

Semester 1 Final REVIEW

evaluate each using the values given.

1) $z + y^2$; use $y = -3$, and $z = -4$

$(-4) + (-3)^2 \rightarrow -4 + 9 \rightarrow \boxed{5}$

3) $(p + p) \div m$; use $m = \frac{1}{2}$, and $p = 2$

$(2+2) \div \frac{1}{2} \rightarrow 4 \div \frac{1}{2}$
 $4 \cdot \frac{2}{1} \rightarrow \boxed{8}$

2) $(x - z) \div 3$; use $x = 5$, and $z = -4$

$(5 + (-4)) \div 3 \rightarrow 9 \div 3 = \boxed{3}$

4) $|q| - p^2$; use $p = 5$, and $q = -3$

$| -3 | - (5)^2 \rightarrow 3 - 25 \rightarrow \boxed{-22}$

Simplify each problem to an equivalent expression.

5) $5k - 8(5k + 8)$

$5k - 40k - 64$
 $\boxed{-35k - 64}$

6) $-5(6 + 7x) - 5(x + 1)$

$-30 - 35x - 5x - 5$
 $\boxed{-40x - 35}$

7) $-4 - 9(10a - 6)$

$-4 - 90a + 54$
 $\boxed{-90a + 50}$

8) $-10 + n - (-9 - 7n)$

$-10 + n + 9 + 7n$
 $\boxed{8n - 1}$

olve for the solution of each equation.

9) $-\frac{7}{10} - \frac{17}{10} = x$

$-\frac{24}{10} = x$
 $\frac{10}{10} = -x$
 $\boxed{-1 = x}$

10) $\frac{9}{2} = \frac{m}{6}$

$-\frac{54}{2} = m$
 $\boxed{m = -27}$

11) $\frac{2}{3}(3 + 4n) = 18$

$\frac{2}{3} + \frac{8}{3}n = 18$
 $\frac{8}{3}n = 16 \cdot \frac{3}{8}$
 $n = \frac{48}{8}$
 $\boxed{n = 6}$

12) $-7.2x + 4.9x = 1.15$

$-2.3x = 1.15$
 $x = -0.5$
 $\boxed{x = -0.5}$

13) $-3.9x + 3.9x = 0$

$0 = 0$

$\boxed{\text{infinite solutions}}$

14) $9 + 7n + 4 + 4n = 8n - 2$

$11n + 13 = 8n - 2$
 $3n + 13 = -2$
 $3n = -15$
 $n = -5$
 $\boxed{n = -5}$

15) $7n + 5 = -1 + 7n$

$5 = -1$

$\boxed{\text{No solution}}$

16) $4 - 6(6 + 7k) = -32 + 3k$

$4 - 36 - 42k = -32 + 3k$
 $-32 - 42k = -32 + 3k$
 $-42k = 3k$
 $0 = 45k$
 $0 = k$
 $\boxed{0 = k}$

$$17) \begin{array}{r} 8n - 40 \\ -8n \\ \hline -40 \\ +5 \\ \hline -35 \\ \hline -7n \\ \hline -35 \\ \hline 7n \\ \hline n = -5 \end{array}$$

$$19) \frac{(n-6)}{(n+4)} = \frac{8}{2}$$

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

$$2n-12 = 8n+32$$

$$-2n \quad -2n$$

$$-12 = 6n+32$$

$$-32 \quad -32$$

$$\frac{-44}{6} = \frac{6n}{6}$$

$$\frac{-22}{3} = n$$

$$21) |n| - 6 = 1$$

$$+6 \quad +6$$

$$|n| = 7$$

$$n = 7 \quad n = -7$$

$$23) |8x+5| = 35$$

$$8x+5 = 35$$

$$-5 \quad -5$$

$$8x = 30$$

$$\frac{8x}{8} = \frac{30}{8}$$

$$x = 15/4$$

$$8x+5 = -35$$

$$-5 \quad -5$$

$$8x = -40$$

$$\frac{8x}{8} = \frac{-40}{8}$$

$$x = -5$$

Solve each equation for the indicated variable.

