

Name Key Date _____ Per. _____

PLEASE SHOW YOUR WORK FOR CREDIT

X-intercept

$$2x+9=0$$

$$2x=-9$$

$$x=-\frac{9}{2}=-4\frac{1}{2}$$

VA

$$2x^2-x-3$$

$$(2x-3)(x+1)$$

$$x \neq 1.5 \quad x = -1$$

$$\left(\frac{3}{2}\right)$$

y-intercept

$$2(0)+9$$

$$2(0)^2-0-3$$

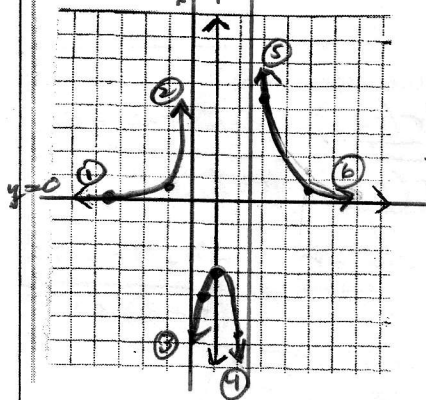
$$\frac{9}{-3}=-3$$

$$0, -3$$

HA: $y=0$

1.

$$f(x) = \frac{2x+9}{2x^2-x-3} \quad x \neq 1.5$$



x	y
-2	$\frac{5}{7}$
$-\frac{1}{2}$	$-\frac{8}{2}=-4$
1	$-\frac{11}{2}=-5\frac{1}{2}$
2	$\frac{13}{3}=4\frac{1}{3}$
4	$\frac{17}{25}$

$$x \neq -1, x \neq 1.5$$

$$D: (-\infty, -1) \cup (-1, 1.5) \cup (1.5, \infty)$$

$$R: (-\infty, -3) \cup (0, \infty)$$

$$VA: x \neq 1.5 \quad x \neq -1$$

$$HA/SA: y=0$$

$$a(x\text{-int}): (-4\frac{1}{2}, 0)$$

$$b(y\text{-int}): (0, -3)$$

End behaviors:

$$x \rightarrow -\infty, y \rightarrow 0; x \rightarrow -1, y \rightarrow \infty$$

$$x \rightarrow -1, y \rightarrow -\infty; x \rightarrow 1.5, y \rightarrow \infty$$

$$x \rightarrow 1.5, y \rightarrow -\infty; x \rightarrow \infty, y \rightarrow 0$$

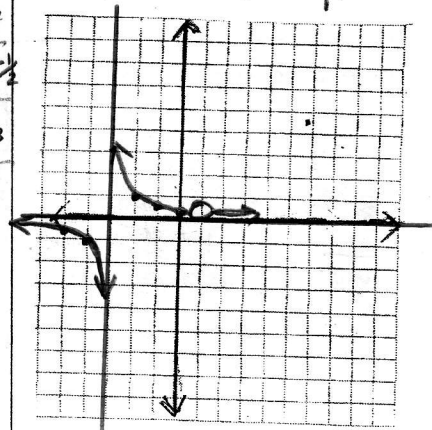
①+②

③+④

⑤+⑥

2.

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



Holes: $1, \frac{1}{4}$

VA: $x=-3$

X-inter: none

y-inter: $0, \frac{1}{3}$

HA: $y=0$

x	y
-1	$\frac{1}{2}$
-2	1
-4	-1
-5	$-\frac{1}{2}$

$$x \neq -3 \quad x \neq 1$$

$$D: (-\infty, -3) \cup (-3, 1) \cup (1, \infty)$$

$$R: (-\infty, 0) \cup (0, \frac{1}{4}) \cup (\frac{1}{4}, \infty)$$

$$VA: x=-3$$

$$HA/SA: y=0$$

X-inter: none y-inter: $(0, \frac{1}{3})$

Hole: $(1, \frac{1}{4})$

3.

$$f(x) = \frac{x^2+5x+4}{x+3} = \frac{(x+4)(x+1)}{(x+3)}$$

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

$$R: \mathbb{R}$$

$$VA: x=-3$$

$$HA/SA: y=x+2$$

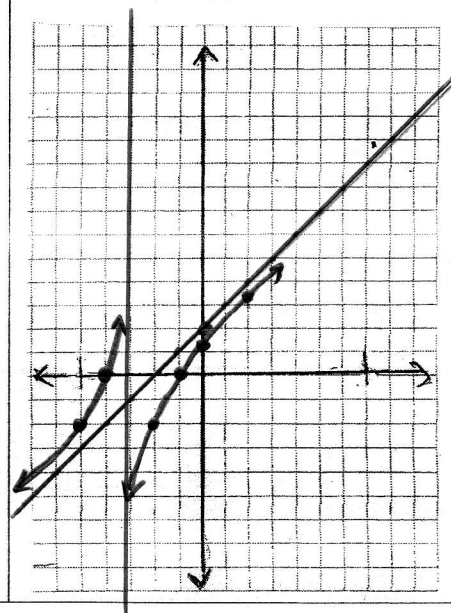
$$a(x\text{-int}): (-4, 0) \quad (-1, 0)$$

