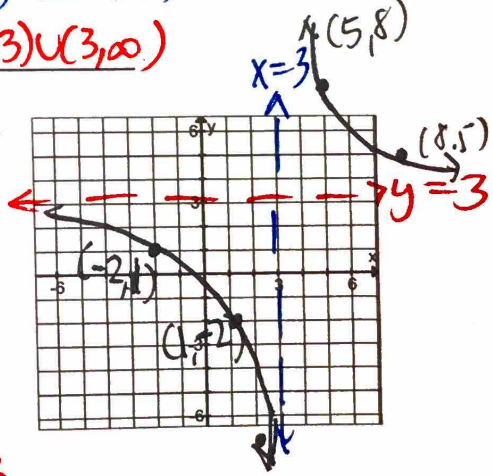
H.A. $y=2$

V.A. $x=2$

Domain: $(-\infty,2)\cup(2,\infty)$

Range: $(-\infty,2)\cup(2,\infty)$

13. $f(x) = \frac{3x+1}{x-3}$



H.A. $y=3$

V.A. $x=3$

Domain: $(-\infty,3)\cup(3,\infty)$

Range: $(-\infty,3)\cup(3,\infty)$