50) $\frac{5}{6}w^9\left(7w^4 - 3w^2 + \frac{5}{4}\right)$

A) $\frac{35}{6}w^{13} + \frac{5}{2}w^{11} - \frac{25}{24}w^9$

B) $\frac{35}{6}w^4 - \frac{5}{2}w^2 + \frac{25}{24}$

(C) $\frac{35}{6}w^{13} - \frac{5}{2}w^{11} + \frac{25}{24}w^9$

D) $\frac{35}{6}w^{13} + \frac{5}{6}w^{11} - \frac{25}{24}w^9$

$\frac{5}{6}w^9\left(7w^4 - 3w^2 + \frac{5}{4}\right)$

$= \frac{5}{6}w^9 \cdot 7w^4 - \frac{5}{6}w^9 \cdot 3w^2 + \frac{5}{6}w^9 \cdot \frac{5}{4}$

$= \frac{35}{6}w^{13} - \frac{5}{2}w^{11} + \frac{25}{24}w^9$

51) $\left(\frac{1}{3}m - 2\right)\left(\frac{5}{3}m - 2\right)$

A) $\frac{5}{3}m^2 - 4m + 8$ B) $\frac{5}{3}m^2 - 4m + 4$

(C) $\frac{5}{9}m^2 - 4m + 4$ D) $\frac{5}{6}m^2 - 4m + 4$

$\left(\frac{1}{3}m - 2\right)\left(\frac{5}{3}m - 2\right)$

$= \frac{1}{3}m \cdot \frac{5}{3}m - \frac{1}{3}m \cdot 2 - 2 \cdot \frac{5}{3}m + 2 \cdot 2$

$= \frac{5}{9}m^2 - \frac{2}{3}m - \frac{10}{3}m + 4$

$= \frac{5}{9}m^2 - 4m + 4$

52) $(2a - 9)^2$

A) $2a^2 - 36a + 81$ B) $2a^2 + 81$

C) $4a^2 + 81$ (D) $4a^2 - 36a + 81$

$(2a-9)^2$

$= (2a-9)(2a-9)$

$= 4a^2 - 18a - 18a + 81$

$= 4a^2 - 36a + 81$

OR

$(2a-9)^2$

$= (2a)^2 - 2(2a)(9) + 9^2$

$= 4a^2 - 36a + 81$

53) $(x - 0.4)(x + 0.4)$

A) $x^2 - 0.8x + 0.16$ (B) $x^2 - 0.16$

C) $x^2 + 0.16$ D) $x^2 - 0.8x - 0.16$

$(x-0.4)(x+0.4)$

$= x^2 - (0.4)^2$

$= x^2 - 0.16$

Solve.

54) $y - 2x = 8$

$2y - x = 8$

A) Infinite number of solutions

B) No solution

(C) $\left(-\frac{8}{3}, \frac{8}{3}\right)$

D) $\left(-\frac{8}{3}, -\frac{8}{3}\right)$

$\begin{cases} y - 2x = 8 \\ 2y - x = 8 \end{cases} \Big| \times(-2)$

$\Rightarrow \begin{cases} y - 2x = 8 \\ -4y + 2x = -16 \end{cases} (+)$

$-3y = -8$

$y = \frac{8}{3}$

$y - 2x = 8$

$\frac{8}{3} - 2x = 8 \quad \times 3$

$\Rightarrow 8 - 6x = 24$

$-6x = 16$

$x = -\frac{16}{6}$

$x = -\frac{8}{3}$

Solution: $\left(-\frac{8}{3}, \frac{8}{3}\right)$

55) $-7x + 14 = -5y$

$3x + 3y = -30$

A) $(-4, -6)$

(B) $(-3, -7)$

C) No solution

D) Infinite number of solutions

$\begin{cases} -7x + 14 = -5y \\ 3x + 3y = -30 \end{cases} \Rightarrow \begin{cases} -7x + 5y = -14 \\ x + y = -10 \end{cases} \Big| \times 7$

$\Rightarrow \begin{cases} -7x + 5y = -14 \\ 7x + 7y = -70 \end{cases} (+)$

$12y = -84$

$y = -7$

$3x + 3(-7) = -30$

$3x - 21 = -30$

$3x = -9$

$x = -3$

Solution: $(-3, -7)$

Solve.

