

Algebra 2

Chapter 9 Review Pt. 1

Name: Key Hour: _____

9.1 Direct Variation

1. x and y vary directly. $x = 11$ when $y = 33$. Find the constant of variation. State the direct variation equation. Then find x when $y = 9$.

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

$$\underline{x = 3 \text{ when } y = 9}$$

$$y = kx \quad \frac{33}{11} = \frac{k \cdot 11}{11} \quad k = 3$$

constant of variation:

$$\underline{k = 3}$$

Direct Variation Equation:

$$\underline{y = 3x}$$

2. x and y vary directly. $x = \frac{1}{3}$ when $y = \frac{7}{3}$. Find the constant of variation. State the direct variation equation. Then find y when $x = 10$.

$$\frac{7}{3} = k \left(\frac{1}{3}\right) \cdot 3 \quad \underline{k = 7} \quad \underline{y = 7x}$$

$$y = 7(10)$$

$$\underline{y = 70}$$

3. Given the following data set, do x and y vary directly? $\{(4, 1.6), (12, 4.8), (20, 8), (50, 20)\}$

Yes

$$\frac{1.6}{4} = \frac{k(4)}{4} \quad k = 0.4$$

$$\frac{4.8}{12} = 0.4(12) \quad \checkmark$$

$$\frac{8}{20} = 0.4(20) \quad \checkmark$$

$$\frac{20}{50} = 0.4(50) \quad \checkmark$$

4. Given the following data set, do x and y vary directly? $\{(2, 14), (10, 70), (5, 35), (6, 48)\}$

No

$$\frac{14}{2} = \frac{2 \cdot k}{2} \quad k = 7$$

$$\frac{70}{10} = 7 \cdot 10 \quad \checkmark$$

$$\frac{35}{5} = 5 \cdot 7 \quad \checkmark$$

$$\frac{48}{6} = 7.6 \quad \times$$

9.2 Graphing Rational Functions

For the following problems, state the following: x -intercept(s), y -intercept, vertical asymptote(s), and horizontal asymptote.

$$5. y = \frac{4x+8}{x-1}$$

$$4x+8=0 \quad x=-2$$

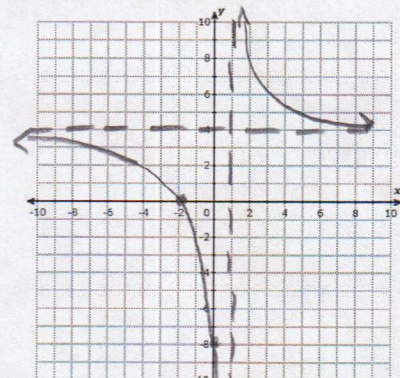
$$4x=-8 \quad (-2, 0)$$

x -intercept(s): $(-2, 0)$

y -intercept: $(0, -8)$

V.A.: $x = 1$

H.A.: $y = 4$



$$6. y = \frac{x^2+5x-14}{3x-7}$$

$$x^2+5x-14=0$$

$$(x+7)(x-2)=0$$

$$x=-7 \quad x=2$$

x -intercept(s): $(-7, 0), (2, 0)$

y -intercept: $(0, 2)$

V.A.: $x = \frac{7}{3}$

H.A.: None

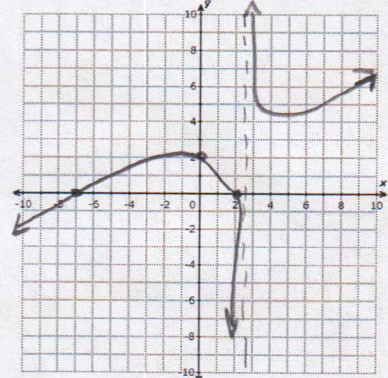
$$\frac{0^2+0-14}{0-7} = 2$$

$$(0, 2)$$

$$3x-7=0$$

$$3x=7$$

$$x=\frac{7}{3}$$



$$7. y = \frac{12x^2 + 16x - 3}{x^3 - 3x^2 - 4x}$$

$$\text{x-intercept(s): } \left(-\frac{3}{2}, 0\right), \left(\frac{1}{6}, 0\right)$$

