SUMMIT MATH

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ALGEBRA 1

second edition

Books 1-7 REVIEW

CONTENTS

Pre-Algebra Review

ADDITION, SUBTRACTION, MULTIPLICATION & DIVISION

Before you review Book 1, try a few scenarios that involve the operations of addition, subtraction, multiplication, and division.

1. Without a calculator, which expression is larger?

   Expression #1: $77 + 14$ Expression #2: $113 - 22$

2. Without a calculator, which expression is larger? Support your choice with calculations.

   Expression #1: $\dfrac{2}{3} + \dfrac{5}{4}$ Expression #2: $\dfrac{5}{2} - \dfrac{3}{5}$

3. Without a calculator, which expression is larger? Support your choice with calculations.

   Expression #1: $\dfrac{2}{3} \cdot \dfrac{6}{7}$ Expression #2: $\dfrac{3}{15} \div \dfrac{2}{5}$

4. Some equations can be solved using one step, or one operation. Consider the equations below. Describe the <u>one operation</u> you can perform to solve each equation. Do not solve the equation.

a. $x - 0.5 = 7.8$

b. $\dfrac{x}{3} = 1.5$

c. $\dfrac{2}{3}x = 8$

5. In each equation in the previous scenario, is the value of x bigger or smaller than the number on the right side of the equation? Do not solve the equation to answer this. Instead, make a logical guess.

6. Solve each equation in the previous scenario.

7. Solve each equation.

a. $0.4a + a = 28$

b. $4 - \dfrac{1}{3}b = 9$

8. Solve each equation.
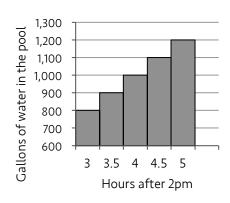
a. $-4x + 5 = 17 - 2x$

b. $\dfrac{60 + 45 + c}{3} = 40$

In Book 1, you learned how to calculate percent changes and how to write and solve equations to represent percentage scenarios.

9. Without a calculator, which expression has a larger value? Explain your choice with words.

   Expression #1: 49% of 4   Expression #2: 26% of 8

10. Write and solve an equation to answer each question.

    a. What number is 75% of 32?   b. 18% of 910 is what number?

11. Write and solve an equation to answer each question.

    a. 40% of what number is 20?   b. 113 is 3.1% of what number?

12. Write and solve an equation to answer each question.

    a. 30 is what percent of 50?   b. What percent of 16 is 54?

13. On Monday, 90 students were sick and had to stay home from school. On Tuesday, 135 students were sick. By what percent did the number of sick students increase from Monday to Tuesday?

14. The whale population dropped from 315,000 to 290,000. By what percent did the whale population change?

15. The value of a savings account was $1,000 on Tuesday. The value of the account decreased by 5% from Tuesday to Wednesday. What was the value of the account on Wednesday?

16. You have some of your money in a bank account. After the bank realizes it made a mistake, it increases your account by 5%. Your account is now worth $1,000. How much money was in your account before the bank realized it made a mistake?

17. The population of a small town decreases by 10% in one year to 9,000 people.

    a. How many people were in the town before the decrease?

    b. A common response is to increase 9000 by 10% to find the population last year. Why does this not calculate the original population?

18. The final bill for a new TV is $638.40 after tax is calculated. If the sales tax is 6.4%, what was the original cost of the TV?
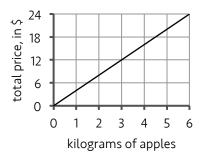
At the end of Book 1, you learned about rates.

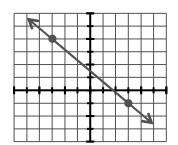19. What rate can be calculated in the chart shown?

20. The pool in the previous scenario is being filled with water. How much water was in the pool at 2pm?

21. In the previous scenario, how much water will be in the pool at 9pm?

22. In October, a Monarch butterfly begins its southward migration to Mexico. After 8 days of flying, the butterfly is spotted 1200 miles away from its eventual destination. After 12 days of flying, the butterfly is 900 miles away from its destination.

    a. How far will the Monarch have traveled by the time it reaches its destination?

    b. How many total days will it take for the Monarch to arrive at its destination in Mexico?