56) $r + 3s = 5$
$7r + 4s = 35$

(A) (5, 0)
B) No solution
C) (−5, −1)
D) Infinite number of solutions

$\begin{cases} r+3s=5 \\ 7r+4s=35 \end{cases} \quad \times(-7)$

$\Rightarrow \begin{cases} -7r-21s=-35 \\ 7r+4s=35 \end{cases}$ ④

$-17s = 0$

$s = 0$

$r + 3(0) = 5$

$r = 5$

solution: (5, 0)

Simplify, if possible.

57) $\frac{b-a}{7a-7b}$

A) $\frac{1}{7}$ B) $\frac{b-a}{7a-7b}$

C) −7 (D) $-\frac{1}{7}$

$\frac{b-a}{7a-7b} = \frac{b-a}{-7(b-a)}$

$= -\frac{1}{7}$

58) $\frac{t^2+12t+36}{t^2-12t+36} \div \frac{(t+6)^7}{(t-6)^7} \div \frac{2t-12}{t^2-36}$

(A) $\frac{(t-6)^5}{2(t+6)^4}$ B) $\frac{2(t-6)^5}{(t+6)^6}$

C) $\frac{2(t+6)^6}{(t-6)^9}$ D) $\frac{(t+6)^{10}}{2(t-6)^9}$

$\frac{t^2+12t+36}{t^2-12t+36} \div \frac{(t+6)^7}{(t-6)^7} \div \frac{2t-12}{t^2-36}$

$= \frac{(t+6)^2}{(t-6)^2} \cdot \frac{(t-6)^7}{(t+6)^7} \cdot \frac{(t+6)(t-6)}{2(t-6)}$

$= \frac{(t-6)^5}{2(t+6)^4}$

59) $\frac{m^2-25}{m^2+10m+25}$

A) $\frac{1}{m+5}$ B) $\frac{m+5}{m-5}$

(C) $\frac{m-5}{m+5}$ D) 1

$\frac{m^2-25}{m^2+10m+25} = \frac{(m-5)(m+5)}{(m+5)(m+5)}$

$= \frac{m-5}{m+5}$

60) $\frac{x^2-4}{(x-2)^2}$

A) $\frac{x+2}{x-2}$ B) $\frac{x^2-4}{(x-2)^2}$

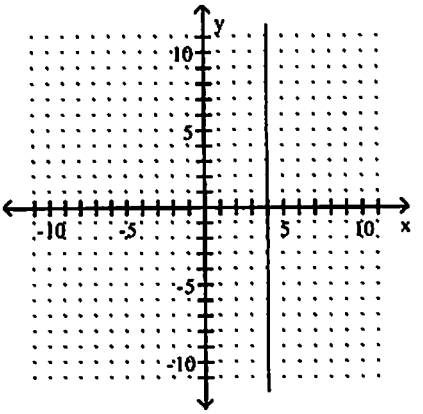
C) $x + 2$ D) $\frac{x-2}{x+2}$

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

$= \frac{x+2}{x-2}$

Write an equation for the graph.

61)



A) $y = x + 8$ B) $y = x + 4$

C) $y = 4$ (D) $x = 4$

Vertical line $x = a$, a any number

$\Rightarrow x = 4$

Find an equation of the line meeting the specified conditions. Write your final answer in slope-intercept form.

62) Containing the point $\left(0, \frac{3}{4}\right)$ and perpendicular to $9x + y = 6$

A) $y = 9x - \frac{3}{4}$ B) $y = -9x + \frac{3}{4}$

C) $y = 9x + \frac{3}{4}$ (D) $y = \frac{1}{9}x + \frac{3}{4}$

$9x + y = 6$

$y = -9x + 6$

$m = -9$

$\Rightarrow$ slope of the line is $+\frac{1}{9}$.

So, use $m = +\frac{1}{9}$ and $(0, \frac{3}{4})$

$y = mx + b$

$y = +\frac{1}{9}x + \frac{3}{4}$

Solve using the addition and multiplication principles.

63) $0.6x + 10 + x > 2x + 5 - 0.5x$

A) $\{x \mid x \geq 5\}$ B) $\{x \mid x < -50\}$

(C) $\{x \mid x > -50\}$ D) $\{x \mid x < 5\}$

$0.6x + 10 + x > 2x + 5 - 0.5x$

$1.6x + 10 > 1.5x + 5$

$1.6x - 1.5x > 5 - 10$

$0.1x > -5$

$x > \frac{-5}{0.1}$

$x > -50$

$\{x \mid x > -50\}$

Multiply and, if possible, simplify.