$$25) \frac{x}{k} = \frac{w-v}{k}$$

$$x = \frac{w-v}{k}$$

$$27) g = 16 - 12a - b, \text{ for } a$$

$$-16 \quad -16$$

$$g-16 = -12a - b$$

$$+b \quad +b$$

$$g-16+b = -12a$$

$$\frac{g-16+b}{-12} = \frac{-12a}{-12}$$

$$\frac{g+b-16}{-12} = a$$

$$18) \frac{r+8}{6} = \frac{r-6}{9}$$

$$6(r-6) = 9(r+8)$$

$$6r-36 = 9r+72$$

$$-6r \quad -6r$$

$$-36 = 3r+72$$

$$-72 \quad -72$$

$$-108 = 3r$$

$$\frac{-108}{3} = \frac{3r}{3}$$

$$-36 = r$$

$$20) \frac{5}{8} = \frac{n-2}{n}$$

$$5n = 8(n-2)$$

$$5n = 8n-16$$

$$-8n \quad -8n$$

$$-3n = -16$$

$$\frac{-3n}{-3} = \frac{-16}{-3}$$

$$n = 16/3$$

$$22) |x-7| - 7 = -6$$

$$+7 \quad +7$$

$$|x-7| = 1$$

$$x-7 = 1$$

$$+7 \quad +7$$

$$x = 8$$

$$x-7 = -1$$

$$+7 \quad +7$$

$$x = 6$$

$$24) 7|10+n| - 2 = 40$$

$$+2 \quad +2$$

$$7|10+n| = 42$$

$$\frac{7|10+n|}{7} = \frac{42}{7}$$

$$|10+n| = 6$$

$$10+n = 6$$

$$-10 \quad -10$$

$$n = -4$$

$$10+n = -6$$

$$-10 \quad -10$$

$$n = -16$$

$$26) u = \frac{a}{k} + \frac{k}{b} - b, \text{ for } a$$

$$-k \quad -k$$

$$u-k = \frac{a}{k} - b$$

$$+b \quad +b$$

$$u-k+b = \frac{a}{k}$$

$$k(u-k+b) = a$$

$$28) u = \frac{15x}{2y}, \text{ for } x$$

$$\frac{2yu}{15} = \frac{15x}{15}$$

$$\frac{2yu}{15} = x$$

Write a proportion for the given scenario and solve.

$$29) \text{ Randy can mow the lawn of 4 houses in 50 minutes. At this rate, how many lawns can he mow in 20 minutes?}$$

$$\frac{4 \text{ lawns}}{50 \text{ min}} = \frac{x}{20}$$

$$50x = 80$$

$$\frac{50x}{50} = \frac{80}{50}$$

$$x = 1.6 \text{ lawns}$$

$$30) \text{ Jeremy can read 10 pages of a book in 25 minutes. How many pages can he read in 45 minutes?}$$

$$\frac{10 \text{ pages}}{25 \text{ min}} = \frac{x}{45}$$

$$25x = 450$$

$$\frac{25x}{25} = \frac{450}{25}$$

$$x = 18 \text{ pages}$$

31) Carly can drive 35 miles in 45 minutes. At this rate, how far can she drive in 2 hours?

$$\frac{35}{45} = \frac{x}{120}$$

$$45x = 4200$$

$$x = 93.3 \text{ miles}$$

32) Jenny can bake 55 cupcakes in 1 hour. How many can she bake in 40 minutes?

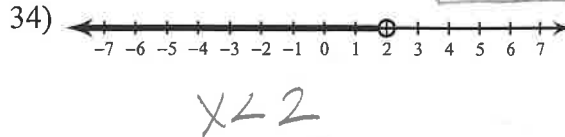
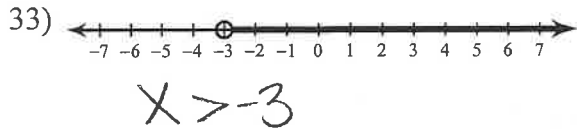
$$\frac{55}{60} = \frac{x}{40}$$

$$60x = 2200$$

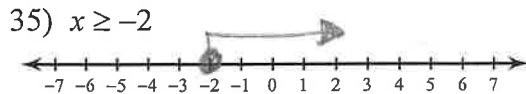
$$x = 36.6$$

about 37 cupcakes

Write an inequality for each graph.

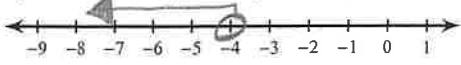


Draw a graph for each inequality.



Solve each inequality and graph its solution.

