Algebra I

2019 Summer Prep Packet

Please do your work on a separate sheet of paper. Bring completed work with you to class at the start of the year. Do your best. Know that you will have an opportunity to ask questions if there are problems that you don't know how to do or don't remember fully. There will be a diagnostic assessment in the first few weeks of class, so that your teacher can assess your understanding. The answers are at the end of the document, so check as you go.

Summer Work: Algebra I

1. Friday's temperature was $20°$ warmer than Monday's temperature t. Write an expression for Friday's temperature.

2. Ann sleeps 8 hours per night. Write an expression for the number of hours Ann sleeps in n nights.

3. Jim is paid for overtime when he works for more than 40 hours per week. Write an expression for the number of hours he works overtime when he works h hours.

4. If you have a bar of steel that is 160 centimeters long. If you remove x centimeters form the bar then write an expression to represent the length of the remaining piece of the bar in terms of x.

5. If you have a piece of string that is x meters long and cut it into three equal pieces then write an expression to represent the length of each of the pieces in terms of x.

6. The circumference of a circle is c centimeters. If you cut the circle into two arcs one that has a length 21 centimeters then write an expression to represent the length of the remaining arc in terms of c.

7. Calculate $|-2+4|$.

8. Calculate $|-5-12|$.

9. Calculate $|8-9|$.

10. A meteorologist reported that the day's high temperature was $17°F$ and the low temperature was $-6°F$. What was the difference between the day's high and low temperatures?

11. A restaurant manager lost $415 in business during the month of January. Business picked up in February, and he ended that month with a profit of $1580. What was the manager's profit after January and February?

12. Sam visited two volcanoes, Cotapaxi and Sangay, and two caves, Sistema Huautla and Sistema Cheve. Cotapaxi, in Ecuador, has an elevation of 19,347 ft. Sangay, also in Ecuador, has an elevation of 17,159 ft. The main entrance of Sistema Huautla, in Mexico, has an elevation of 5051 ft. The main entrance of Sistema Cheve, also in Mexico, has an elevation of 9085 ft. What is the average elevation of these places?

13. The Dow Jones Industrial Average (DJIA) reports the average prices of stocks for 30 companies. Use the table to determine the total decrease in the DJIA for the two days.

DJIA 1987	
Friday, Oct. 16	-108.35
Monday, Oct. 19	-505.99

14. Death Valley National Park is located in California. Use the table to determine the difference in elevation between the highest and lowest locations.

Death Valley National Park	
Location	***Elevation (ft.)***
Badwater	-282
Emigrant Pass	5,318
Furnace Creek Airport	-210
Telescope Peak	11,049

15. The table below shows some of the world's most extreme elevations. A negative number means the location is below sea level. Find the difference in elevation between the Puerto Rico Trench and the Java Trench

Location	Elevation (ft.)
Mount Everest	29,028
Aconcagua	22,832
Mount McKinley	20,320
Mariana Trench	-35,840
Puerto Rico Trench	-28,232
Java Trench	-23,376

16. A hot-air balloon is taken for a 2.5-hour trip. The wind speed (and the speed of the balloon) is 4.75 mi/h. The balloon travels in a straight line parallel to the ground. How many miles away from the liftoff site will the balloon land?

17. It is estimated that 7 million people saw off-Broadway shows in 2002. Assume that the average prices of a ticket was $30. How much money was spent on tickets for off-Broadway shows in 2002?

18. A cold front changes the temperature by $-3°F$ each day. If the temperature started at $0°F$, what will the temperature be after 5 days?

19. A cleaning service charges $49.00 to clean a one-bedroom apartment. If the work takes longer than 2 hours, the service charges $18.00 for each additional hour. What would be the total cost for a job that took 4 hours to complete?

20. The value of an investor's stock changed by $-1\frac{3}{4}$ points last week. This week the value changed by 3 times as much. How much did the value of the investor's stock change this week?

21. Isari's recipe for strawberry smoothies requires $\frac{1}{2}$ cup of sliced strawberries per smoothie. How many smoothies can she make using 8 cups of strawberries?

