

1. The dollar amount  $d$  that Jane earns varies directly as the number of hours  $t$  that she works. If  $d = \$115.35$  when  $t = 15$  find  $t$  when  $d = 438.33$

$$d = kt$$

$$k = \frac{d}{t} = \frac{115.35}{15} = 7.69$$

$$d = 7.69t$$

$$438.33 = 7.69t$$

$$t = 57$$

2. Determine whether the following data set represents a direct or inverse variation.

x	2.7	61.2	41.4
y	3	68	46

Multiply or Divide. Assume that all expressions are defined.

$$3. \frac{x^2 - 25}{x^2 + 3x - 10} \cdot \frac{x^2 + x - 6}{(x-5)}$$

*(x-5)(x+5) (x+3)(x-2)*  
*(x+5)(x-2)*

$$= \frac{x+3}{1} = \boxed{x+3}$$

$$4. \frac{x+7}{x^2-9x+20} \div \frac{5x+35}{x^2-x-12}$$

$$\frac{(x+7)}{(x-4)(x-5)} \cdot \frac{(x-4)(x+3)}{5(x+7)} = \frac{x+3}{5(x-5)}$$

$$5. \frac{4x^5y^6}{2x^4} \cdot \frac{8}{y^3} = \frac{16xy^3}{1} = \boxed{16xy^3}$$

Find the least common multiple for each pair.

6.  $7x^3y^8z^2$  and  $42x^5y^4$

$$\boxed{42x^5y^8z^2}$$

7.  $4x^2 - 64y^2$  and  $4x - 16y$

$$4(x^2 - 16y^2)$$

$$\boxed{4(x-4y)(x+4y)}$$

KEY

Simplify. Assume that all expressions are defined.

8.  $\left(\frac{3}{7} - \frac{3}{5x}\right) \frac{(7)(5x)(x-5)}{(7)(5x)(x-5)} = \frac{-3(5x)(x-5) - 3(7)(x-5)}{(5x-7)(7)(5x)}$   
 $\frac{15x(x-5) - 21(x-5)}{35x(5x-7)} = \frac{(x-5)(15x-21)}{35x(5x-7)}$

9.  $\left(\frac{4}{x-5}\right) \frac{4}{x-5} = \frac{16}{(x-5)^2}$   
 $\frac{4}{x-5} \cdot \frac{7}{x-5} = \frac{28}{(x-5)^2}$   
 $\frac{7}{(x-5)(5x-7)} = \frac{7(x-5)}{35x(5x-7)}$

Add or subtract. Assume all expressions are defined.

10.  $\frac{2x-5}{x+7} - \frac{7}{x} = \frac{x(2x-5) - 7(x+7)}{(x+7)x} = \frac{2x^2-5x-7x-49}{x(x+7)} = \frac{2x^2-12x-49}{x(x+7)}$

11.  $\frac{x-2}{x^2+5x+6} + \frac{1}{x^2+3x} = \frac{x(x-2)}{x(x+3)(x+2)} + \frac{1}{x(x+3)} \cdot \frac{x+2}{x+2} = \frac{x^2-x-2}{x(x+3)(x+2)}$

12.  $\frac{x-1}{x^2+7x-8} - \frac{x+3}{x+8} = \frac{(x-1)}{(x+8)(x-1)} - \frac{(x+3)}{(x+8)} \cdot \frac{(x-1)}{(x-1)} = \frac{-1(x+2)}{x+8}$

13.  $\frac{3x+2}{4x+5} - \frac{5x+8}{4x+5} = \frac{3x+2-(5x+8)}{4x+5} = \frac{3x+2-5x-8}{4x+5} = \frac{-2x-6}{4x+5} = \frac{-2(x+3)}{4x+5}$

14. Use  $f(x) = \frac{x-1}{x^2+3x-4}$  to find the following: Accurately graph the function. If there is no answer to the blank, write "none".  
 $(x-1)(x+4)$

Domain All reals except  $x \neq 1$   $x \neq -4$

Range All reals except  $y \neq 0$

x-intercept(s) NONE

y-intercept  $\frac{1}{4}$

horizontal asymptote  $y=0$

vertical asymptote(s)  $x=-4$

hole in the graph at  $x = 1$   $\frac{1}{1}$  leading coefficient

