EXAM_1_PREPARATION Alex Jordan

These exercises are to help you practice for the first exam. The actual exam will have all its questions taken from this list of exercises, usually with numbers and some other small details changed. This collection of exercises is not to be turned in for any type of credit. Answers to the exercises here will be posted on the class site.

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1. Add the following.

a. $-8+4=$ ____

b. $-1+7=$ ____

c. $-2+2=$ ____

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2. Subtract the following.

a. $-5-(-8)=$ ____

b. $-10-(-1)=$ ____

c. $-4-(-4)=$ ____

---

3. Multiply the following.

a. $(-1)\cdot(-5)\cdot(-3)=$ ____

b. $4\cdot(-8)\cdot(-5)=$ ____

c. $(-98)\cdot(-64)\cdot 0=$ ____

---

4. Evaluate the following.

a. $(-1)^2=$ ____

b. $-2^2=$ ____

---

5. Simplify without using a calculator.

$-9.35+(-37.5)=$ _____

---

6. Simplify without using a calculator.

$42-9.02=$ _____

---

7. Consider the following situation in which you borrow money from your cousin:

- On June 1st, you borrowed 1300 dollars from your cousin.
- On July 1st, you borrowed 470 more dollars from your cousin.
- On August 1st, you paid back 670 dollars to your cousin.
- On September 1st, you borrowed another 970 dollars from your cousin.

How much money do you owe your cousin now?

____

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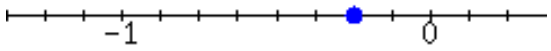
8. The dot in the graph can be represented by what fraction?



____

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9. Reduce the fraction $\frac{140}{14}$.

___

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10. Multiply: $\frac{6}{5}\cdot\frac{9}{14}$

____

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11. Multiply: $\frac{2}{25}\cdot\frac{21}{4}\cdot\frac{5}{49}$

_____

---

12. Divide: $-\frac{25}{9}\div(-15)$

_____

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13. Add: $\frac{5}{7}+\frac{13}{14}$

_____

14. Add: $\frac{7}{10}+\frac{5}{6}$

____

15. Add: $5+\frac{1}{6}$

____

16. Subtract: $\frac{3}{7}-\frac{32}{35}$

____

17. Subtract: $-4-\frac{29}{9}$

____

18. Each page of a book is $6\frac{1}{6}$ inches in height, and consists of a header (a top margin), a footer (a bottom margin), and the middle part (the body). The header is $\frac{1}{9}$ of an inch thick and the middle part is $5\frac{4}{9}$ inches from top to bottom.

What is the thickness of the footer?

The footer is ____ of an inch thick.

19. A company received a grant, and decided to spend $\frac{5}{8}$ of this grant in research and development next year. Out of the money set aside for research and development, $\frac{2}{5}$ will be used to buy new equipment. What fraction of the grant will be used to buy new equipment?

___ of the grant will be used to buy new equipment.

20. To pave the road on Ellis Street, the crew used $2\frac{1}{6}$ tons of cement on the first day, and used $2\frac{9}{10}$ tons on the second day. How many tons of cement were used in all?

____ tons of cement were used in all.

21. Evaluate the following.

$|1| =$ ___

22. Evaluate the following.

a. $|2| =$ ___

b. $|-6| =$ ___

c. $|0| =$ ___

d. $|12+(-5)| =$ ___

e. $|-6-(-2)| =$ ___

23. Evaluate the following.

a. $\sqrt{\frac{4}{9}} =$ ____

b. $\sqrt{-\frac{1}{25}} =$ ____

24. Evaluate the following.

Use a calculator to approximate with a decimal.

$\sqrt{102} \approx$____

25.

Evaluate the following.

$\sqrt{-\frac{100}{121}} =$ _____.