37) $-133 > 7(1 + 5x)$

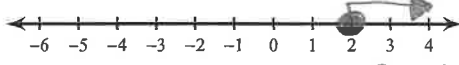


$$-133 > 7 + 35x$$

$$\frac{-140}{35} > \frac{35x}{35}$$

$$-4 > x$$

38) $-40 - 8r \leq -6(r + 8) + 4$



$$-40 - 8r \leq -6r - 48 + 4$$

$$-40 - 8r \leq -6r - 44$$


$$-8r \leq -6r - 4$$

$$-2r \leq \frac{-4}{-2}$$

*sign flip

$$r \geq 2$$

39) $n + 4.5 > 16.4 + 8n$



$$n + 4.5 > 16.4 + 8n$$

$$-4.5 \quad -4.5$$

$$n > 11.9 + 8n$$

$$-8n \quad -8n$$


$$-7n > 11.9$$

*sign flip

$$\frac{-7n}{-7} > \frac{11.9}{-7}$$

$$n < -1.7$$

40) $6.5n + 3.02 < 14.98 + 0.52n$



$$6.5n + 3.02 < 14.98 + 0.52n$$

$$-0.52n \quad -0.52n$$

$$5.98n + 3.02 < 14.98$$

$$-3.02 \quad -3.02$$

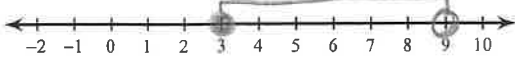
$$5.98n < 11.96$$

$$\frac{5.98n}{5.98} < \frac{11.96}{5.98}$$

$$n < 2$$

Solve each compound inequality and graph its solution.

41) $0 \leq 2x - 6 < 12$



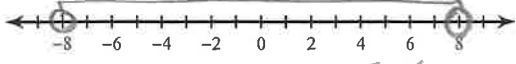
$$0 \leq 2x - 6 < 12$$

$$\frac{+6}{+6} \quad \frac{+6}{+6} \quad \frac{+6}{+6}$$

$$\frac{6}{2} \leq \frac{2x}{2} < \frac{18}{2}$$

$$3 \leq x < 9$$

42) $-41 < 7 + 6x < 55$



$$-41 < 7 + 6x < 55$$

$$\frac{-7}{-7} \quad \frac{-7}{-7} \quad \frac{-7}{-7}$$

$$\frac{-48}{6} < \frac{6x}{6} < \frac{48}{6}$$

$$-8 < x < 8$$

43) How do you know if something is a function?

- a function means for every x-value, there is only 1 y-value
 * x doesn't repeat on a table
 * vertical line test on a graph

44) Make a table of ordered pairs that represents a function. Then make one that does NOT represent a function.

Function

x	y
2	3
4	2
6	3

Not a function

x	y
1	4
2	5
1	6

45) If $f(x) = -3x + 2$, what is $f(-1)$?

$f(-1) = -3(-1) + 2$
 $f(-1) = 5$

46) If $f(x) = 8 + 0.5x$, what is $f(50)$?

$f(50) = 8 + 0.5(50)$
 $f(50) = 8 + 25$
 $f(50) = 33$

47) The equation represents the height of water in a bucket that is slowly draining.

$H = -2t + 10$

- a) What is the independent variable? t
- b) What is the dependent variable? H
- c) What does the number 10 represent? starting height of water
- d) What does the number -2 represent? how fast the water drains over time

48) The equation represents the speed of a car as it goes down a steep hill

$f(t) = 4t + 50$

- a) What is the independent variable? t
- b) What is the dependent variable? $f(t)$ speed
- c) What does the number 50 represent? original speed
- d) What does the number 4 represent? how quick the speed increases over time

Write an equation to represent the situation.

49) Jenny must pay \$5 for parking at the fair, and must pay \$1 for every game she plays. Write an equation to represent how much she will pay.

$C = \text{cost}$
 $g = \text{games}$
 $C(g) = 5 + 1g$

50) A group of kids are going to the bowling alley, and each pair of shoes costs \$3 to rent. They have a \$9 coupon. Write an equation to represent what they will pay.

$C = \text{cost}$
 $r = \text{shoes}$
 $C(r) = 3r - 9$

Find the slope of the line through each pair of points.

51) $(11, -17), (-16, -17)$

$\frac{-17 - (-17)}{-16 - 11} = \frac{0}{-27} = 0$

$\frac{y_2 - y_1}{x_2 - x_1}$

52) $(10, -19), (17, -17)$

$\frac{-17 - (-19)}{17 - 10} = \frac{2}{7}$

Find the slope of a line parallel to each given line.

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

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

54) $y = \frac{10}{3}x - 5$

$m = \frac{10}{3}$

Find the slope of a line perpendicular to each given line.

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

opposite sign flipped fraction
 $m = -\frac{5}{4}$

56) $y = 3x + 2$

$m = -\frac{1}{2}$

Write the slope-intercept form of the equation of the line through the given point with the given slope.

57) through: $(1, -2)$, slope = -2

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

$$y - (-2) = -2(x - 1)$$

$$y + 2 = -2(x - 1)$$

$$y + 2 = -2x + 2$$

$$y = -2x$$

58) through: $(-2, -1)$, slope = $-\frac{3}{2}$

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

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

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

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

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

Write the slope-intercept form of the equation of the line through the given points.