23. Suppose $T = 18 - 2A$.

    a. What is the value of T if $A = 9$?   b. What is the value of A if $T = 11$?

Book 2
LINEAR EQUATIONS & INEQUALITIES

24. The Smith family owns an apple orchard and they sell their apples. The cost of the apples depends on the total weight of the apples.

    a. What is the rate shown in the graph? Identify the numerical value of the rate and express the rate using proper units.

    b. Write an equation that shows the total price, *P*, if someone buys *k* kilograms of apples.

25. The rate in the previous graph can be found by calculating the <u>slope</u> of the line. Determine the slope of the line shown to the right.
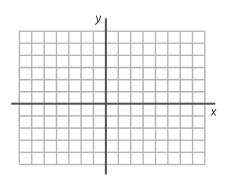
26. The slope in the previous scenario can be measured by using the graph. Sometimes, you will not have a graph. Suppose a line passes through the points $(-25, 11)$ and $(-10, 6)$. Without graphing these points, what is the slope of this line?

27. Graph the lines on the same Cartesian Plane.

   a. $y = \dfrac{3}{4}x - 2$
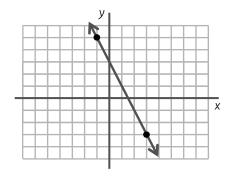
   b. $y = -\dfrac{4}{3}x + 3$

   c. Describe what you notice when you look at the way that these lines appear on the graph.
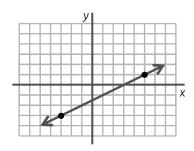
28. In the previous scenario, the two lines are exactly perpendicular. Why does this occur?

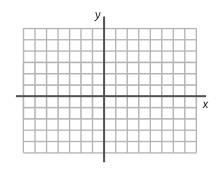29. Consider the line shown in the graph. Identify the equation of this line.

30. If a point is located on a line, it "satisfies" the equation of that line. In the previous scenario, the equation of the line is $y = -2x + 3$. Do any of the points below satisfy the equation?

   a. (2, –1)

   b. (–1, 4)

   c. (15, –28)

31. Identify the *y*-intercept of the line shown.

32. A line has a slope of $-\dfrac{2}{5}$. It passes through the point $(10,8)$. What is the y-intercept of the line?

33. Consider the ordered pairs $(-5, 1)$ and $(5, -3)$. Determine the equation of the line that passes through the given ordered pairs and then graph the line.

34. What is the equation of the line that passes through the points $(-1, -4)$ and $(-6, 11)$?
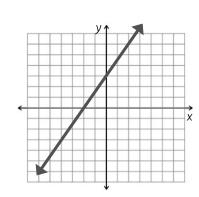
35. If an ordered pair has an x-value of 0, where will that point be located on the Cartesian plane?

36. If an ordered pair has a y-value of 0, where will it be located on the Cartesian plane?
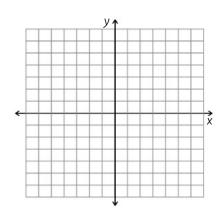
37. Consider the graph shown to the right.

    a. Identify the x-intercept of the line shown to the right.

    b. Identify the y-intercept of the line shown to the right.
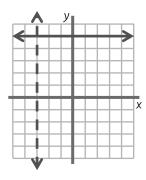
38. Consider the equation $2x + 5y = -10$.

    a. Find the coordinates of the x- and y-intercepts of the equation.

    b. Find the coordinates of one more point on the line and then graph the line.

39. Two lines are shown on the Cartesian Plane to the right.

    a. What is the slope of the dashed line?

    b. What is the slope of the solid line?

Book 3
PROPERTIES OF EXPONENTS

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40. Simplify each expression as much as you can.

     a. $\left(-10\right)^3$ b. $5-1\left(-3\right)^3$ c. $\left(7^2-5\cdot9\right)^2\div\left(-1\right)^9$