26. Multiply the following.

a. $(-9)\cdot(-2) =$ ___

b. $(-5)\cdot 2 =$ ___

c. $6\cdot(-3) =$ ___

d. $(-10)\cdot 0 =$ ___

27. Evaluate the following.

$2(4+2) =$ ____

28. Evaluate the following.

$23 - 5 \cdot 4 =$ ____

29. Evaluate the following.

$-[8-(2-8)^2] =$____

30. Evaluate the following.

$57 - 4[4^2 - (6-2)] =$____

31. Evaluate the following.

$4(6-2)^2 - 4(6-2^2) =$ ____

32. Evaluate the following.

$$\frac{(-6)\cdot(-1)-(-10)\cdot 9}{(-2)^2+(-6)} =$$ ____

33. Evaluate the following.

$2-2\left|-9+(3-5)^3\right| =$ ____

34. Evaluate the following.

$$2+10\cdot\frac{8}{9} =$$ ____

35. Evaluate the following.

$$\frac{1}{2}+\frac{5}{2}\div\frac{5}{3}-\frac{1}{5} =$$____

36. Evaluate the following.

$\sqrt{100}-4\sqrt{2+34} =$____

37. Evaluate the following.

$$\frac{\sqrt{39+7\cdot 6}+|-10-11|}{-59-(-4)^3} =$$____

38. Write the decimal number as a fraction.

0.85 = _____

39. Write the mixed number as a decimal number. Do not round your answers.

a. $9\frac{3}{20}$ = _____

b. $2\frac{1}{5}$ = _____

40. Which of the following are integers? There may be more than one correct answer.

- A. $\sqrt{3}$
- B. $-0.5\overline{47}$
- C. -1.899
- D. -4
- E. $-5.101001000100001\ldots$
- F. 62
- G. 11086
- H. -21582

41. Determine the validity of each statement by selecting True or False.

[?] 1. The number $\sqrt{17}$ is a real number, but not an irrational number
[?] 2. The number $\sqrt{6}$ is a real number, but not a rational number
[?] 3. The number $\frac{11}{37}$ is rational, but not an integer
[?] 4. The number $\frac{17}{13}$ is rational, but not a natural number
[?] 5. The number 0.700070007000700070000... is rational

42. Write the rational number $8.1\overline{701} = 8.1701701\ldots$ as a fraction.

_____

43. Write the fraction as a decimal number. Do not round your answers.

a. $\frac{3}{5}$ = _____

b. $\frac{3}{8}$ = _____

44. Use the $>$ symbol to arrange the following numbers in order from greatest to least. For example, your answer might look like `4>3>2>1>0`.

$$\frac{13}{2} \quad 4 \quad -4 \quad -6 \quad -\frac{33}{4}$$

_____

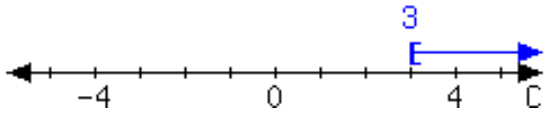
45. Choose $<$, $>$, or $=$ to make a true statement.

$-\frac{1}{4}$ [?/</>/=] $-\frac{4}{5}$

46. Choose $<$, $>$, or $=$ to make a true statement.

$-4\frac{1}{3}$ [?/</>/=] 2

47. Here is an interval:



Write the interval using set-builder notation.

_____

Write the interval using interval notation.

_____

48. A set is written using set-builder notation. Write it using interval notation.

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

_____

49. A set is written using set-builder notation. Write it using interval notation.

$\{x \mid -7 \geq x\}$

_____

50. A set is written using set-builder notation. Write it using interval notation.

$\left\{x \mid x \leq -\frac{2}{3}\right\}$

_____

51. Evaluate $3x-7$ for $x=-2$.

___

52. Evaluate the following expressions.

a. Evaluate $2y^2$ when $y=3$.

$2y^2$ = ___

b. Evaluate $(2y)^2$ when $y=3$.

$(2y)^2$ = ___

53. Evaluate $\frac{-4}{p}-\frac{2}{A}$ for $p=5$ and $A=-3$.

___

54. Evaluate the expression $-16t^2+64t+128$ when $t=-4$.

_____ help (numbers)

55. Evaluate each algebraic expression for the given value(s):

$\frac{\sqrt{x}}{y}-\frac{y}{x}$, for $x=49$ and $y=-6$: _____

56. Evaluate each algebraic expression for the given value(s):

$\frac{4+5|y-x|}{x+4y}$, for $x=9$ and $y=-10$: _____

57. The formula

$$y = \frac{1}{2}at^2 + v_0 t + y_0$$

gives the vertical position of an object, at time t, thrown with an initial velocity v_0, from an initial position y_0 in a place where the acceleration of gravity is a. The acceleration of gravity on earth is $-9.8\ \frac{\text{m}}{\text{s}^2}$. It is negative, because we consider the upward direction as positive in this situation, and gravity pulls down.