59) through: $(0, 4)$ and $(4, 3)$

Slope

$$\frac{3-4}{4-0} = -\frac{1}{4}$$

$$y - 4 = -\frac{1}{4}(x - 0)$$

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

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

60) through: $(4, 5)$ and $(2, -3)$

Slope

$$\frac{-3-5}{2-4} = \frac{-8}{-2} = 4$$

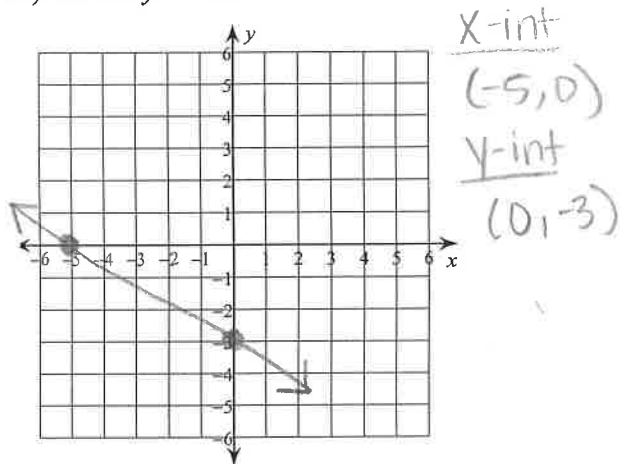
$$y - 5 = 4(x - 4)$$

$$y - 5 = 4x - 16$$

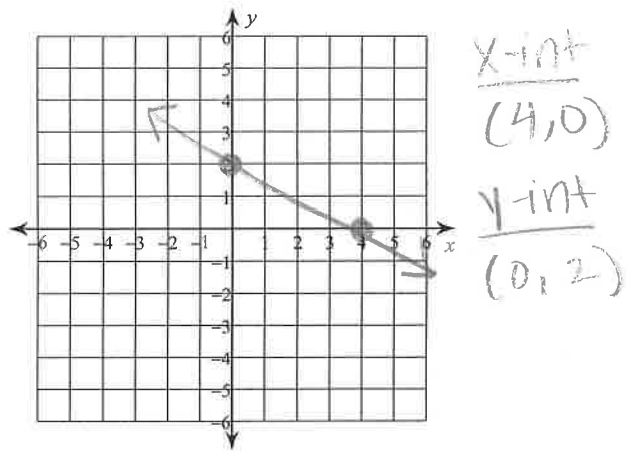
$$y = 4x - 11$$

Sketch the graph of each line.

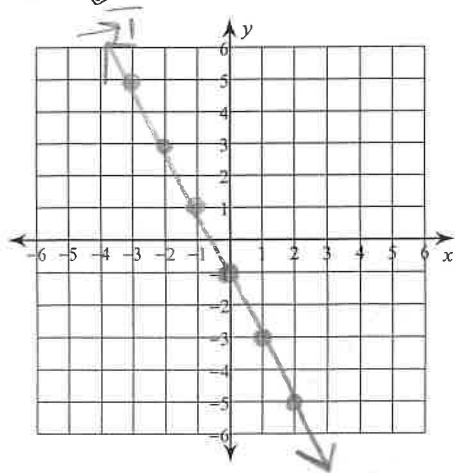
61) $3x + 5y = -15$



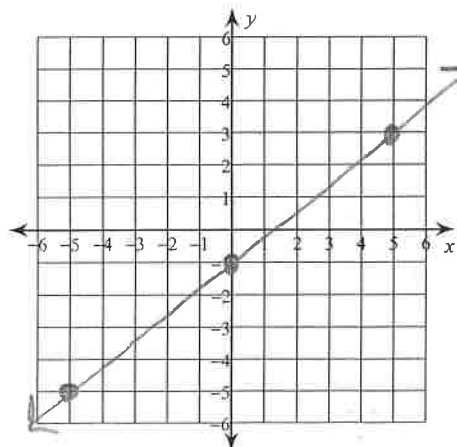
62) $x + 2y = 4$



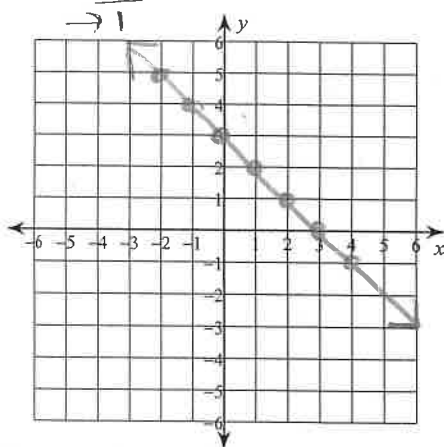
63) $y = -2x - 1$



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



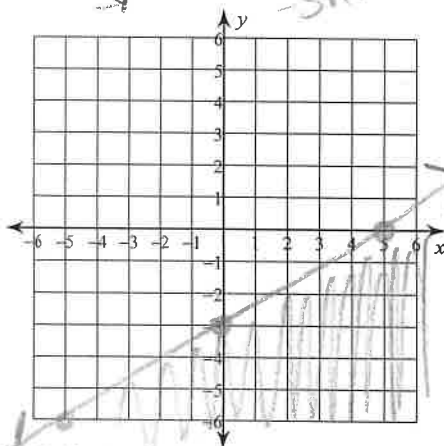
65) $y = -x + 3$



Sketch the graph of each linear inequality.