$$\text{y-intercept: } \underline{\text{None}}$$

$$\text{V.A.: } \underline{x=0, x=4, x=-1}$$

$$\text{H.A.: } \underline{y=0}$$

$$12x^2 + 16x - 3 = 0$$

$$x^2 + 16x - 36 = 0$$

$$(x + \frac{18}{12})(x - \frac{2}{12})$$

$$x + \frac{3}{2} \quad x - \frac{1}{6}$$

$$(2x+3)(6x-1)$$

$$x^3 - 3x^2 - 4x = 0$$

$$x(x^2 - 3x - 4) = 0$$

$$x(x-4)(x+1) = 0$$

$$8. f(x) = \frac{x^2 + 4x + 4}{x^2 - 3x - 4}$$

$$\text{x-intercept(s): } \underline{(-2, 0)}$$

$$\text{y-intercept: } \underline{(0, -1)}$$

$$\text{V.A.: } \underline{x=4, x=-1}$$

$$\text{H.A.: } \underline{y=1}$$

$$x^2 + 4x + 4 = 0$$

$$(x+2)(x+2) = 0$$

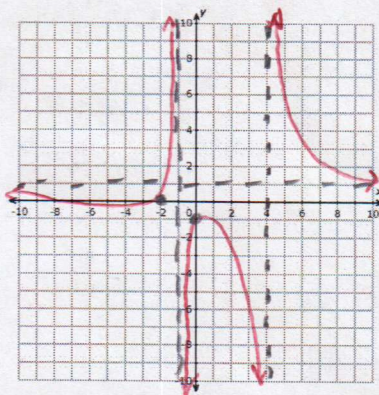
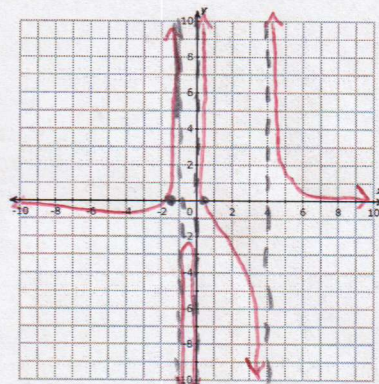
$$x = -2$$

$$0, -1$$

$$x^2 - 3x - 4 = 0$$

$$(x-4)(x+1) = 0$$

EATS
D/C
y = 1



9.3 Simplifying, Multiplying, & Dividing Rational Expressions

$$9. \frac{x(x^2 + x - 2)}{x^4 + 4x^3 - 5x^2} = \frac{\cancel{x}(x+2)\cancel{(x-1)}}{x^2(x+5)\cancel{(x-1)}} = \frac{x+2}{x(x+5)}$$

$$x^2(x^2 + 4x - 5)$$

$$x^2(x+5)(x-1)$$

$$10. \frac{x^2 + 2x - 8}{x^2 + 5x + 4} \cdot \frac{(x+1)(x-3)}{x^2 - 5x + 6}$$

$$\frac{\cancel{(x+4)}\cancel{(x-2)}}{\cancel{(x+4)}(x+1)} \cdot \frac{\cancel{(x+1)}\cancel{(x-3)}}{\cancel{(x-2)}\cancel{(x-3)}} = 1$$

$$11. \frac{x+2}{2x^2+3x} \cdot \frac{2x^2+x-3}{x^2+x-2}$$

$$\frac{\cancel{x+2}}{x(2x+3)} \cdot \frac{\cancel{(2x+3)}\cancel{(x-1)}}{\cancel{(x+2)}(x+1)} = \frac{1}{x}$$

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

$$x^2 + x - 6$$

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

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

$$12. \frac{3x^2 - 17x - 6}{4x} \div \frac{3x^2 + 4x + 1}{24x^3}$$

$$\frac{\cancel{(x-6)}\cancel{(3x+1)}}{\cancel{4x}} \cdot \frac{6 \cdot 24x^3}{\cancel{(x+1)}\cancel{(3x+1)}} = \frac{6x^2(x-6)}{x+1}$$

$$3x^2 - 17x - 6$$

$$x^2 - 17x - 18$$

$$(x - \frac{18}{3})(x + \frac{1}{3})$$

$$(x-6)(3x+1)$$

$$3x^2 + 4x + 1$$

$$x^2 + 4x + 3$$

$$(x + \frac{3}{3})(x + \frac{1}{3})$$

$$(x+1)(3x+1)$$