64) $\frac{x - 7}{(x + 4)^2} \cdot \frac{x^2 - 3x - 28}{(x - 7)^2}$

(A) $\frac{1}{x + 4}$ B) $x + 4$

C) $\frac{x - 7}{x + 4}$ D) $\frac{1}{x - 7}$

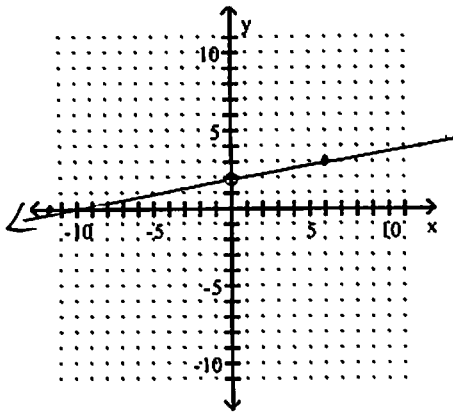
$\frac{x-7}{(x+4)^2} \cdot \frac{x^2-3x-28}{(x-7)^2}$

$= \frac{x-7}{(x+4)^2} \cdot \frac{(x-7)(x+4)}{(x-7)^2}$

$= \frac{1}{x+4}$

Graph the linear equation.

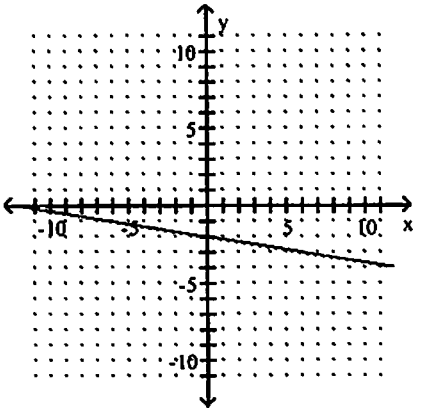
65) $y = \frac{1}{6}x + 2$



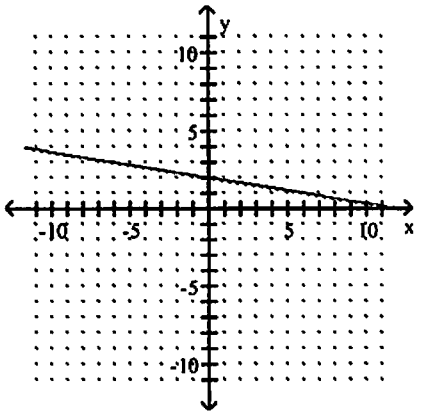
Slope: $m = \frac{1}{6}$ up 1 Right 6

y-intercept (0, 2)

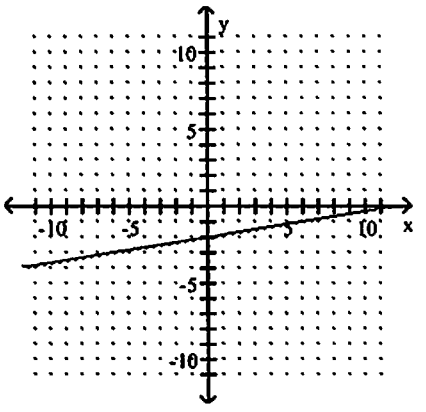
A)



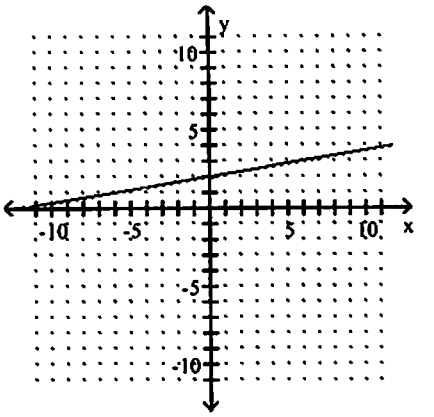
B)



C)



(D)



Find an equation of the line meeting the specified conditions. Write your final answer in slope-intercept form.