What is the height of a baseball thrown with an initial velocity of $v_0 = 87\ \frac{\text{m}}{\text{s}}$, from an initial position of $y_0 = 85$ m, and at time $t = 1$ s?

One seconds after the baseball was thrown, it was _____ high in the air.

58. The height inside a camping tent when you are d feet from the edge of the tent is given by

$$h = -1.8|d - 6.6| + 6.5$$

where h stands for height in feet.

Determine the height when you are:

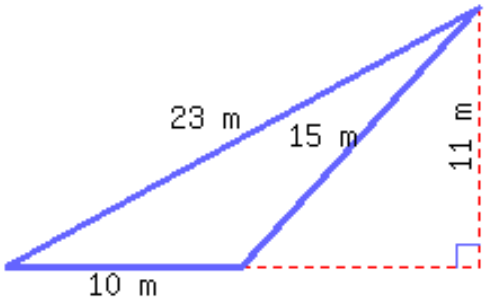
a. 9.3 ft from the edge.
The height inside a camping tent when you 9.3 ft from the edge of the tent is _____

b. 4.3 ft from the edge.
The height inside a camping tent when you 4.3 ft from the edge of the tent is _____

59. Find the perimeter and area of a rectangular table top with a length of 4.7 ft and a width of 31 in.

Its perimeter is ____ and its area is ____.

60. Find the perimeter and area of the triangle.



Its perimeter is _____ and its area is _____.

61. A circle's diameter is 20 m.

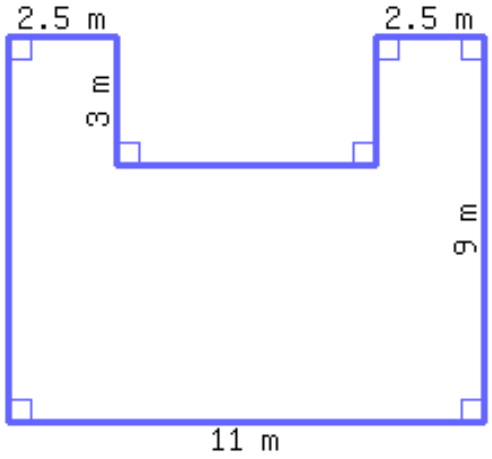
a. This circle's circumference, in terms of π, is _____.

b. This circle's circumference, rounded to the hundredths place, is _____.

c. This circle's area, in terms of π, is _____.

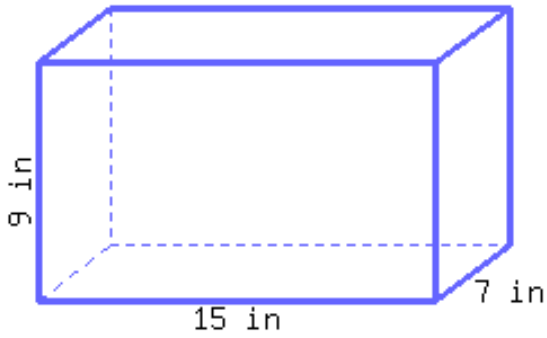
d. This circle's area, rounded to the hundredths place, is _____.

62. Find the perimeter and area of this polygon.



Its perimeter is _____ and its area is _____.

63. Find the volume of this rectangular prism.



_____

64. A cylinder's base's diameter is 12 ft, and its height is 7 ft.

a. This cylinder's volume, in terms of π, is _____.

b. This cylinder's volume, rounded to the hundredths place, is _____.

65. Subtract the following.

a. $4-10=$ ____

b. $8-4=$ ____

c. $6-15=$ ____

66. Count the number of terms in each expression.

a. $0.4y^2-3.9s^2+5.6z^2$

_____

b. $-4.5s-4.6z-8x^2$

_____

c. $-3.9s^2$

_____

d. $-6.6x^2-1.3y^2$

_____

67. Simplify each expression, if possible, by combining like terms.

a. $-3z+6y$

_____

b. $-2x^2+3$

_____

c. $-9z+8t$

_____

d. $5z-8s$

_____

68. Simplify each expression, if possible, by combining like terms.

a. $4z^2-\frac{9}{7}z^2$

_____

b. $-7z+\frac{5}{8}y-\frac{1}{8}y$

_____

c. $-\frac{1}{2}s^2-\frac{7}{8}s^2-s^2$

_____

d. $\frac{7}{8}s^2-s^2$

_____

69. Evaluate $-9(x+2)$ for $x=3$.

___

70. Are the equations below linear equations in one variable?

a. $-3.79p=-4$ [?/is/is not] a linear equation in one variable.