41. Simplify each expression as much as you can.

     a. $11-5\left(-2\right)^3$ b. $4^2-\left(3^2-1\right)^2\div\left(-2\right)^5$

42. Simplify each expression as much as you can.

     a. $x\cdot x^3\cdot x^5$ b. $\dfrac{y^{70}}{y^{10}}$ c. $x+x$

43. Simplify each expression as much as you can, using only positive exponents in your answer.

   a. $2x \cdot 3x^2$

   b. x^{-2}

   c. $\dfrac{2x^{-4}}{3y^{-1}}$

44. Simplify each expression as much as you can.

   a. $-2y^4 \cdot 3y^2 \cdot y$

   b. $2^4 \cdot 2^2$

   c. $\dfrac{9x^2y^4}{15x^3y}$

45. Simplify each expression as much as you can.

   a. $\left(\dfrac{-2y^2}{x^3}\right)^3$

   b. $\left(x^2\right)^3 + \left(x^3\right)^2$

   c. $-3\left(-y\right)^2 \cdot \left(-2y\right)^3$

46. Rewrite each expression using only positive exponents.

   a. $3x^{-2}$

   b. $3^{-2}x^3$

   c. $\left(\dfrac{1}{2}\right)^{-1}$

47. Rewrite each expression using only positive exponents.

a. $y^0 + x^0 + 3w^0$

b. $\left(x^{-2}\right)^2$

c. $\left(\dfrac{1}{2}x\right)^{-3}$

48. Without a calculator, evaluate each expression if $x = -1$ and $y = -2$.

a. $x^2 + 3x - 7$

b. $-2y^2 - 7y + 9$

49. Without a calculator, evaluate the expression $x^{-1} + x^{-2}$ if $x = -2$.

50. Simplify each expression as much as you can.

   a. $2x + 3x$ b. $2x + 3y$ c. $(x+3)^2$ d. $(2x-1)(2x+1)$

51. Simplify the following expressions.

   a. $(3x-11)(3x-11)$ b. $(7-2x)-(7-2x)$

52. Multiply the expressions below to find an equivalent expression that does not contain parentheses.

   a. $5(x-4)(x-4)$ b. $-10(2x-1)(2x+1)$

53. Simplify the following expressions.

   a. $(2y-5)(2y+5)$ b. $(10x^4+6)-(10x^4-6)$ c. $(8x-1)^2$

54. Simplify the following expressions.

    a. $-\left(x+7y\right)^2$ b. $5-\left(x+5\right)^2$

55. Multiply the binomial and trinomial as shown below.
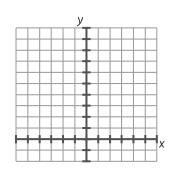
$$\left(x+y\right)\left(x^2-xy+y^2\right)$$

56. Solve the following equation: $-\left(2-x\right)^2+4x^2=-3\left(3-x\right)\left(1+x\right)$.
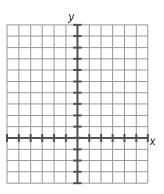
57. In earlier lessons, you learned how to graph equations that look like $y=mx+b$.

    a. What is the shape of the graph of $y=mx+b$?

b. Draw the graph for the equation $y = x^2$. Use the T-chart shown and plot at least 5 points that fit in the graph to the right.

x	y		ordered pair
-2	$(-2)^2 \rightarrow 4$		$(-2, 4)$
-1			
0			
1			
2			

58. Draw the graph for the equation $y = x^2 - 2$. Use a T-chart and plot at least 5 points that fit in the graph to the right.

59. Fill in the blanks below to complete the equation.

a. $(x+1)^2 = x^2 + 2x +$ _____

b. $(x-4)^2 = x^2 +$ _____ $x +$ _____

FACTORING POLYNOMIALS & SOLVING QUADRATIC EQUATIONS

60. Factor each polynomial below by writing it as the product of a monomial and a remaining polynomial. Make the monomial the greatest common factor of the original polynomial.