66) Containing the point $\left(0, \frac{1}{8}\right)$ and parallel to $6x + 4y = 5$

(A) $y = -\frac{3}{2}x + \frac{1}{8}$ B) $y = 6x + \frac{1}{8}$

C) $y = \frac{2}{3}x + \frac{1}{8}$ D) $y = \frac{3}{2}x + \frac{1}{8}$

$6x + 4y = 5$

$4y = -6x + 5$

$y = -\frac{6}{4}x + \frac{5}{4}$

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

$m = -\frac{3}{2}$

parallel line: have same slope

So, we have $m = -\frac{3}{2}$, $(0, \frac{1}{8})$

$y = mx + b$

$y = -\frac{3}{2}x + \frac{1}{8}$

Perform the indicated operation and, if possible, simplify.

67) $\frac{22}{23} - \frac{10}{21}$

A) $\frac{232}{23}$ (B) $\frac{232}{483}$

C) $\frac{4}{161}$ D) $\frac{483}{232}$

$\frac{22}{23} - \frac{10}{21}$ LCD: 483

$= \frac{22 \cdot 21}{483} - \frac{10 \cdot 23}{483}$

$= \frac{462}{483} - \frac{230}{483}$

$= \frac{232}{483}$

Subtract.

68) $(-9x^5 + 4x^7 - 2 - 6x^6) - (-4 + 4x^6 + 8x^7 - 5x^5)$

A) $-4x^7 - 2x^6 - 14x^5 - 6$

B) $12x^7 - 2x^6 - 14x^5 - 6$

C) $12x^7 - 2x^6 - 14x^5 + 2$

(D) $-4x^7 - 10x^6 - 4x^5 + 2$

$(-9x^5+4x^7-2-6x^6)-(-4+4x^6+8x^7-5x^5)$

$= -9x^5+4x^7-2-6x^6+4-4x^6-8x^7+5x^5$

$= -4x^7 - 10x^6 - 4x^5 + 2$

69) 0.078 - 1

A) 1.078 B) 0.922

C) -1.078 (D) -0.922

$0.078 - 1$

$= -0.922$

1.000
-0.078
0.922

Solve using the addition and multiplication principles.

70) $\frac{2}{3}(2x - 1) < -2$

A) $\{x \mid x \le -1\}$ B) $\{x \mid x \ge 1\}$

(C) $\{x \mid x < -1\}$ D) $\{x \mid x < 1\}$

$\frac{2}{3}(2x-1) < -2$

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

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

$4x - 2 < -6$

$4x < -6 + 2$

$4x < -4$

$x < -1$ $\{x \mid x < -1\}$

71) $\frac{5}{6}\left(5x - \frac{2}{15}\right) - \frac{2}{5} < \frac{3}{5}$

A) $\left\{x \mid x \ge -\frac{4}{15}\right\}$ B) $\left\{x \mid x < -\frac{4}{15}\right\}$

C) $\left\{x \mid x \le \frac{4}{15}\right\}$ (D) $\left\{x \mid x < \frac{4}{15}\right\}$