22. Find the value of $(-2)(-2)(-2)$.

23. Find the value of $\frac{5}{7} \cdot \frac{5}{7}$.

24. Find the value of $\left(-\frac{3}{4}\right)\left(-\frac{3}{4}\right)\left(-\frac{3}{4}\right)$.

25. Simplify $\left(2^2\right)\left(2^2\right)\left(2^2\right)$.

26. Simplify -4^3.

27. Simplify $\left(\frac{1}{3}\right)^3$.

28. Simplify $\sqrt{2} \cdot \sqrt{8}$.

29. Simplify $\sqrt{12} \cdot \sqrt{6}$.

30. Simplify $\sqrt{27} \cdot \sqrt{3}$.

31. The square root of 180 is between what two whole numbers?

32. The square root of 57 is between what two whole numbers?

33. The square root of 102 is between what two whole numbers?

34. Anthony had 10 packages of markers. Each package contained 8 markers. He gave his 3 best friends 2 packages each. Write a mathematical expression that would show how many markers he kept for himself.

35. Each month, Mrs. Li pays her phone company $28 for phone service, and $0.07 per minute for long distance calls. Write a mathematical expression to represent her bill for a month in which long distance calls totaled 4 hours.

36. Write a mathematical expression that can be used to represent "the sum of 8 and the product of -3 and 5".

37. In a polygon with *n* sides, the sum of the measures of the interior angle is $180(n-2)°$. What is the sum of the measures of the interior angles of a hexagon?

38. In a regular polygon with *n* sides, the measure of each interior angle is $\frac{180(n-2)°}{n}$. What is the measure of an interior angle of an octagon?

39. Degrees Fahrenheit *F* can be converted to degrees Celsius *C* using the expression $\frac{9}{5}(F-32)$. The hottest day in Florida history was $109°F$ which occurred on June 29, 1931 in Monticello. Convert this temperature to degrees Celsius. Round your answer to the nearest tenth of a degree.

40. Simplify $4[3(x+9)+2]$.

41. Simplify $-3[(x-2)+5(x-2)]$.

42. Simplify $\frac{1}{2}[(10-g)+(-6+3g)]$

43. Use the Commutative Property of Addition to fill in the blank

    $5+x=$ _____

44. Use the Associative Property of Addition to fill in the blank

    $2+(3+y)=$ _____

45. Use the Distributive Property to fill in the blank

    $3(2r-7)=$ _____

46. Consider the equation $y=\frac{3}{2}x+4$. What is the value of y when $x=8$?

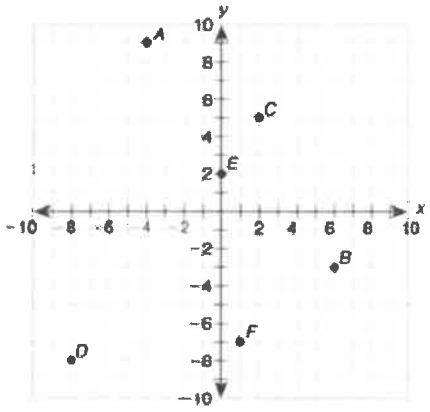
47. Consider the equation $y = x^2 + 4$. What is the value of y when $x = -1$?

48. Consider the equation $y = 15 - 2x$. What is the value of y when $x = 3$?

49. Consider the equation $y = 6x - 2$. What is the value of y when $x = -2$?

50. Consider the equation $y = \frac{1}{2}x + 4$. What is the value of x when $y = 0$?

51. Consider the equation $y = 2x + 8$. What is the value of x when $y = 2$?



52. What are the coordinates for point A?

53. What are the coordinates for point E?

54. What are the coordinates for point F?

55. If you shift the point (2, -1) up 4 units and to the left 3 units what is the coordinate of the location where you land?

56. If you shift the point (-1, 3) down 2 units and to the left 4 units what is the coordinate of the location where you land?

57. If you shift the point (7, -3) up 3 units and to the right 2 units what is the coordinate of the location where you land?

58. There are 250 balls in a box. 20% of them are red. How many red balls are in the box?

59. If a shirt is on sale at 10% off and you paid $9.00 for the shirt. What was its original price?

60. You know that 15% of the students at the school will take AP Chemistry. There are 12 AP Chemistry students. How many student are at the school?