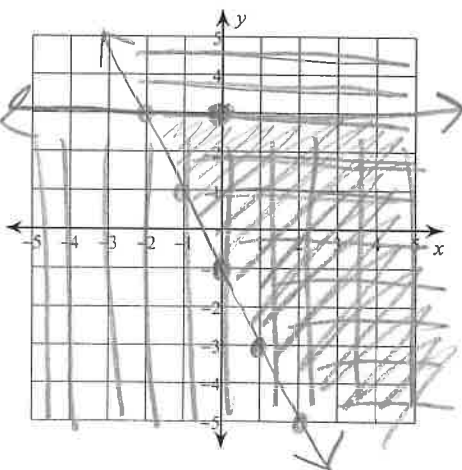
67) $y \leq \frac{3}{5}x - 3$

*solid
shade below*



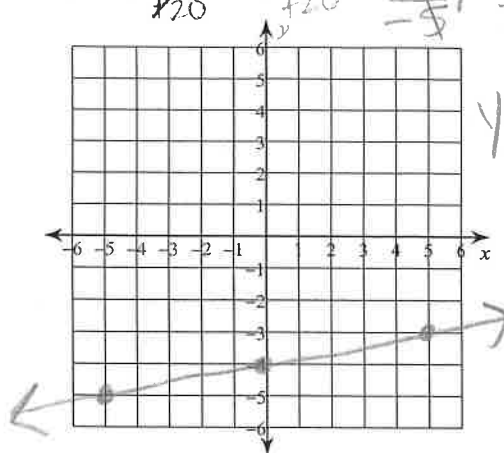
Sketch the solution to each system of inequalities.