$\frac{5}{6}(5x - \frac{2}{15}) - \frac{2}{5} < \frac{3}{5}$

$\frac{25}{6}x - \frac{1}{9} - \frac{2}{5} < \frac{3}{5}$

$90(\frac{25}{6}x - \frac{1}{9} - \frac{2}{5}) < 90 \cdot \frac{3}{5}$

$375x - 10 - 36 < 54$

$375x - 46 < 54$

$375x < 54 + 46$

$375x < 100$

$x < \frac{100}{375}$

$x < \frac{4}{15}$ $\{x \mid x < \frac{4}{15}\}$

72) $-6 + 11x - 2 \ge 10x + 2$

A) $\{x \mid x < 11\}$ B) $\{x \mid x > 11\}$

(C) $\{x \mid x \ge 10\}$ D) $\{x \mid x \le 10\}$

$-6 + 11x - 2 \ge 10x + 2$

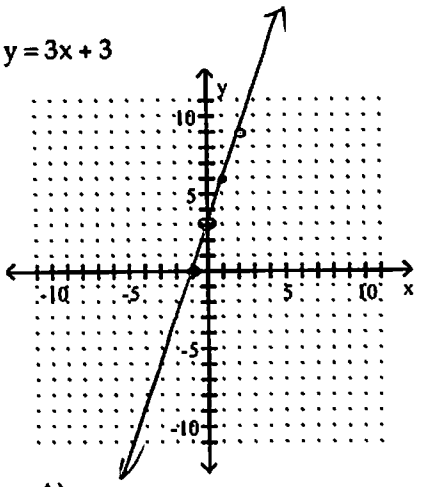
$11x - 8 \ge 10x + 2$

$11x - 10x \ge 2 + 8$

$x \ge 10$

Graph the equation. $\{x \ge 10\}$

73) $y = 3x + 3$

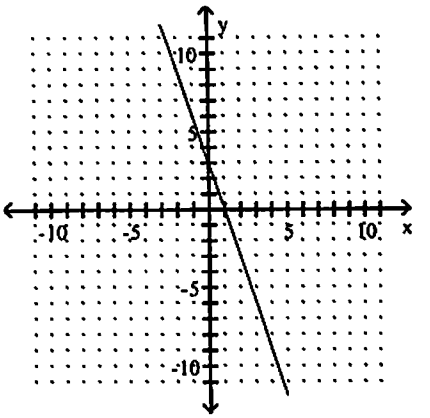


$y = 3x + 3$

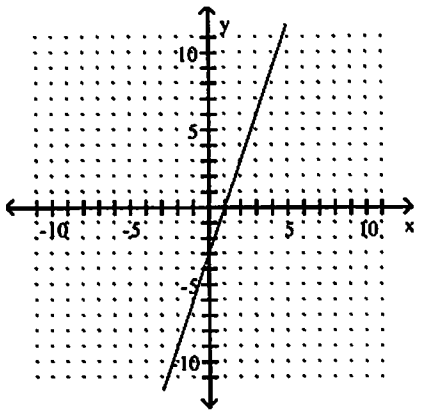
y-intercept: $(0, 3)$

slope: $m = 3 = \frac{3}{1}$

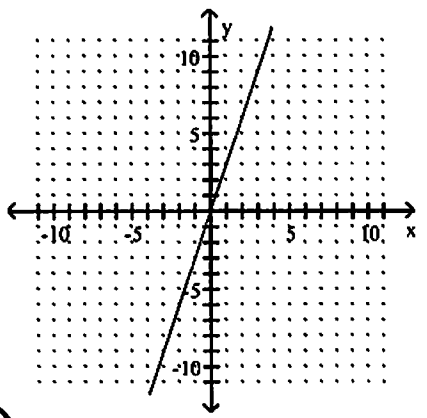
D)



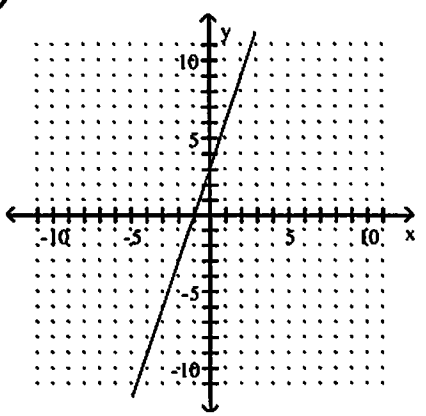
A)



B)



C)



Multiply and, if possible, simplify.

74) $\frac{x^2 - 9x + 18}{4x^3 - 5x^2} \cdot \frac{16x^3 - 25x}{2x - 12}$

A) $\frac{(x - 3)(4x + 5)}{2x}$ B) $\frac{(x + 3)(4x + 5)}{2}$

C) $\frac{(x - 3)(4x - 5)}{2x}$ D) $\frac{(x - 3)(4x + 5)}{2x^2}$

$\frac{x^2-9x+18}{4x^3-5x^2} \cdot \frac{16x^3-25x}{2x-12}$

$= \frac{(x-3)(x-6)}{x^2(4x-5)} \cdot \frac{x(4x+5)(4x-5)}{2(x-6)}$

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

75) $\frac{6x + 12}{x + 3} \cdot \frac{3x^2 + 18x + 27}{x^2 - 4}$

A) $\frac{18(x + 3)}{x + 2}$ B) $\frac{6(x + 3)}{x - 2}$

C) $\frac{18(x + 2)(x + 3)}{x^2 - 4}$ D) $\frac{18(x + 3)}{x - 2}$

$\frac{6x+12}{x+3} \cdot \frac{3x^2+18x+27}{x^2-4}$

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

$= \frac{18(x+3)}{x-2}$

Simplify. Assume that no denominator is zero and that 0^0 is not considered.