61. Write $\frac{4}{5}$ as a percent.

62. Write $\frac{5}{20}$ as a percent.

63. Write $\frac{3}{25}$ as a percent.

64. If Jerry made 5 out of 30 free throws what percent did he make?

65. If 3 out of 8 ice cream flavors at the store are a fruit flavor what percent of the choices are fruit flavors?

66. If 27% of the student body are seniors and the school has 500 students how many seniors are attending the school?

67. What is the prime factorization of 2184?

68. What is the prime factorization of 8820?

69. What is the prime factorization of 378?

70. Pens are sold in packages of three for $2.25. How many pens can you buy for $20.25?

71. A package of two candy bars cost $1.25. How much will 20 candy bars cost?

72. Five tons of gravel costs $141. How much will 200 tons of gravel cost?

73. Find the value of x for $\frac{3}{4}x+5=17$.

74. Find the value of x for $\frac{1}{8}x-2=2$.

75. Find the value of x for $\frac{3}{5}x+12=18$.

Answers

① $(t + 20)^\circ$

② $(2t)$ hours

③ $(h - 40)$ hours

④ $(160 - x)$ cm

⑤ $\left(\frac{x}{3}\right)$ m

⑥ $(C - 21)$ cm

⑦ $|-2|$

$= |2|$

$= 2$

⑧ $|-5-12|$

$= |-17|$

$= |17|$

⑨ $|8-9|$

$= |-1|$

$= 1$

⑩ $17 - (-6)$

$= 17 + 6$

$= 23^\circ F$

⑪ $1580 - 45$

$= \$1165$

⑫ $19,347 + 17,159 + 5051 + 9$

$= \frac{50642}{4}$

$= 12,660.5$ ft

⑬ $|-108.35 + -505.9|$

$= |-614.26|$

$= 614.26$

⑭ $11,049 - (-282)$

$= 11,331$ ft

⑮ $-28,232 - (-23,376)$

$= |-4856|$

$= 4856$ ft.