$$b(y\text{-int}): (0, \frac{4}{3})$$

Interval:

$$\begin{array}{r} x+2 \\ x+3 \overline{) x^2+5x+4} \\ \underline{-(x^2+3x)} \\ 2x+4 \\ \underline{-(2x+6)} \\ -2 \end{array}$$

3.



x	y
-2	-2
2	$3\frac{3}{5}$
-5	-2

4. Simplify the expression: $\frac{2x^2 - 7x - 15}{(x+4)^2} \div \frac{x^2 - 10x + 25}{x+4} =$

$$\frac{(2x+3)(x-5)}{(x+4)(x+4)} \cdot \frac{(x+4)}{(x-5)(x-5)} = \frac{(2x+3)}{(x+4)(x-5)}$$

(6) $\left. \begin{matrix} r \\ r+2 \\ r(r+2) \end{matrix} \right\} \text{LCD } r(r+2)$
 $r^2 + 4r + 3 = (r+3)(r+1)$

5. Simplify the expression:

$$\frac{y-5}{y^2-3y-10} + \frac{y}{y^2+y-2}$$

$$\frac{(y-5)}{(y-5)(y+2)} + \frac{y}{(y+2)(y-1)}$$

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

$$\frac{2y-1}{(y-1)(y+2)}$$

6. Simplify the expression:

$$\left(\frac{r+6}{r} - \frac{1}{r+2} \right) \frac{r(r+2)}{r(r+2)} = \frac{(r+6)(r+2) - r}{(r^2+4r+3)} = \frac{r^2+7r+12-r}{(r+3)(r+1)}$$

$$= \frac{r^2+6r+12}{(r+3)(r+1)} = \frac{(r+4)(r+3)}{(r+1)(r+3)} = \frac{r+4}{r+1}$$

7. The variables x and y vary inversely, and $y = -3$ when $x = 9$. $y = \frac{k}{x}$

a) Write an equation that relates x and y . $k = xy$ $k = 9(-3) = -27$

$$y = \frac{-27}{x} \text{ or } xy = -27$$

b) Find y when $x = 81$

$$y = \frac{-27}{81} = \frac{-1}{3}$$

8. The variables y varies jointly with x and z . Use the given values: $x = 8$, $y = 72$, and $z = 3$. $y = kxz$ $k = \frac{y}{xz}$

a) Write an equation relating x , y , and z . $k = \frac{72}{8(3)} = \frac{72}{24} = 3$

$$y = 3xz$$

b) Find y when $x = -2$ and $z = -5$.

$$y = 3(-2)(-5) = 30$$

9. Solve & state the restriction(s):

$$3r(r-2) \left(\frac{r+2}{3r} - \frac{r+4}{r-2} - \frac{2}{3} \right)$$

$$(r-2)(r+2) = 3r(r+4) - 2r(r-2)$$

$$r^2 - 4 = 3r^2 + 12r - 2r^2 + 4r$$

$$r^2 - 4 = r^2 + 16r$$

$$-4 = 16r$$

$$r = -\frac{1}{4}$$

Restriction(s): $x \neq 0$ $x \neq 2$

Solution(s): $r = -\frac{1}{4}$

10. Solve & state the restriction(s):

$$30x \left(\frac{1}{2x} - \frac{4}{5x} + \frac{1}{3} \right)$$

$$15 - 24 > 10x$$

$$-9 > 10x$$

$$\frac{-9}{10} > x \rightarrow x < -\frac{9}{10}$$

$$-1 < x < 0$$

Restriction(s): $x \neq 0$

Solution(s): $-\frac{9}{10} < x < 0$

Test 1

$$\frac{1}{2} - \frac{4}{5} > \frac{1}{3}$$

$$\frac{15}{30} - \frac{24}{30} > \frac{10}{30}$$

$$-\frac{9}{30} > \frac{10}{30}$$

No

Test -1

$$-\frac{1}{2} + \frac{4}{5} > \frac{1}{3}$$

$$-\frac{15}{30} + \frac{24}{30} > \frac{10}{30}$$

$$\frac{9}{30} > \frac{10}{30}$$

No