69) $y \geq -2x - 1$
 $y \leq 3$



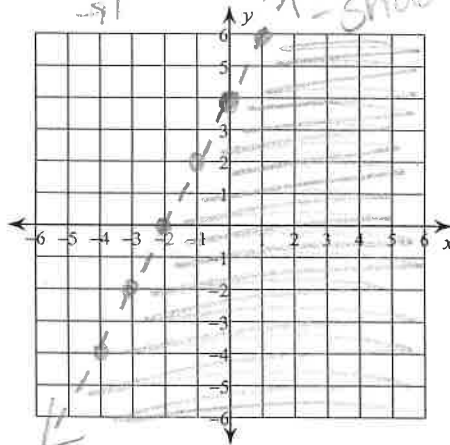
66) $-5y - 20 = -x$

$\frac{-5y}{-5} = \frac{-x + 20}{-5}$
 $y = \frac{1}{5}x - 4$

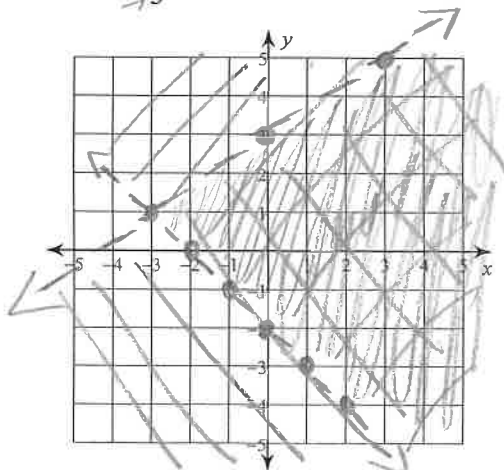


68) $y < 2x + 4$

*dotted
shade below*

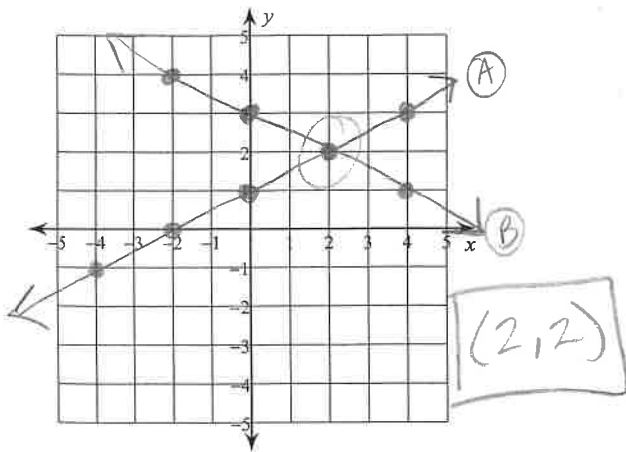


70) $y \geq -x - 2$
 $y < \frac{1}{3}x + 3$

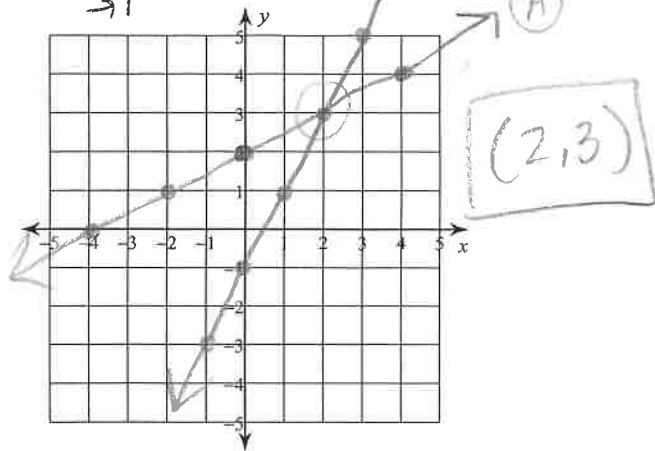


Solve each system by graphing.

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



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



Solve each system by substitution.

73) $y = x + 1$
 $-5x + 8y = 5$
 $-5x + 8(x + 1) = 5$
 $-5x + 8x + 8 = 5$
 $3x + 8 = 5$
 $3x = -3$
 $x = -1$
 $y = (-1) + 1$
 $y = 0$
 $(-1, 0)$

74) $-8x - y = -23$
 $3x + y = 8$
 $-8x - (-3x + 8) = -23$
 $-8x + 3x - 8 = -23$
 $-5x - 8 = -23$
 $-5x = -15$
 $x = 3$
 $3(3) + y = 8$
 $9 + y = 8$
 $y = -1$
 $(3, -1)$

Solve each system by elimination.

75) $-7x + 9y = -6$
 $7(x - 2y) = 21$
 $-7x + 9y = -6$
 $+ 7x - 14y = 21$
 $-5y = 15$
 $y = -3$
 $x - 2(-3) = 3$
 $x + 6 = 3$
 $x = -3$
 $(-3, -3)$

76) $4x - 2y = 4$
 $2(10x + 3y) = 26$
 $12x - 6y = 12$
 $+ 20x + 6y = 26$
 $32x = 38$
 $x = 2$
 $4(2) - 2y = 4$
 $8 - 2y = 4$
 $-2y = -4$
 $y = 2$
 $(2, 2)$

77) Beth's school is selling tickets to a spring musical. On the first day of ticket sales the school sold 9 adult tickets and 7 student tickets for a total of \$75. The school took in \$102 on the second day by selling 10 adult tickets and 14 student tickets. Find the price of an adult ticket and the price of a student ticket.

$x = \text{adult}$
 $y = \text{child}$
 $9x + 7y = 75$
 $10x + 14y = 102$
 $-2(9x + 7y = 75) \rightarrow -18x - 14y = -150$
 $+ 10x + 14y = 102$
 $-8x = -48$
 $x = 6$
 $9(6) + 7y = 75$
 $54 + 7y = 75$
 $7y = 21$
 $y = 3$

An adult ticket costs \$6 and a child ticket costs \$3.

- 78) Shayna and Gabriella each improved their yards by planting rose bushes and ornamental grass. They bought their supplies from the same store. Shayna spent \$108 on 9 rose bushes and 12 bunches of ornamental grass. Gabriella spent \$42 on 3 rose bushes and 6 bunches of ornamental grass. What is the cost of one rose bush and the cost of one bunch of ornamental grass?

x - roses
y - grass

$$\begin{aligned} 9x + 12y &= 108 \\ -3(3x + 6y &= 42) \end{aligned}$$

$$\begin{aligned} 9x + 12y &= 108 \\ -9x - 18y &= -126 \\ \hline -6y &= -18 \\ \hline y &= 3 \end{aligned}$$

$$\begin{aligned} 3x + 6y &= 42 \\ 3x + 18 &= 42 \\ -18 & -18 \\ \hline 3x &= 24 \\ \hline x &= 8 \end{aligned}$$

A rose bush costs \$8 and bunches of grass cost \$3.

Simplify. Your answer should contain only positive exponents.