b. $5Vxq=2$ [?/is/is not] a linear equation in one variable.

c. $p\sqrt{24}=-50$ [?/is/is not] a linear equation in one variable.

d. $y^2+V^2=-2$ [?/is/is not] a linear equation in one variable.

e. $12q-9=78$ [?/is/is not] a linear equation in one variable.

f. $\pi r^2=66\pi$ [?/is/is not] a linear equation in one variable.

71. Is 8 a solution for r in the equation $-9-r=-16$? [?/Yes/No]

72. Is 5 a solution for y in the equation $3(y+1)=4(y+2)$? [?/Yes/No]

73. Decide whether each value is a solution to the given inequality.

$-2x+9\geq 1$

a. $x=-5$ [?/is/is not] a solution.

b. $x = 0$ [?/is/is not] a solution.

c. $x = 4$ [?/is/is not] a solution.

d. $x = 6$ [?/is/is not] a solution.

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74. A water tank has 228 gallons of water in it, and it is being drained at the rate of 18 gallons per minute. After how many minutes will there be 30 gallons of water left?

Assume the tank will have 30 gallons of water after m minutes. We can solve this problem using the equation:

$$228 - 18m = 30$$

Check whether 11 is a solution for m of this equation. [?/Yes/No]

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75. A rectangular frame's perimeter is 7 feet. If its length is 2.1 feet, suppose we want to find how long is its width. A rectangle's perimeter formula is

$$P = 2(l + w)$$

where P stands for perimeter, l for length and w for width. We can solve this problem using the equation:

$$7 = 2(2.1 + w)$$

Check whether 4.9 is a solution for w of this equation. [?/Yes/No]

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76. Evaluate the following.

a. $\dfrac{-4}{-2} =$ ____

b. $\dfrac{12}{-4} =$ ____

c. $\dfrac{-63}{7} =$ ____

---

77. Solve the equation.

$t + 10 = 6$

_____

---

78. Solve the equation.

$t - 7 = -5$

_____

---

79. Solve the equation.

$3 + x = -5$

_____

---

80. Solve the equation.

$\dfrac{10}{3} + B = -\dfrac{1}{10}$

_____

---

81. Solve the equation.

$\dfrac{1}{4}C = 8$

_____

---

82. Solve the equation.

$9n = -8$

_____

---

83. Solve the equation.

$-\dfrac{4}{3} = \dfrac{3x}{5}$

_____

---

84. Solve the equation.

a. $18 = -9x$

_____

b. $18 = -9 + y$

_____

85. Solve the equation.

a. $8r = 16$

_____

b. $36t = 76$

_____

86. A circle's circumference is 8π mm.

a. This circle's diameter is _____.

b. This circle's radius is _____.

87. A rectangular prism's volume is 16530 ft^3. The prism's base is a rectangle. The rectangle's length is 29 ft and the rectangle's width is 19 ft.

This prism's height is _____.

88. Add the following.

a. $3 + (-9) =$ ____

b. $10 + (-3) =$ ____

c. $7 + (-7) =$ ____

89. Evaluate the following.

a. $\dfrac{-2}{-1} =$ ____

b. $\dfrac{5}{-1} =$ ____

c. $\dfrac{100}{-100} =$ ____

d. $\dfrac{-10}{-10} =$ ____

e. $\dfrac{11}{0} =$ ____

f. $\dfrac{0}{-7} =$ ____

90. Solve this inequality.

$2 > x - 6$

In set-builder notation, the solution set is _____.
In interval notation, the solution set is _____.

91. Solve this inequality.

$16 \geq -4x$

In set-builder notation, the solution set is _____.
In interval notation, the solution set is _____.

92. Solve this inequality.

$-\dfrac{3}{2}x \leq 3$

In set-builder notation, the solution set is _____.
In interval notation, the solution set is _____.

93. Solve this inequality.

$-15 < -5x$

In set-builder notation, the solution set is _____.
In interval notation, the solution set is _____.

94. Change the following percentages into decimals:

$17\% =$ ____

$53\% =$ ____

95. Convert the following decimals into percentages:

$6.68 =$ ____

$0.668 =$ ____

$0.0668 =$ ____

96. 370% of 610 is ____.

