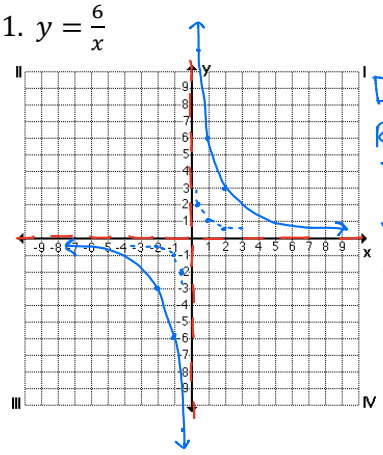
Algebra 2 Graphing Rational Functions KEY

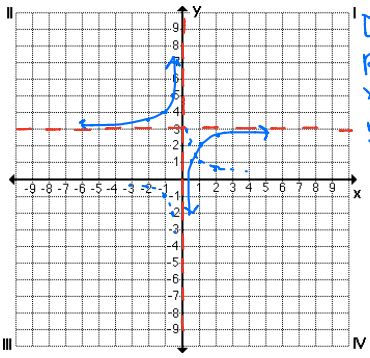
Graph each function and state the domain, range, intercepts, horizontal asymptote, vertical asymptote, and end behavior.

1. $y = \frac{6}{x}$



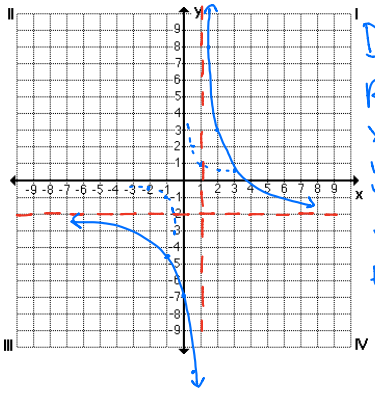
D: ℝ except 0
R: ℝ except 0
x-int: None
y-int: None
HA: $y = 0$
VA: $x = 0$
EB: $x \to \infty, y \to 0$
$x \to -\infty, y \to 0$

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



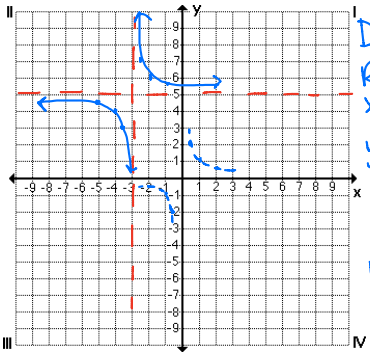
D: ℝ except 0
R: ℝ except 3
x-int: $\frac{2}{3}$
y-int: None
HA: $y = 3$
VA: $x = 0$
EB: $x \to \infty, f(x) \to 3$
$x \to -\infty, f(x) \to 3$

3. $g(x) = \frac{5}{x-1} - 2$



D: ℝ except 1
R: ℝ except -2
x-int: $\frac{7}{2}$
y-int: -7
HA: $y = -2$
VA: $x = 1$
EB: $x \to \infty, g(x) \to -2$
$x \to -\infty, g(x) \to -2$

4. $t(x) = \frac{1}{x+3} + 5$

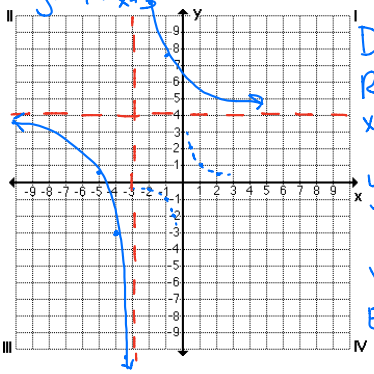


D: ℝ except -3
R: ℝ except 5
x-int: $\frac{-16}{5}$
y-int: $\frac{16}{3}$
HA: $y = 5$
VA: $x = -3$
EB: $x \to \infty, t(x) \to 5$
$x \to -\infty, t(x) \to 5$

5. $y = \frac{4x+19}{x+3}$

$y = 4 + \frac{7}{x+3}$

$x+3 \overline{)4x+19}$ → 4, $-4x+12$, 7

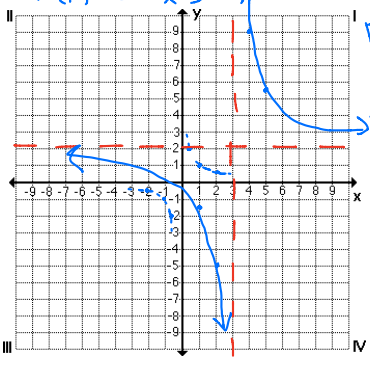


D: ℝ except -3
R: ℝ except 4
x-int: $-\frac{19}{4}$
y-int: $\frac{19}{3}$
HA: $y = 4$
VA: $x = -3$
EB: $x \to \infty, y \to 4$
$x \to -\infty, y \to 4$

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

$r(x) = 2 + \frac{7}{x-3}$

$x-3 \overline{)2x+1}$ → 2, $-2x+6$, 7



D: ℝ except 3
R: ℝ except 2
x-int: $-\frac{1}{2}$
y-int: $-\frac{1}{3}$
HA: $y = 2$
VA: $x = 3$
EB: $x \to \infty, r(x) \to 2$
$x \to -\infty, r(x) \to 2$