76) $(6x^3)(2x^5)$

A) $8x^8$ B) $12x^{15}$

C) $8x^{15}$ (D) $12x^8$

$(6x^3)(2x^5)$

$= 6 \cdot 2 \cdot x^3 \cdot x^5$

$= 12x^8$

77) $\frac{30m^3p^2}{5m^9p}$

A) $6m^6p^2$ B) $6mp$

(C) $\frac{6p}{m^6}$ D) $\frac{6m^6}{p}$

$\frac{30m^3p^2}{5m^9p} = \frac{30}{5} m^{3-9} p^{2-1}$

$= 6m^{-6}p^1$

$= \frac{6p}{m^6}$

78) $\left(\frac{4x^5y^5}{9z^{10}}\right)^2$

A) $\frac{16x^{10}y^{10}}{9z^{12}}$ (B) $\frac{16x^{10}y^{10}}{81z^{20}}$

C) $\frac{16x^{10}y^7}{81z^{20}}$ D) $\frac{16x^7y^7}{81z^{12}}$

$\left(\frac{4x^5y^5}{9z^{10}}\right)^2$

$= \frac{16x^{10}y^{10}}{81z^{20}}$

Factor out the largest common factor.

79) $6x^{12} - 12x^9 + 18x^6 - 24x^3$

A) $x^3(x^9 - 2x^6 + 3x^3 - 4)$

B) $6(x^9 - 2x^6 + 3x^3 - 4)$

(C) $6x^3(x^9 - 2x^6 + 3x^3 - 4)$

D) $6x^3(x^4 - 2x^3 + 3x^2 - 4)$

$6x^{12} - 12x^9 + 18x^6 - 24x^3$

$= 6x^3(x^9 - 2x^6 + 3x^3 - 4)$

80) $16m^8 - 32m^4 - 40m^2$

A) $m^2(16m^6 - 32m^2 - 40)$

B) $8(2m^8 - 4m^4 - 5m^2)$

C) No common factor

(D) $8m^2(2m^6 - 4m^2 - 5)$

$16m^8 - 32m^4 - 40m^2$

$= 8m^2(2m^6 - 4m^2 - 5)$

81) $12x^9y^7 + 16x^4y^5 - 24x^2y^2$

A) $4(3x^9y^7 + 4x^4y^5 - 6x^2y^2)$

B) No common factor

C) $4x^2(3x^7y^7 + 4x^2y^5 - 6y^2)$

(D) $4x^2y^2(3x^7y^5 + 4x^2y^3 - 6)$

$12x^9y^7 + 16x^4y^5 - 24x^2y^2$

$= 4x^2y^2(3x^7y^5 + 4x^2y^3 - 6)$

Divide and, if possible, simplify.

82) $\frac{12x^6}{20y^{11}} \div \frac{30x^4}{20y^5}$

(A) $\frac{2x^2}{5y^6}$ B) $\frac{9x^{10}}{10y^{16}}$

C) $\frac{5y^2}{2x^6}$ D) $\frac{9x^2}{10y^6}$

$\frac{12x^6}{20y^{11}} \div \frac{30x^4}{20y^5}$

$= \frac{\cancel{12}^{2}x^6}{\cancel{20}y^{11}} \cdot \frac{\cancel{20}y^5}{\cancel{30}_{5}x^4}$

$= \frac{2}{5}x^{6-4}y^{5-11}$

$= \frac{2}{5}x^2y^{-6}$

$= \frac{2x^2}{5y^6}$

83) $\frac{x^2 - 14x + 45}{x^2 - 7x + 10} \div (x^2 - 11x + 18)$

A) $\frac{1}{(x+2)^2}$ (B) $\frac{1}{(x-2)^2}$

C) $(x+2)^2$ D) $(x-9)^2$

$\frac{x^2-14x+45}{x^2-7x+10} \div (x^2-11x+18)$

$= \frac{(x-5)(x-9)}{(x-5)(x-2)} \cdot \frac{1}{(x-9)(x-2)}$

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

Solve.

84) A shopkeeper ordered a total of 56 lb of cashews and peanuts. If he ordered 24 less pounds of cashews than peanuts, then how many pounds of peanuts did he order?

A) 28 lb (B) 40 lb

C) 16 lb D) 32 lb

# of pounds of peanuts: x

# of pounds of cashews: $x-24$

$x + (x-24) = 56$

$2x - 24 = 56$

$2x = 56 + 24$

$2x = 80$

$x = 40$

Hence, 40 lbs of peanuts are ordered.