97. 57% of ____ is 376.2.

98. Candi is paying a dinner bill of $31.00. Candi plans to pay 17% in tips. How much tip will Candi pay?

Candi will pay ____ in tip.

99. A painting is on sale at $675.00. Its original price was $750.00. What percentage is this off its original price?

The painting was ____ off its original price.

100. dMarie paid a dinner and left 14%, or $7.00, in tips. How much was the original bill (without counting the tip)?

The original bill (not including the tip) was ____.

101. A town has 1600 registered residents. Among them, there are 608 Democrats and 640 Republicans. The rest are Independents. What percentage of registered voters in this town are Independents?

In this town, ____ of all registered voters are Independents.

102. Last year, a small town's population was 680. This year, the population decreased to 677. What is the percentage decrease?

The percentage decrease of the town's population was approximately ____.

103. Identify a variable you might use to represent each quantity. And identify what units would be most appropriate.

a. Let ___ be the age of a person, measured in ___.

b. Let ___ be the distance traveled by a driver that left Portland, Oregon, bound for Boise, Idaho, measured in ___.

c. Let ___ be the surface area of the walls of a room, measured in ___.

104. The price of a restaurant bill, including an 15% gratuity charge, was $23.00. What was the price of the bill before gratuity was added?

Assume the bill without gratuity is b dollars. Write an equation to model this scenario. There is no need to solve it.

_____

105. A cat litter box has a rectangular base that is 18 inches by 18 inches. What will the height of the cat litter be if 3.375 cubic feet of cat litter is poured? (Hint: 1 $ft^3 = 1728\ in^3$)

Assume h inches will be the height of the cat litter if 3.375 cubic feet of cat litter is poured. Write an equation to model this scenario. There is no need to solve it.

_____

106. An engineer is designing a cylindrical springform pan (the kind of pan a cheesecake is baked in). The pan needs to be able to hold a volume at least 190 cubic inches and have a diameter of 11 inches. Write an *inequality* modeling possible height of the pan. There is no need to solve it.

_____

107. Translate the following phrase or sentence into a math expression or equation (whichever is appropriate).

two subtracted from a number

___

108. Translate the following phrase or sentence into a math expression or equation (whichever is appropriate).

three less than seven times a number

___

109. Translate the following phrase or sentence into a math expression or equation (whichever is appropriate).

The quotient of a number and twenty-five is seven twenty-fifths.

_____

110. Translate the following phrase or sentence into a math expression or equation (whichever is appropriate).

The product of two and a number, added to five, is sixty-three.

_____

111. Translate the following phrase or sentence into a math expression or equation (whichever is appropriate).

a number increased by two twenty-fifths of itself

___

112. Evaluate the following.

a. $1^8 =$ ___

b. $(-1)^{15} =$ ___

c. $(-1)^{16} =$ ___

d. $0^{16} =$ ___

113. Use the properties of exponents to simplify the expression.

$9^{10} \cdot 9^6$

_____

114. Use the properties of exponents to simplify the expression.

$\left(y^8\right)^8$

_____

115. Use the properties of exponents to simplify the expression.

$(-4y^{16}) \cdot (3y^{20})$

_____

116. Use the properties of exponents to simplify the expression.

a. $\left(-9x^4\right)^2 =$_____

b. $-\left(9x^4\right)^2 =$_____

117. List the terms in each expression.

a. $-8.8x^2 - 2.6z^2 + 2t^2 + 5.4y^2$

_____

b. $-0.6x - t^2$

_____

c. $-1.5z$

_____

d. $5.4y - 8.4z$

_____

118. Use the associative property of addition to write an equivalent expression to $p + (39 + y)$.

_____

119. Use the commutative property of addition to write an equivalent expression to $6q + 24$.

_____

120. Use the commutative property of multiplication to write an equivalent expression to $4(b + 14)$.

_____

121. Use the distributive property to simplify $10 + 8(6 + 7y)$ completely.

_____

122. Use the distributive property to simplify $\frac{4}{7}(-8 + 7c)$ completely.

_____

123. The number of students enrolled in math courses at Portland Community College has grown over the years. The formulas

$$M = 0.54x + 3.8 \quad W = 0.59x + 3.6 \quad N = 0.04x + 0.2$$

describe the numbers (of thousands) of men, women, and gender-non-binary students enrolled in math courses at PCC x years after 2005. (Note this is an exercise using randomized numbers, not actual data.) Give a simplified formula for the total number T of thousands of students at PCC taking math classes x years after 2005. Be sure to give the entire formula, starting with `T=`.