 a. $24x^3 - 12x^2 + 20$
 b. $6x^2 + 12x^3$
 c. $30x^6 - 60x^3 - 45x^5$

61. Factor the following trinomials.

 a. $x^2 + 7x + 6$
 b. $x^2 - 7x + 6$
 c. $x^2 - x - 6$
 d. $x^2 + x - 6$

62. Factor each of the following expressions as much as you can.

 a. $x^2 - 8x + 16$
 b. $2x^2 - 6x$
 c. $2x^2 - 7x - 9$
 d. $18 - 2x^2$

63. Factor the following trinomials. Verify that your factors are correct.

 a. $3x^2 + 18x - 21$
 b. $-5x^2 + 40x - 60$
 c. $2x^2 - 7x - 9$

64. Factor the following trinomials. Check your result by multiplying your factors together.

a. $5x^2 - 6 + 7x$

b. $6x^2 - 17x + 10$

c. $-x^2 + 12x - 36$

65. What values of x will make each equation true?

a. $(x+1)(x-5) = 0$

b. $(x+8)(8x-1) = 0$

c. $(3x+2)(4x-5) = 0$

66. Solve the following equations.

a. $x^2 + 2x - 15 = 0$

b. $20x^2 - 45 = 0$

c. $9x^2 + 4 = 12x$

67. What values of x will make each equation true?

a. $x(x-2) = 0$

b. $x^2 + 3x = 0$

c. $10x^2 + 15x = 0$

68. Simplify each of the following fractions.

a. $\dfrac{2 \cdot 10}{3 \cdot 10}$

b. $\dfrac{2 \cdot 3}{3 \cdot 5}$

c. $\dfrac{3x}{8x}$

d. $\dfrac{8y}{12y}$

69. Simplify each of the following fractions.

a. $\dfrac{3x(x+4)}{5x(x+4)}$

b. $\dfrac{(x+1)(x+3)}{(x+1)(x+7)}$

c. $\dfrac{6x+6}{7x+7}$

70. In the previous scenario, the last fraction can only be simplified after you factor the expressions in the numerator and denominator. After you factor, it becomes clear that there are identical factors in the numerator and denominator. Use this strategy to simplify each of the following fractions.
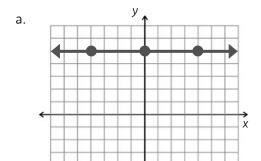
a. $\dfrac{x^2+4x+3}{x^2+8x+7}$
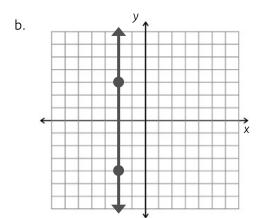
b. $\dfrac{x^2-1}{x^2+2x+1}$

c. $\dfrac{x^2+6x+5}{x^2-25}$

SYSTEMS OF LINEAR EQUATIONS & INEQUALITIES

71. Determine the equation of each line shown.

a.

b.

72. In the previous scenario, if you graph the two lines on the same grid, at what ordered pair would the two lines intersect?

73. Use the <u>Substitution Method</u> to find the intersection point of each pair of lines below.
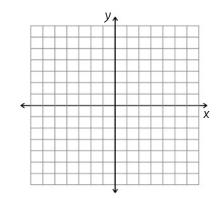
a.
$$-3x - y = 19$$
$$20x - 2y = 12$$

b.
$$9x - 4y = 11$$
$$-4x + 2y = 6$$
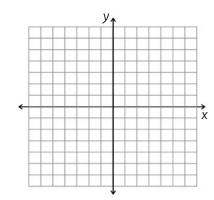
74. Use the Elimination Method to find the intersection point of the lines $3x+4y=14$ and $-5x+2y=20$.

75. Without graphing, determine the intersection point of each pair of lines. Use any method. Graph the two equations to confirm that your intersection point is accurate.
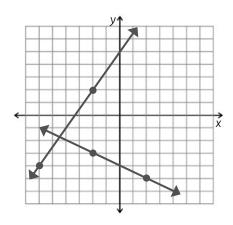
a.
$$-x+2y=14$$
$$3x-6y=-36$$

b.
$$-3x-y=2$$
$$6x=-4-2y$$

76. Where do the two lines intersect?

77. The following equations are written in Standard Form, Ax + By = C. Rearrange the equations to write them in Slope-Intercept Form, y = mx + b.

    a. $3x - 2y = 6$ b. $-5x - 10y = -70$

78. The following inequalities are written in Standard Form. Rearrange them to write them in Slope-Intercept Form.
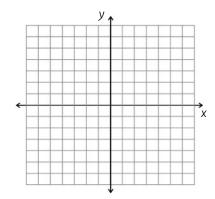
    a. $3x - 2y \geq 6$ b. $-5x - 10y < 70$
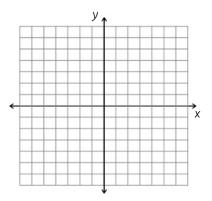
79. Did you forget to switch the direction of the inequality in the previous scenario? Whenever you rearrange an inequality, when do you need to reverse the direction of the inequality symbol?