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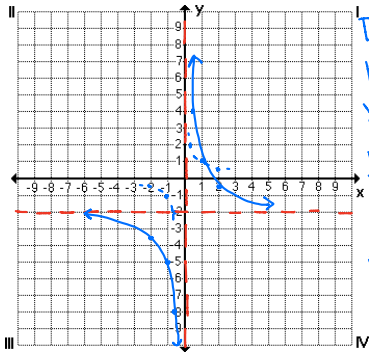
7. $f(x) = \frac{3}{x} - 2$

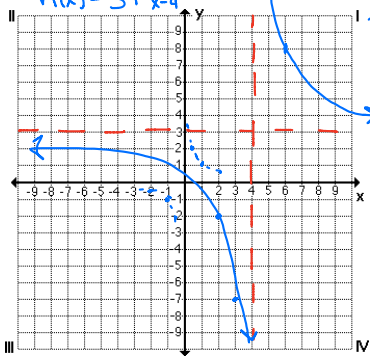


D: $\mathbb{R}$ except 0
R: $\mathbb{R}$ except -2
x-int: $\frac{3}{2}$
y-int: None
HA: $y = -2$
VA: $x = 0$
EB: $x \to \infty$, $f(x) \to -2$
$x \to -\infty$, $f(x) \to -2$

8. $h(x) = \frac{3x-2}{x-4}$

$h(x) = 3 + \frac{10}{x-4}$

$x-4 \overline{)\,3x-2}$ quotient 3, $-3x+12$, remainder 10

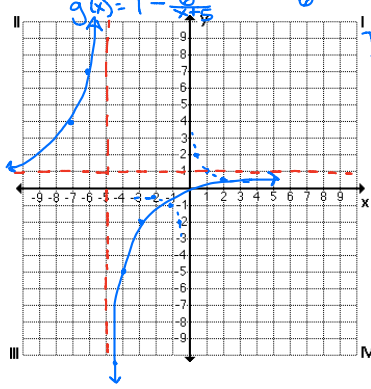


D: $\mathbb{R}$ except 4
R: $\mathbb{R}$ except 3
x-int: $\frac{2}{3}$
y-int: $\frac{1}{2}$
HA: $y = 3$
VA: $x = 4$
EB: $x \to \infty$, $h(x) \to 3$
$x \to -\infty$, $h(x) \to 3$

9. $g(x) = \frac{x-1}{x+5}$

$x+5 \overline{)\,x-1}$ quotient 1, $-x-5$, remainder -6

$g(x) = 1 - \frac{6}{x+5}$

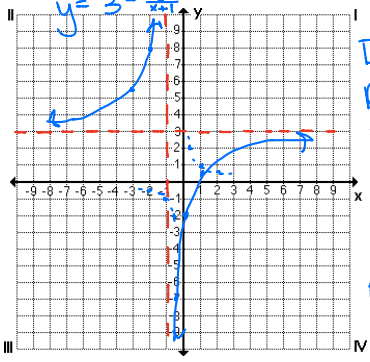


D: $\mathbb{R}$ except -5
R: $\mathbb{R}$ except 1
x-int: 1
y-int: $-\frac{1}{5}$
HA: $y = 1$
VA: $x = -5$
EB: $x \to \infty$, $g(x) \to 1$
$x \to -\infty$, $g(x) \to 1$

10. $y = \frac{-3x+2}{-x-1} = \frac{-(3x-2)}{-(x+1)}$

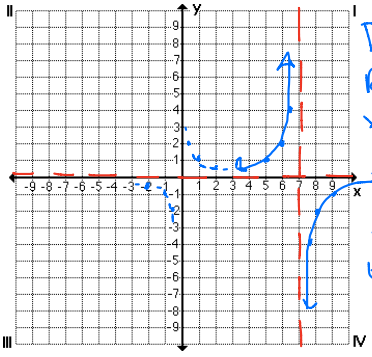
$x+1 \overline{)\,3x-2}$ quotient 3, $-3x-3$, remainder -5

$y = 3 - \frac{5}{x+1}$



D: $\mathbb{R}$ except -1
R: $\mathbb{R}$ except 3
x-int: $\frac{2}{3}$
y-int: -2
HA: $y = 3$
VA: $x = -1$
EB: $x \to \infty$, $y \to 3$
$x \to -\infty$, $y \to 3$

11. $c(x) = -\frac{2}{x-7}$

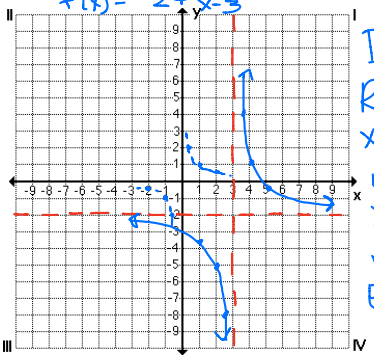


D: $\mathbb{R}$ except 7
R: $\mathbb{R}$ except 0
x-int: None
y-int: $\frac{2}{7}$
HA: $y = 0$
VA: $x = 7$
EB: $x \to \infty$, $c(x) \to 0$
$x \to -\infty$, $c(x) \to 0$

12. $f(x) = \frac{9-2x}{x-3}$

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

$x-3 \overline{)\,-2x+9}$ quotient -2, $+2x-6$, remainder 3



D: $\mathbb{R}$ except 3
R: $\mathbb{R}$ except -2
x-int: $\frac{9}{2}$
y-int: -3
HA: $y = -2$
VA: $x = 3$
EB: $x \to \infty$, $f(x) \to -2$
$x \to -\infty$, $f(x) \to -2$