_____

124. Multiply the polynomials.

$-3y^2\left(-5y^2+6y\right) =$_____

125. Simplify the following expressions if possible.

a. $3x^2 - x^2 =$_____

b. $(3x^2)(-x^2) =$_____

c. $3x^2 + 2x^3 =$_____

d. $(3x^2)(2x^3) =$_____

126. Simplify the following expression.

$(-3x^5)(-4x^2) - (x^4)(-4x^3) =$_____

127. Use the distributive property to write an equivalent expression to $-6q(8q-7)$ that has no grouping symbols.

_____

128. Use the distributive property to simplify $6c^4 - 3c^4\left(-2-3c^2\right)$ completely.

_____

129. Fully simplify $-5(6x+9)+4(9x-1)$.

_____

130. Fully simplify $-2(6x+8)-6(7x+1)$.

_____

131. Fill in the blanks with algebraic expressions that make the equation true. You may not use 0 or 1 in any of the blank spaces.

Here is an example: $? + ? = 8x$.

One possible answer is: $3x + 5x = 8x$.

There are infinitely many correct answers to this problem. ***I encourage you to be creative.*** After finding a correct answer, see if you can come up with a different answer that is also correct.

a. _____ + _____ $= -13x$

b. _____ + _____ $= -13x^{20}$

c. ___ · ___ · ___ $= 11x^{55}$

ANSWERS

(1) (a) -4
(b) 6
(c) 0
(2) (a) 3
(b) -9
(c) 0
(3) (a) -15
(b) 160
(c) 0
(4) (a) 1
(b) -4
(5) -46.85
(6) 32.98
(7) You owe \$2070.
(8) $-\frac{2}{8}$, which simplifies to $-\frac{1}{4}$
(9) 10
(10) $\frac{27}{35}$
(11) $\frac{3}{70}$
(12) $\frac{5}{27}$
(13) $\frac{23}{14}$
(14) $\frac{23}{15}$
(15) $\frac{31}{6}$
(16) $-\frac{17}{35}$
(17) $-\frac{65}{9}$
(18) The footer is $\frac{11}{18}$ of an inch wide/thick/tall.
(19) $\frac{1}{4}$ of the grant will be used for new equipment.
(20) $\frac{76}{15}$ tons of cement were used in all.
(21) 1
(22) (a) 2
(b) 6
(c) 0
(d) 7
(e) 4
(23) (a) $\frac{2}{3}$

(b) Not a real number.

(24) $\approx 10.0995\ldots$

(25) Not a real number.

(26) (a) 18
(b) -10
(c) -18
(d) 0

(27) 12

(28) 3

(29) 28

(30) 9

(31) 56

(32) -48

(33) -32

(34) $\frac{98}{9}$

(35) $\frac{9}{5}$

(36) -14

(37) 6

(38) $\frac{85}{100}$, which reduces to $\frac{17}{20}$

(39) (a) 9.15
(b) 2.2

(40) D, F, G, and H

(41) (a) False
(b) True
(c) True
(d) True
(e) True

(42) $\frac{8162}{999}$

(43) (a) 0.6
(b) 0.375

(44) $\frac{13}{2} > 4 > -4 > -6 > -\frac{33}{4}$

(45) $-\frac{1}{4} > -\frac{4}{5}$

(46) $-4\frac{1}{3} < 2$

(47) (a) $\{C \mid C \geq 3\}$
(b) $[3, \infty)$

(48) $[-1, \infty)$

(49) $(-\infty, -7]$

(50) $\left(-\infty, -\frac{2}{3}\right]$

(51) -13

(52) (a) 18
(b) 36

(53) $-\frac{2}{15}$

(54) -384

(55) $-\frac{307}{294}$

(56) $-\frac{99}{31}$

(57) One second after the baseball was thrown, it was 167.1 meters high in the air.

(58) (a) When you are 9.3 feet from the edge of the tent, the height inside is 1.64 feet.
(b) When you are 4.3 feet from the edge of the tent, the height inside is 2.36 feet.