80. Graph the system of inequalities.

a.
$$y \geq -3$$
$$x < 4$$

b.
$$y > \frac{3}{4}x + 2$$
$$-2x - y > 5$$

81. How many integers are between the locations of $\sqrt{8}$ and $\sqrt{101}$ on the number line?

82. Which integer is closest to the value of $\sqrt{28}+\sqrt{60}$?

83. Multiply each group of expressions and simplify the result as much as you can. Write your answer in the form $A\sqrt{B}$, if possible.

    a. $\left(\sqrt{7}\right)\left(-5\sqrt{7}\right)$ b. $\left(\sqrt{3}\right)\left(-4\sqrt{6}\right)$ c. $\left(-2\sqrt{11}\right)^{2}$

84. Simplify the following expressions.

    a. $\left(2+\sqrt{5}\right)\left(2-\sqrt{5}\right)$ b. $\left(4-\sqrt{6}\right)^{2}$

85. Simplify each expression as much as possible.

a. $\sqrt{\dfrac{8}{18}}$

b. $\dfrac{\sqrt{5}}{\sqrt{25}}$

c. $\dfrac{8\sqrt{7}}{\sqrt{2}}$

86. Determine the value of x that makes the equation true.

$$\sqrt{x^2 + 10} = x + 5$$

87. What is the Pythagorean Theorem?

88. Change the following statement to make it accurate.

"The Pythagorean Theorem shows the relationship between the lengths of the sides of a triangle."

89. Determine the missing side length for each triangle shown.

a.

b.

90. Determine the missing side length for each triangle shown.

a.

$$8$$

$$10$$

b.

$$4$$

$$\sqrt{7}$$
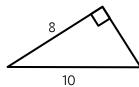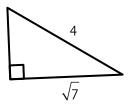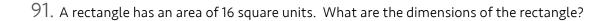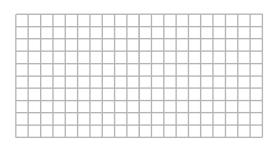
A COLLECTION OF GEOMETRY SCENARIOS

91. A rectangle has an area of 16 square units. What are the dimensions of the rectangle?

92. In the grid to the right, draw 4 possible rectangles that have an area of 16 square units. Assume that each square in the grid has a width of 1 unit.
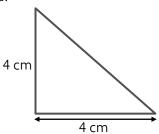
93. In the previous scenario, are there any rectangles with an area of 16 square inches that do not fit in the grid to the right?

94. What is the area of a square that has a perimeter of 20 centimeters?
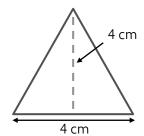
95. What is the area of a triangle if its base is 10 inches and its height is 6 inches?

96. Calculate the area of each triangle below.

a.

4 cm

4 cm

b.

4 cm

4 cm

c.

4 cm

4 cm
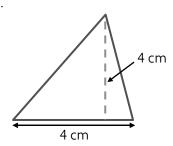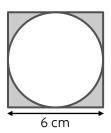
97. A circle is inscribed in a square as shown. What is the area of the circle?

