Math Mammoth End-of-the-Year Test - Grade 6

Basic Operations

1. Two kilograms of ground cinnamon is packaged into bags containing 38 g each. There will also be some cinnamon left over. How many bags will there be?

2. Write the expressions using an exponent. Then solve.

   a. $2 \times 2 \times 2 \times 2 \times 2$

   b. five cubed

   c. ten to the seventh power

3. Write in normal form (as a number).

   a. $7 \times 10^7 + 2 \times 10^5 + 9 \times 10^0$

   b. $3 \times 10^8 + 4 \times 10^6 + 5 \times 10^5 + 1 \times 10^2$

4. Round to the place of the underlined digit.

   a. $6,29\underline{9},504 \approx$ _____   **b.** $6,609,\underline{9}42 \approx$ _____

Expressions and Equations

5. Write an expression.

   a. 2 less than s **b.** the quantity $7 + x$, squared

   c. 5 times the quantity $y - 2$ **d.** the quotient of 4 and x^2

6. Evaluate the expressions when the value of the variable is given.

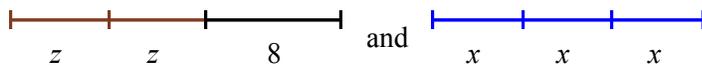|	
a. $40 - 8x$ when $x = 2$	**b.** $\dfrac{65}{p} \cdot 3$ when $p = 5$

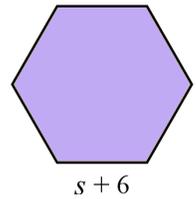7. Write an expression for each situation.

   a. You bought m yogurt cups at \$2 each and paid with \$50. What is your change?

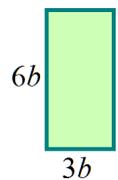   **b.** What is the area of a square with side length s?

8. Write an expression for the total length of the line segments, and simplify it.

   z z 8 and x x x

9. Write an expression for the perimeter of the figure, and simplify it.

   $s + 6$

10. Write an expression for the area of the figure, and simplify it.

    $6b$

    $3b$

11. Simplify the expressions.

a. $9x - 6x$	**b.** $w \cdot w \cdot 7 \cdot w \cdot 2$

12. Multiply using the distributive property.

a. $7(x + 5) =$	**b.** $2(6p + 5) =$

13. Find the missing number in the equations.

a. ____ $(6x + 5) = 12x + 10$	**b.** $5(2h + $ ____ $) = 10h + 30$

14. Solve the equations.

 | **a.** $\dfrac{x}{31} = 6$ | **b.** $a - 8.1 = 2.8$ |
    |---|---|

15. Which of the numbers 0, 1, 2, 3 or 4 make the equation $\dfrac{8}{y^2} = 2$ true?

16. Write an equation EVEN IF you could easily solve the problem without an equation! Then solve the equation.

   The value of a certain number of quarters is 1675 cents. How many quarters are there?

17. Write an inequality for each phrase. You will need to choose a variable to represent the quantity in question.

   a. Eat at most 5 pieces of bread.

   b. You have to be at least 21 years of age.

18. Write an inequality that corresponds to the number line plot.

   a.

   b.
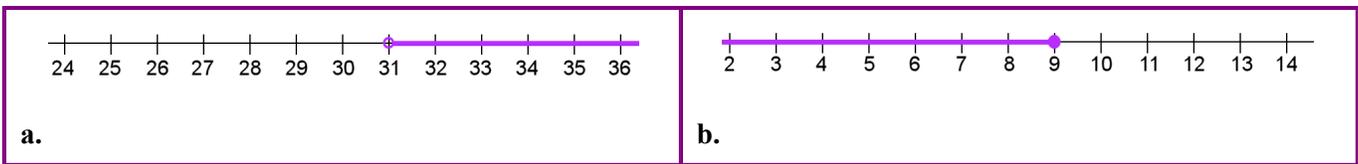
19. A car is traveling with a constant speed of 80 kilometers per hour. Consider the variables of time (t), measured in hours, and the distance traveled (d), measured in kilometers.
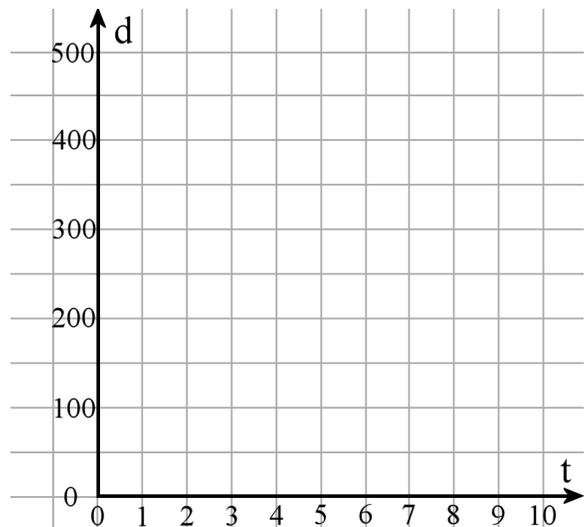
   a. Fill in the table.

t (hours)	0	1	2	3	4	5	6
d (km)							

   b. Plot the points on the coordinate grid.

   c. Write an equation that relates t and d.

   d. Which of the two variables is the independent variable?

7

Decimals

20. Write as decimals.

    a. 13 millionths   **b.** 2 and 928 ten-thousandths

21. Write as fractions or mixed numbers.

    a. 0.00078   **b.** 2.000302

22. Find the value of the expression $x + 0.07$ when x has the value 0.0002.

23. Calculate mentally.

a. $0.8 \div 0.1 =$	**b.** $0.06 \times 0.008 =$

24. **a.** Estimate the answer to 7.1×0.0058.

    b. Calculate the exact answer.

