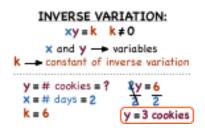
Algebra II – Chapter 8

8.1: Model Inverse and Joint Variation



- Remember that direct variation is y = ax
- Joint variable is when the quantity varies directly with the product of two or more variables. The formula is: z = axy. This reads "z varies jointly with x and y".
 - 1) Do these show direct variation, inverse variation, or neither?
 - a. 3x = yb. xy = 0.75c. y = x - 5
 - 2) If x and y vary inversely, write an equation and find y when x=2
 - a. x = 4, y = 3b. x = 8, y = -1
 - 3) If z varies jointly with x and y, write an equation. Find z when x=-2 and y=5.
 - a. x = 1, y = 2, z = 7
 - b. x = 4, y = -3, z = 24
 - 4) Write an equation:
 - a. x varies inversely with y and directly with w
 - b. p varies jointly with q and r and inversely with s

8.2: Graph Simple Rational Functions

Graph the function. State the domain and range:

1) $f(x) = -\frac{4}{x}$

2)
$$y = \frac{8}{x} - 5$$

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

4)
$$y = \frac{x-1}{x+3}$$

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

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

8.3: Graph General Rational Functions

GRAPH CHARACTERISTICS

x-intercepts are real zeros of p(x) [top]
Vertical asymptotes are at each real zero of q(x) [bottom]

At most one horizontal asymptote:(m is degree of top, n is degree of bottom)

Graph the function. State the domain, range, identify x-intercept(s) and vertical and horizontal asymptote(s):

1)
$$y = \frac{4}{x^2+2}$$

2)
$$y = \frac{3x^2}{x^2 - 1}$$

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

4)
$$y = \frac{x^2 - 2x - 2}{x - 4}$$

8.4: Multiply and Divide Rational Expressions

$$\frac{ac}{bc} = \frac{a}{b}$$

Simplify, if possible:

1) $\frac{2(x+1)}{(x+1)(x+3)}$ 2) $\frac{40x+20}{10x+30}$ 3) $\frac{4}{x(x+2)}$ 4) $\frac{x+4}{x^2-16}$ 5) $\frac{x^2 - 2x - 3}{x^2 - x - 6}$ $6) \frac{3x^5y^2}{8xy} \cdot \frac{6xy^2}{9x^3y}$ 7) $\frac{2x^2-10x}{x^2-25} \cdot \frac{x+3}{2x^2}$ 8) $\frac{4x}{5x-20} \div \frac{x^2-2x}{x^2-6x+8}$

8.5: Add and Subtract Rational Expressions

$$\frac{a}{c} + \frac{b}{c} = \frac{a+b}{c} \qquad \qquad \frac{a}{c} - \frac{b}{c} = \frac{a-b}{c}$$

Practice:

1)
$$\frac{7}{12x} - \frac{5}{12x}$$

2)
$$\frac{2}{3x^2} + \frac{1}{3x^2}$$

3)
$$\frac{4x}{x-2} - \frac{x}{x-2}$$

$$4)\frac{2x^2}{x^2+1} + \frac{2}{x^2+1}$$

5)
$$\frac{3}{4x} - \frac{1}{7}$$

$$6)\,\frac{1}{3x^2} + \frac{x}{9x^2 - 12x}$$

8.6: Solve Rational Equations

For certain equations, you can use cross multiplication to solve.

1)
$$\frac{3}{5x} = \frac{2}{x-7}$$

2) $\frac{1}{2x+5} = \frac{x}{11x+8}$
3) $\frac{7}{2} + \frac{3}{x} = 3$

4)
$$\frac{2}{x} + \frac{4}{3} = 2$$

5)
$$\frac{3}{2} + \frac{4}{x-1} = \frac{x+1}{x-1}$$