6 cm

ANSWER KEY

1.	Both expressions are equal to 91.
2.	Expression #1 is larger. $\frac{8}{12}+\frac{15}{12}=\frac{23}{12}=1\frac{11}{12}$ $\frac{25}{10}-\frac{6}{10}=\frac{19}{10}=1\frac{9}{10}$ $\frac{11}{12}$ is larger than $\frac{9}{10}$.
3.	Expression #1 is larger. Expression #1: $\frac{12}{21}\rightarrow\frac{4}{7}$ Expression #2: $\frac{3}{15}\cdot\frac{5}{2}\rightarrow\frac{15}{30}\rightarrow\frac{1}{2}$
4.	a. Add 0.5 to both sides b. Multiply both sides by 3 c. Multiply both sides by $\frac{3}{2}$
5.	a. x is greater than 7.8 (What number decreased by 0.5 equals 7.8?) b. x is greater than 1.5 (What number divided by 3 equals 1.5?) c. x is greater than 8 (Two-thirds of what number is 8?)
6.	a. $x = 8.3$ b. $x = 4.5$ c. $x = 12$
7.	a. $1.4a=28\rightarrow a=\frac{28}{1.4}\rightarrow a=20$ b. $-\frac{1}{3}b=5\rightarrow b=-15$
8.	a. $5=17+2x\rightarrow-12=2x\rightarrow-6=x$ b. $\frac{105+c}{3}=40\rightarrow105+c=120\rightarrow c=15$
9.	Expression #2 is larger. Since 49% is smaller than one-half, 49% of 4 is less than 2. Since 26% is larger than one-fourth, 26% of 8 is larger than 2 (one-fourth of 8 is 2).
10.	a. $n=0.75(32)\rightarrow n=24$ b. $0.18(910)=n\rightarrow n=163.8$
11.	a. $0.4n=20\rightarrow n=50$ b. $113=0.031n\rightarrow n\approx3645.2$
12.	a. $30=\frac{x}{100}(50)\rightarrow30=\frac{1}{2}x\rightarrow x=60\%$
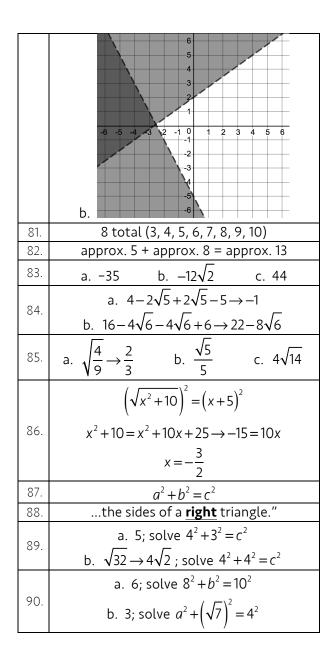
	b. $\frac{x}{100}(16)=54\rightarrow\frac{4}{25}x=54\rightarrow x=337.5\%$
13.	45 more students were sick on Tuesday. 45 is one-half of 90, or 50% of 90. The number of sick students increased by 50% from Monday to Tuesday.
14.	The population decreased about 7.9%. 315,000 – 290,000 = 25,000 25,000 is what percent of 315,000? 25,000 = x(315,000) x=7.94% You can also calculate the percent by dividing the amount of change by the original amount.
15.	$950. Option 1: Find 95% of 1000 Option 2: Solve 1000 – 0.05(1000) = x
16.	$952.38; solve $x + 0.05x = 1000$
17.	a. equation: $0.9P = 9,000\rightarrow P = 10,000$ b. The original population decreases by 10%, which is not the same result as increasing the new population by 10%.
18.	$x + 0.064x = 638.40\rightarrow1.064x = 638.4$ $x = 600\rightarrow$ $600
19.	The amount of water in a pool is increasing by 100 gallons per half-hour, which is 200 gallons per hour.
20.	At 5pm, 800 gallons of water are in the pool. At 2pm (3 hours earlier) it has 200 gallons in it (600 fewer gallons).
21.	At 7pm, 1200 gallons of water are in the pool. At 9pm (2 hours later) it has 1600 gallons in it (400 more gallons).
22.	a. 1800 miles b. 24 days
23.	a. $T = 18 – 2(9)\rightarrow T = 0$ b. $11=18-2A\rightarrow-7=-2A\rightarrow A=3.5$
24.	a. $4 per kilogram b. $P = 4k$
25.	$-\frac{5}{6}$
26.	$\frac{6-11}{-10-(-25)}\rightarrow\frac{-5}{15}\rightarrow-\frac{1}{3}$