79) $\frac{3^2 \cdot 3^3}{3^1} = \frac{3^5}{3^1} = 3^4 = \boxed{81}$

80) $\frac{2^3}{2^0 \cdot 2^0} = 2^3 = \boxed{8}$

81) $\frac{4yx^4 \cdot 2x^2y^{-1}}{1} = \frac{8yx^6}{y} = \boxed{8x^6}$

82) $\frac{v^{-3} \cdot u^{-3} \cdot v^{-4}}{v^3 u^3 v^4} = \frac{1}{u^3 v^7} = \boxed{\frac{1}{u^3 v^7}}$

83) $\frac{(m^3 n^{-4})^2}{1} = \frac{m^6 n^{-8}}{1} = \boxed{\frac{m^6}{n^8}}$

84) $(3y^0)^{-1} = \frac{1}{3^1} = \boxed{\frac{1}{3}}$

85) $(3a^2)^2 = 3^2 a^4 = \boxed{9a^4}$

86) $\frac{(2x^0)^4}{2y^{-3}} = \frac{2^4}{2^1 y^{-3}} = \frac{2^3 y^3}{1} = \boxed{8y^3}$

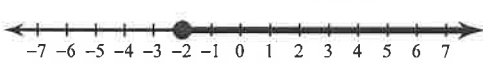

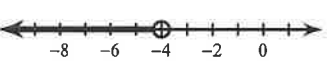
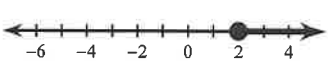
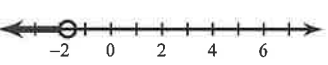
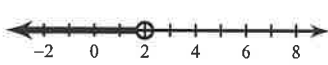


87) $\frac{(x^4 y^{-1})^3}{x^{-1} y^{-4}} = \frac{x^{12} y^{-3}}{x^{-1} y^{-4}} = \frac{x^{13} y^1}{y^3} = \boxed{x^{13} y}$

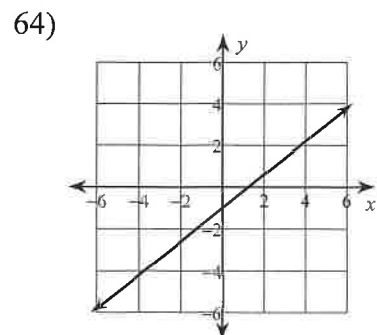
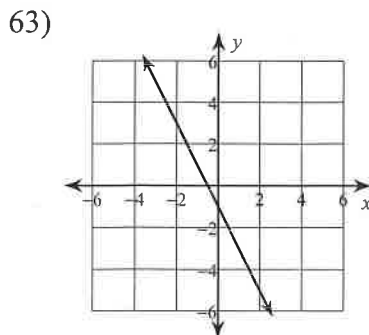
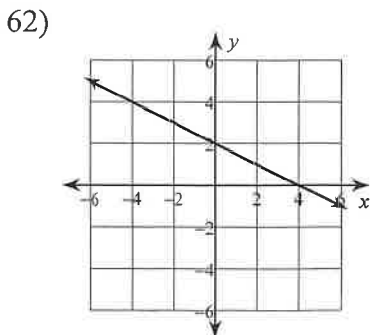
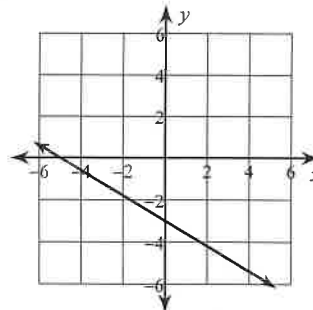
88) $\frac{2xy^4 \cdot x^4}{(xy^{-3})^{-1}} = \frac{2x^5 y^4}{x^{-1} y^3} = \frac{2x^5 y^4}{y^3} x^1 = \boxed{2x^6 y}$

89) $\left(\frac{x^2 y^{-3} \cdot 2y^{-1}}{x^{-3}}\right)^{-2} = \left(\frac{x^5 y^{-4} \cdot 2}{x^{-3}}\right)^{-2} = \left(x^8 y^{-1} \cdot 2\right)^{-2} = \frac{1}{2^2 x^{16} y^2} = \boxed{\frac{1}{4x^{16} y^2}}$

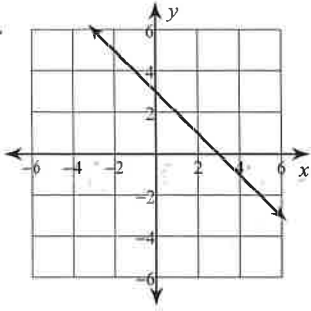
90) $\left(\frac{x^4 \cdot x}{xy^4}\right)^{-2} = \left(\frac{x^5}{xy^4}\right)^{-2} = \frac{x^{-8}}{y^{-8}} = \boxed{\frac{y^8}{x^8}}$