85) A contractor finds that it takes Julie 9 hours to construct a wall of a certain size. It takes Leann 8 hours to construct the same wall. How long would it take if they worked together?

A) 1 hr B) 17 hr

C) $\frac{17}{72}$ hr (D) $4\frac{4}{17}$ hr

Let x be the time worked together

$\frac{1}{9}x + \frac{1}{8}x = 1$

$72(\frac{1}{9}x + \frac{1}{8}x) = 72 \cdot 1$

$8x + 9x = 72$

$17x = 72$

$x = \frac{72}{17}$

$x = 4\frac{4}{17}$

So, it take $4\frac{4}{17}$ hours.

Solve. If no solution exists, state this.

86) $\frac{x}{x+4} - \frac{4}{x-4} = \frac{x^2+16}{x^2-16}$

A) -4 B) $-4, 4$

(C) No solution D) 4

$\frac{x}{x+4} - \frac{4}{x-4} = \frac{x^2+16}{x^2-16}$

$\frac{x}{x+4} - \frac{4}{x-4} = \frac{x^2+16}{(x+4)(x-4)}$

$(x+4)(x-4)\left[\frac{x}{x+4} - \frac{4}{x-4}\right] = (x+4)(x-4) \cdot \left[\frac{x^2+16}{(x+4)(x-4)}\right]$

$x(x-4) - 4(x+4) = x^2 + 16$

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

$-8x - 16 = 16$

$-8x = 32$

$x = \frac{32}{-8}$

$x = -4$

Check

When $x = -4$, the equation is undefined

Hence, No solution.

Solve:

87) $\frac{1}{y+4} - \frac{4}{y-4} = \frac{4}{y^2-16}$

A) 24 B) 8 C) 16 (D) -8

$\frac{1}{y+4} - \frac{4}{y-4} = \frac{4}{(y-4)(y+4)}$, $x \neq 4, x \neq -4$.

$(y+4)(y-4)\left[\frac{1}{y+4} - \frac{4}{y-4}\right] = (y+4)(y-4)\left[\frac{4}{(y-4)(y+4)}\right]$

$y - 4 - 4(y+4) = 4$

$y - 4 - 4y - 16 = 4$

$-3y - 20 = 4$

$-3y = 4 + 20$

$-3y = 24$

$y = -8$.

Check. ok

Solution: $\{-8\}$.

Solve: 88) $\frac{3}{x} = 7 + \frac{2}{x}$

(A) $\frac{1}{7}$ B) $\frac{7}{5}$ C) 7 D) $\frac{1}{5}$

$\frac{3}{x} = 7 + \frac{2}{x}$ LCD. x,

$\Rightarrow x \neq 0$

$x\left(\frac{3}{x}\right) = x\left(7 + \frac{2}{x}\right)$

$3 = 7x + 2$

$3 - 2 = 7x$

$1 = 7x$

$\frac{1}{7} = x$

Check. $x = \frac{1}{7}$. ok

Solution: $\left\{\frac{1}{7}\right\}$

Determine whether the pair of equations represents perpendicular lines.

89) $y + 13 = -4x$

$5y = 30x - 1$

A) Yes (B) No

$y + 13 = -4x$

$y = -4x - 13$

$m_1 = -4$

$5y = 30x - 1$

$y = 6x - \frac{1}{5}$

$m_2 = 6$

$m_1 \cdot m_2 \neq -1$

or they are not negative reciprocal of each other, so the lines are not perpendicular lines.

Evaluate the polynomial.

90) $2x^3 - 6x^2 - x + 14$ for $x = -2$

(A) -24 B) -34

C) 12 D) -36

$2x^3 - 6x^2 - x + 14$

$= 2(-2)^3 - 6(-2)^2 - (-2) + 14$

$= 2(-8) - 6(4) + 2 + 14$

$= -16 - 24 + 2 + 14$

$= -24$

Find an equation in point-slope form of the line having the specified slope and containing the point indicated.

91) $m = \frac{-1}{2}$; $(-6, -3)$

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

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

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

D) $y - 3 = \frac{-1}{2}(x - 6)$

$m = -\frac{1}{2}$, point $(-6, -3)$

$y - y_1 = m(x - x_1)$

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

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