27.	 a, b. c. The lines are perpendicular.
28.	The slopes of the two lines are opposite reciprocals.
29.	$y = -2x + 3$
30.	a. Yes, it is on the line b. No, it is not on the line c. No, when you replace x and y with 15 and –28, the equation becomes $-28 = -2(15) + 3$ or $-28 = -27$, which is a false statement.
31.	(0, –1.5)
32.	The y-intercept is (0, 12). In the equation $y = mx + b$, replace m with $-\dfrac{2}{5}$ and replace x and y with 10 and 8 to make the equation $8 = -\dfrac{2}{5}(10) + b$. Solve for b to get b = 12.
33.	$y = -\dfrac{2}{5}x - 1$
34.	$y = -3x - 7$
35.	on the y-axis
36.	on the x-axis
37.	a. x-int: (–2, 0) b. y-int: (0, 3)
38.	a. To find the x-int, replace y with 0 in the equation and solve for x. To find the y-int, replace x with 0 in the equation and solve for y. x-int: (–5, 0) y-int: (0, –2) b. Graph:
39.	a. undefined b. 0
40.	a. –1000 b. $5 - 1(-27) \rightarrow 5 + 27 \rightarrow 32$

	c. $(49-45)^2 \div (-1)^9 \rightarrow (4)^2 \div -1 \rightarrow -16$
41.	a. $11 - 5(-8) \rightarrow 11 + 40 \rightarrow 51$ b. $4^2 - (9-1)^2 \div (-2)^5 \rightarrow 16 - 8^2 \div (-32)$ $\rightarrow 16 - 64 \div (-32) \rightarrow 16 - (-2) \rightarrow 18$
42.	a. $x^{1+3+5} \rightarrow x^9$ b. $y^{70-10} \rightarrow y^{60}$ c. $2x$
43.	a. $6x^3$ b. $\dfrac{1}{x^2}$ c. $\dfrac{2y}{3x^4}$
44.	a. $-6y^7$ b. 2^6 c. $\dfrac{3y^3}{5x}$
45.	a. $\dfrac{-8y^6}{x^9}$ b. $x^6 + x^6 \rightarrow 2x^6$ c. $-3y^2 \cdot -8y^3 \rightarrow 24y^5$
46.	a. $\dfrac{3}{x^2}$ b. $\dfrac{x^3}{9}$ c. 2
47.	a. $1 + 1 + 3(1) \rightarrow 5$ b. $\dfrac{1}{x^4}$ c. $\dfrac{8}{x^3}$
48.	a. $(-1)^2 + 3(-1) - 7 \rightarrow 1 - 3 - 7 \rightarrow -2 - 7 = -9$ b. $-2(-2)^2 - 7(-2) + 9 \rightarrow -2(4) + 14 + 9 = 15$
49.	$(-2)^{-1} + (-2)^{-2} \rightarrow -\dfrac{1}{2} + \dfrac{1}{4} \rightarrow -\dfrac{1}{4}$
50.	a. $5x$ b. $2x + 3y$ c. $x^2 + 6x + 9$ d. $4x^2 - 1$
51.	a. $9x^2 - 66x + 121$ b. 0
52.	a. $5x^2 - 40x + 80$ b. $-40x^2 + 10$
53.	a. $4y^2 - 25$ b. 12 c. $64x^2 - 16x + 1$
54.	a. $-(x^2 + 14xy + 49y^2) \rightarrow -x^2 - 14xy - 49y^2$ b. $5 - (x^2 + 10x + 25) \rightarrow -x^2 - 10x - 20$
55.	$x^3 - x^2y + xy^2 + x^2y - xy^2 + y^3 \rightarrow x^3 + y^3$
56.	$x = -\dfrac{1}{2}$
57.	a. line b. see below