Answers to Semester 1 Final REVIEW

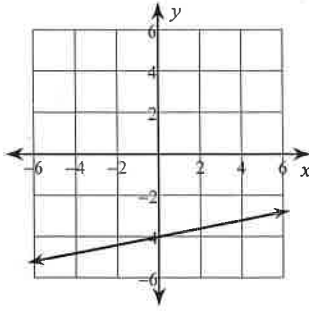
- | | | | |
|--|---------------------------|---|---------------------------------------|
| 1) 5 | 2) 3 | 3) 8 | 4) -22 |
| 5) $-35k - 64$ | 6) $-35 - 40x$ | 7) $50 - 90a$ | 8) $8n - 1$ |
| 9) $\{-1\}$ | 10) $\{-27\}$ | 11) $\{6\}$ | 12) $\{-0.5\}$ |
| 13) $\{\text{All real numbers.}\}$ | 14) $\{-5\}$ | 15) No solution. | |
| 16) $\{0\}$ | 17) $\{-5\}$ | 18) $\{-36\}$ | 19) $\left\{-\frac{22}{3}\right\}$ |
| 20) $\{5.33\}$ | 21) $\{7, -7\}$ | 22) $\{1, -1\}$ | 23) $\left\{\frac{15}{4}, -5\right\}$ |
| 24) $\{-4, -16\}$ | 25) $x = \frac{w - v}{k}$ | 26) $a = u - k + b$ | 27) $a = \frac{-g + 16 - b}{12}$ |
| 28) $x = \frac{2uy}{15}$ | 29) | 30) | 31) |
| 32) | 33) $k > -3$ | 34) $x < 2$ | |
| 35)  | | 36)  | |
| 37) $x < -4$:  | | 38) $r \geq 2$:  | |
| 39) $n < -1.7$:  | | 40) $n < 2$:  | |
| 41) $3 \leq x < 9$:  | | | |
| 42) $-8 < x < 8$:  | | | |
| 43) | 44) | 45) 5 | 46) 32 |
| 47) | 48) | 49) | 50) |
| 51) 0 | 52) $\frac{2}{7}$ | 53) $-\frac{2}{3}$ | 54) $\frac{10}{3}$ |
| 55) $-\frac{5}{4}$ | 56) $-\frac{1}{2}$ | 57) $y = -2x$ | 58) $y = -\frac{3}{2}x - 4$ |
| 59) $y = -\frac{1}{4}x + 4$ | 60) $y = 4x - 11$ | 61) | |



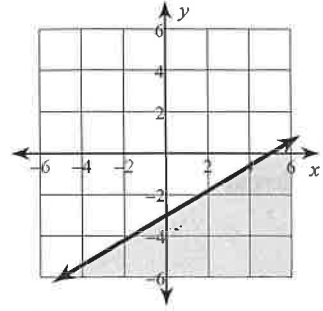
65)



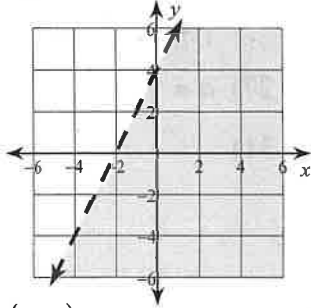
66)



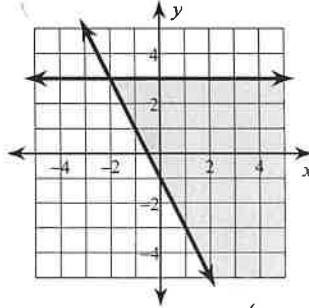
67)



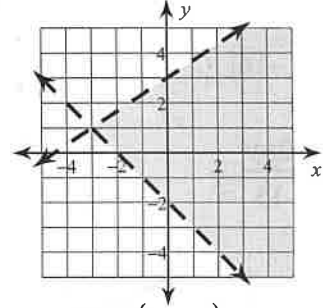
68)



69)



70)



71) $(2, 2)$

72) $(2, 3)$

73) $(-1, 0)$

74) $(3, -1)$

75) $(-3, -3)$

76) $(2, 2)$

77) adult ticket: \$6, student ticket: \$3

78) rose bush: \$8, bunch of ornamental grass: \$3

79) 3^4

80) 2^3

81) $8x^6$

82) $\frac{1}{v^7 u^3}$

83) $\frac{m^6}{n^8}$

84) $\frac{1}{3}$

85) $9a^4$

86) $8y^3$

87) $x^{13}y$

88) $2x^6y$

89) $\frac{y^8}{4x^{10}}$

90) $\frac{y^8}{x^8}$