⑯ $2.5(4.75) = 11.875$ miles

⑰ $7(30) = \$210$ million

⑱ $0 + 5(-3) = -15^\circ F$

⑲ $49,00 + (4-2)18$

$= 49 + (2)18$

$= 49 + 36$

$= \$85,00$

(20) $(-1\frac{3}{4})(3)$

$= -3\frac{9}{4}$

$= -5\frac{1}{4}$ Points

(21) $8 \div \frac{1}{2}$

$= 8 \cdot 2$

$= 16$ smoothies

(22) $(-2)(-2)(-2)$

$= 4(-2)$

$= -8$

(23) $\frac{5}{7} \cdot \frac{5}{7}$

$= \frac{25}{49}$

(24) $(-\frac{3}{4})(-\frac{3}{4})(-\frac{3}{4})$

$= (\frac{9}{16})(-\frac{3}{4})$

$= \frac{-27}{64}$

(25) $(2^2)(2^2)(2^2)$

$= (4)(4)(4)$

$= 16(4)$

$= 64$

(26) $-4^3 = -64$

(27) $(\frac{1}{3})^3 = \frac{1}{27}$

(28) $\sqrt{2} \cdot \sqrt{8} = \sqrt{16} = 4$

(29) $\sqrt{12} \cdot \sqrt{6} = \sqrt{72}$

$= \sqrt{36}\sqrt{2}$

$= 6\sqrt{2}$

(30) $\sqrt{27} \cdot \sqrt{3}$

$= \sqrt{81}$

$= 9$

(31) $169 < 180 < 196$

$\Rightarrow \sqrt{169} < \sqrt{180} < \sqrt{196}$

$= 13 < \sqrt{180} < 14$

$13 < 14$

(32) $49 < 57 < 64$

$\Rightarrow \sqrt{49} < \sqrt{57} < \sqrt{64}$

$\Rightarrow 7 < \sqrt{57} < 8$

$7 < 8$

(33) $100 < 102 < 121$

$\Rightarrow \sqrt{100} < \sqrt{102} < \sqrt{121}$

$\Rightarrow 10 < \sqrt{102} < 11$

$10 < 11$

34

$(10 - 3(2))(8)$ markers

35

$28 + 4(0.07)$ dollars

36

$8 + (-3)(5)$

37

$180(6-2)$

$= 180(4)$

$= 720°$

38

$\frac{180(8-2)}{8}$

$= \frac{180(6)}{8}$

$= \frac{1080}{8}$

$= 135°$

39

$\frac{9}{5}(109 - 32)$

$= \frac{9}{5}(77)$

$= \frac{693}{5}$

$= 138.6°C$

40

$4[3(x+9)+2]$

$= 4[3x + 27 + 2]$

$= 4[3x + 29]$

$= 12x + 116$

41

$-3[(x-2) + 5(x-2)]$

$= -3[6(x-2)]$

$= -3[6x - 12]$

$= -18x + 36$

42

$\frac{1}{2}[(10-9) + (-6+3g)]$

$= \frac{1}{2}[4 + 2g]$

$= 2 + g$

43

$5 + x = x + 5$

44

$2 + (3+g) = (2+3) + g$

45

$3(2n-7) = 6n - 21$

46

$y = \frac{3}{2}(8) + 4$

$y = \frac{24}{2} + 4$

$y = 12 + 4$

$y = 16$

47) $y = (-1)^2 + 4$

$y = 1 + 4$

$y = 5$

48) $y = 5 - 2(3)$

$y = 5 - 6$

$y = 9$

49) $y = 6(-2) - 2$

$y = -12 - 2$

$y = -24$

50) $y = \frac{1}{2}(0) + 4$

$y = 0 + 4$

$y = 4$

51) $y = 2(2) + 8$

$y = 4 + 8$

$y = 12$

52) $(-4, 9)$

53) $(0, 2)$

54) $(1, -7)$

55) $(2 - 3, -1 + 4)$

$= (-1, 3)$

56) $(-1 - 4, 3 - 2)$

$= (-5, 1)$

57) $(7 + 2, -3 + 3)$

$= (9, 0)$

58) $(0.20)(250)$

$= 50$ Red balls

59) $(9.00)(1 - .10)$

$= (9.00)(.9)$

$= \$8.10$

60) $.15(x) = 12$

$\Rightarrow x = \frac{12}{.15}$

$x = 80$ students.

61) $\frac{4}{5} = 0.8 = 80\%$

(62) $\frac{5}{20} = 0.25 = 25\%$

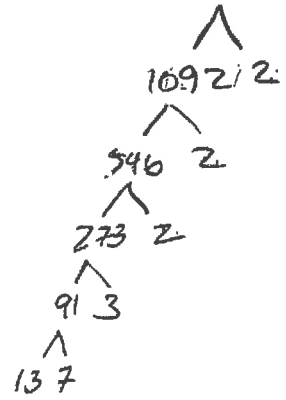
(63) $\frac{3}{25} = 0.12 = 12\%$

(64) $\frac{5}{30} = 0.1\overline{6} \approx 16.67\%$

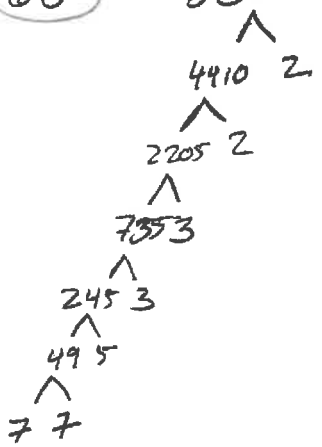
(65) $\frac{3}{8} = 0.375 = 37.5\%$

(66) $(.27)(500) = 135$ seniors

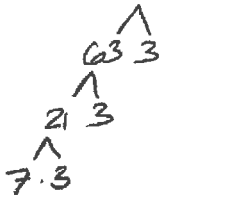
(67) $2184 = 2^3 \cdot 3 \cdot 7 \cdot 13$



(68) $8820 = 2^2 \cdot 3^2 \cdot 5 \cdot 7^2$



(69) $378 = 2 \cdot 3^3 \cdot 7$



(70) $\frac{3}{2.25} = \frac{x}{20.25}$

$2.25x = 3(20.25)$

$\frac{2.25x}{2.25} = \frac{60.75}{2.25}$

$x = 27$ pens

(71) $\frac{2}{1.25} = \frac{20}{x}$

$\frac{2x}{2} = \frac{25}{2}$

$x = 12.5$

\$12.50

(72) $\frac{5}{141} = \frac{200}{x}$

$\frac{5x}{5} = \frac{28200}{5}$

$x = \$5640$

(73) $\frac{3}{4}x + 5 = 17$

$-5 \quad -5$

$3 \cdot \frac{3}{4}x = 12 \cdot 3$

$x = \frac{36}{3}$

$x = 16$

(74) $\frac{1}{8}x - 2 = 2$

$+2 \quad +2$

$8 \cdot \frac{1}{8}x = 4 \cdot 8$

$x = 32$

(75) $\frac{3}{5}x + 12 = 18$

$-12 \quad -12$

$\frac{5}{3} \cdot \frac{3}{5}x = 6 \cdot \frac{5}{3}$

$x = \frac{30}{3}$

$x = 10$