58.	
59.	a. 1 b. −8, 16
60.	a. $4(6x^3-3x^2+5)$ b. $6x^2(1+2x)$ c. $15x^3(2x^3-4-3x^2)$
61.	a. $(x+6)(x+1)$ b. $(x-1)(x-6)$ c. $(x-3)(x+2)$ d. $(x+3)(x-2)$
62.	a. $(x-4)(x-4)$ b. $2x(x-3)$ c. $(2x-9)(x+1)$ d. $2(3+x)(3-x)$
63.	a. $3(x+7)(x-1)$ b. $-5(x-6)(x-2)$ c. $(2x-9)(x+1)$
64.	a. $(5x-3)(x+2)$ b. $(6x-5)(x-2)$ c. $-(x-6)(x-6)$ or $(-x+6)(x-6)$
65.	a. $x=-1, 5$ b. $x=-8, \dfrac{1}{8}$ c. $x=-\dfrac{2}{3}, \dfrac{5}{4}$
66.	a. $(x-3)(x+5)=0 \rightarrow x=3, -5$ b. $5(2x+3)(2x-3)=0 \rightarrow x=-\dfrac{3}{2}, \dfrac{3}{2}$ c. $9x^2-12x+4=0 \rightarrow (3x-2)^2=0 \rightarrow x=\dfrac{2}{3}$
67.	a. $x=0, 2$ b. $x(x+3)=0 \rightarrow x=0, -3$ c. $5x(2x+3)=0 \rightarrow x=0, -\dfrac{3}{2}$
68.	a. $\dfrac{2}{3}$ b. $\dfrac{2}{5}$ c. $\dfrac{3}{8}$ d. $\dfrac{2}{3}$
69.	a. $\dfrac{3}{5}$ b. $\dfrac{x+3}{x+7}$ c. $\dfrac{6(x+1)}{7(x+1)} \rightarrow \dfrac{6}{7}$
70.	a. $\dfrac{(x+3)(x+1)}{(x+7)(x+1)} \rightarrow \dfrac{x+3}{x+7}$ b. $\dfrac{(x+1)(x-1)}{(x+1)(x+1)} \rightarrow \dfrac{x-1}{x+1}$ c. $\dfrac{(x+5)(x+1)}{(x+5)(x-5)} \rightarrow \dfrac{x+1}{x-5}$
71.	a. $y = 5$ b. $x = -2$

72.	$(-2, 5)$
73.	a. $(-1, -16)$ b. $(23, 49)$
74.	$(-2, 5)$
75.	a. No solution b. Infinite solutions
76.	$\left(-\dfrac{9}{2}, -\dfrac{7}{4}\right)$ Equation 1: $y=-\dfrac{1}{2}x-4$ Equation 2: $y=\dfrac{3}{2}x+5$
77.	a. $-2y=-3x+6 \rightarrow y=\dfrac{3}{2}x-3$ b. $-10y=5x-70 \rightarrow y=-\dfrac{1}{2}x+7$
78.	a. $-2y \geq -3x+6 \rightarrow y \leq \dfrac{3}{2}x-3$ b. $-10y < 5x-70 \rightarrow y > -\dfrac{1}{2}x+7$
79.	When you multiply by a negative number or divide by a negative number on both sides of the inequality, the direction of the inequality symbol must be switched.
80.	a.

	  b.
81.	8 total (3, 4, 5, 6, 7, 8, 9, 10)
82.	approx. 5 + approx. 8 = approx. 13
83.	a. −35 b. $-12\sqrt{2}$ c. 44
84.	a. $4-2\sqrt{5}+2\sqrt{5}-5\rightarrow-1$ b. $16-4\sqrt{6}-4\sqrt{6}+6\rightarrow22-8\sqrt{6}$
85.	a. $\sqrt{\dfrac{4}{9}}\rightarrow\dfrac{2}{3}$ b. $\dfrac{\sqrt{5}}{5}$ c. $4\sqrt{14}$
86.	$\left(\sqrt{x^2+10}\right)^2=\left(x+5\right)^2$ $x^2+10=x^2+10x+25\rightarrow-15=10x$ $x=-\dfrac{3}{2}$
87.	$a^2+b^2=c^2$
88.	...the sides of a **right** triangle."
89.	a. 5; solve $4^2+3^2=c^2$ b. $\sqrt{32}\rightarrow4\sqrt{2}$; solve $4^2+4^2=c^2$
90.	a. 6; solve $8^2+b^2=10^2$ b. 3; solve $a^2+\left(\sqrt{7}\right)^2=4^2$

91.	There are infinitely many dimensions. The sides could be 16x1 or 8x2 or 4x4 or $32\times\dfrac{1}{2}$ or $64\times\dfrac{1}{4}$ or 10×1.6 or ...
92.	
93.	Rectangles with a width longer than 20 units do not fit in the grid. For example, a 20x0.8 rectangle has an area of 16 square units but it does not fit in the grid.
94.	25 (the sides would each be 5 cm)
95.	30 in^2 $A=\dfrac{1}{2}bh$
96.	Each triangle has an area of 8 cm^2.
97.	$36-9\pi$ The circle's radius is 3cm, or half of the diameter (6cm). $A=\pi r^2\rightarrow A=9\pi$ Subtract the circle's area from the square's area (6x6=36).