(59) The perimeter is 174.8 inches (or $\frac{437}{30}$ feet) and the area is $1748.4\,\text{in}^2$ (or $\frac{1457}{120}\,\text{ft}^2$).

(60) The perimeter is 48 meters and the area is 55 square meters.

(61) (a) The circumference is 20π meters.
(b) The circumference is about 62.83 meters.
(c) The area is 100π square meters.
(d) The area is about 314.16 square meters.

(62) The perimeter is 46 meters and the area is 81 square meters.

(63) The volume is 945 cubic inches.

(64) (a) The volume is 252π cubic feet.
(b) The volume is about 791.68 cubic feet.

(65) (a) -6
(b) 4
(c) -9

(66) (a) Three
(b) Three
(c) One
(d) Two

(67) (a) $-3z + 6y$
(b) $-2x^2 + 3$
(c) $-9z + 8t$
(d) $5z - 8s$

(68) (a) $\frac{19}{7}z^2$
(b) $-7z + \frac{1}{2}y$
(c) $-\frac{19}{8}s^2$
(d) $-\frac{1}{8}s^2$

(69) -45

(70) (a) is
(b) is not
(c) is
(d) is not
(e) is
(f) is not

(71) No

(72) No

(73) (a) is
(b) is
(c) is not
(d) is not

(74) Yes

(75) No

(76) (a) 2
(b) -3
(c) -9

(77) $\{-4\}$

(78) $\{2\}$

(79) $\{-8\}$

(80) $-\frac{103}{30}$

(81) $\{32\}$

(82) $\{-\frac{8}{9}\}$

(83) $-\frac{20}{9}$

(84) (a) $\{-2\}$
(b) $\{27\}$

(85) (a) $\{2\}$
(b) $\{\frac{19}{9}\}$

(86) (a) 8 millimeters
(b) 4 millimeters

(87) The prism's height is 30 feet.

(88) (a) -6
(b) 7
(c) 0

(89) (a) 2
(b) -5
(c) -1
(d) 1
(e) undefined
(f) 0

(90) (a) $\{x \mid x < 8\}$
(b) $(-\infty, 8)$

(91) (a) $\{x \mid x \geq -4\}$
(b) $[-4, \infty)$

(92) (a) $\{x \mid x \geq -2\}$
(b) $[-2, \infty)$

(93) (a) $\{x \mid x < 3\}$
(b) $(-\infty, 3)$

(94) (a) 0.17
(b) 0.53

(95) (a) 668%
(b) 66.8%
(c) 6.68%

(96) 2257

(97) 660

(98) \$5.27

(99) 10% off

(100) \$50

(101) 22%

(102) about 0.7894% decrease

(103) (a) Let a be the age of a person, measured in years.
(b) Let d be the distance traveled by a driver that left Portland, Oregon, bound for Boise, Idaho, measured in miles.

(c) Let A be the surface area of the walls of a room, measured in square feet.

(104) $b+0.15b=23$

(105) $18(18)h=3.375$

(106) $\pi(5.5)^2h\geq 190$

(107) $x-2$

(108) $7x-3$

(109) $\frac{x}{25}=\frac{7}{25}$

(110) $2x+5=63$

(111) $x+\frac{2}{25}x$

(112) (a) 1
(b) -1
(c) 1
(d) 0

(113) 9^{16}

(114) y^{64}

(115) $-12y^{36}$

(116) (a) $81x^8$
(b) $-81x^8$

(117) (a) $-8.8x^2,-2.6z^2,2t^2,5.4y^2$
(b) $-0.6x,-t^2$
(c) $-1.5z$
(d) $5.4y,-8.4z$

(118) $(p+39)+y$

(119) $24+6q$

(120) $(b+14)\cdot 4$

(121) $58+56y$

(122) $-\frac{32}{7}+4c$

(123) $T=1.17x+7.6$

(124) $15y^4-18y^3$

(125) (a) $2x^2$
(b) $-3x^4$
(c) $3x^2+2x^3$
(d) $6x^5$

(126) $16x^7$

(127) $-48q^2+42q$

(128) $12c^4+9c^6$

(129) $6x-49$

(130) $-54x-22$

(131) (a) One possible answer is $-8x+(-5x)=-13x/$
(b) One possible answer is $-20x^{20}+7x^{20}=-13x^{20}$
(c) One possible answer is $x^2\cdot x^{20}\cdot 11x^{33}=11x^{55}$