25. What number is 22 ten-thousandths more than 1 1/2?

26. Multiply or divide.

a. $10^5 \times 0.905 =$	**b.** $24 \div 10^4 =$

27. Divide, and give your answer as a decimal. If necessary, round the answers to three decimal digits.

a. $175 \div 0.3$	**b.** $\dfrac{2}{9}$

28. Annie bought 3/4 kg of cocoa powder, which cost $12.92 per kg.

    a. Estimate the cost.

    b. Find the exact amount she had to pay.

29. Alyssa and Anna bought three toy cars for their three cousins from a store on line. The price for one car was $3.85. A shipping fee of $4.56 was added to the total cost. The two girls shared the total cost equally. How much did each girl pay?

Measuring Units   *A calculator is allowed in this section.*

1 mile = 5,280 feet	1 ton = 2,000 lb	1 gal = 4 qt
1 mile = 1,760 yards	1 lb = 16 oz	1 qt = 2 pt
		1 pt = 16 fl. oz

30. Convert to the given unit. Round your answers to two decimals, if needed.

a. 178 fl. oz. = _____ qt   **b.** 0.412 mi = _____ ft   **c.** 1.267 lb = _____ oz

31. How many miles is 60,000 inches?

32. A big coffee pot makes 2 quarts of coffee.
    How many 6-ounce servings can you get from that?

33. A pack of 36 milk chocolate candy bars costs $23.20. Each bar weighs 1.6 oz.
    Calculate how much one pound of these chocolate bars would cost (price per pound).

34. Convert the measurements. You can write the numbers in the place value charts to help you.

    a. 39 dl = _____ L   **b.** 15,400 mm = _____ m

    c. 7.5 hm = _____ cm   **d.** 597 hl = _____ L

    e. 7.5 hg = _____ kg   **f.** 32 g = _____ cg

kl	hl	dal	l	dl	cl	ml

kg	hg	dag	g	dg	cg	mg

km	hm	dam	m	dm	cm	mm

35. **a.** One brick is 215 mm long. How many of these bricks,
    put end to end, will cover a 5.15 meter wall?

    b. Calculate the answer to the previous question again,
    assuming 1 cm of mortar is laid between the bricks.

Ratio

36. **a.** Draw a picture where there are a total of ten squares,
    and for each two squares, there are three triangles.

    b. Write the ratio of squares to all triangles,
    and simplify this ratio to the lowest terms.

37. Write ratios of the given quantities. Then, simplify the ratios. You will need to *convert* one quantity so it has
    the same measuring unit as the other.

a. 3 kg and 800 g	**b.** 2.4 m and 100 cm

38. Express these rates in the lowest terms.

a. $56 : 16 kg	**b.** There are six teachers for every 108 students.

39. Change to unit rates.

a. $20 for five T-shirts	**b.** 45 miles in half an hour

40. **a.** It took 7 hours to mow four equal-size lawns. At that rate, how many lawns could be mowed in 35 hours?
    You can use the table below to help.

Lawns					
Hours					

    b. What is the unit rate?

41. Joe and Mick also worked on a project unequally. They decided to divide
    their pay in a ratio of 3:4 (3 parts for Joe, 4 parts for Mick). The total pay was $180.
    Calculate how much Mick got.

42. Use the given ratios to convert the measuring units. If necessary, round the answers to three decimal digits.

a. Use $1 = \dfrac{1.6093 \text{ km}}{1 \text{ mi}}$ and convert 7.08 miles to kilometers.

7.08 mi =

b. Use $1 = \dfrac{1 \text{ qt}}{0.946 \text{ L}}$ and convert 4 liters to quarts.

4 L =

Percent

43. Write as percentages, fractions, and decimals.

a. _____% $= \dfrac{35}{100} =$ _____

b. 9% $= \dfrac{}{} =$ _____

c. _____% $= \dfrac{}{} = 1.05$

44. Fill in the table, using mental math.

	510
1% of the number	
5% of the number	
10% of the number	
30% of the number	

45. A pair of roller skates is discounted by 40%. The normal price is $65.
What is the discounted price?

46. A store has sold 90 notebooks, which is 20% of all the notebooks they had.
How many notebooks did the store have at first?

47. Janet has read 17 of the 20 books she borrowed from the library.
What percentage of the books she borrowed has she read?

Prime Factorization, GCF, and LCM

48. Find the prime factorization of the following numbers.

a. 45 /\	**b.** 78 /\	**c.** 97 /\

49. Find the least common multiple of these pairs of numbers.

a. 2 and 8	**b.** 9 and 6

50. Find the greatest common factor of the given number pairs.

a. 30 and 16	**b.** 45 and 15

51. List three different multiples of 28 that are more than 100 and less than 200.

52. First, find the GCF of the numbers. Then factor the expressions using the GCF.
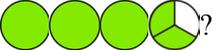
a. The GCF of 18 and 21 is _____

$18 + 21 =$ ____ · ____ + ____ · ____ = ____ (____ + ____)

b. The GCF of 56 and 35 is _____

$56 + 35 =$ ____ (____ + ____)

Fractions

53. Solve.

a. $\dfrac{4}{5} \div \dfrac{1}{5}$	**b.** $3\dfrac{1}{8} \div 1\dfrac{1}{2}$	**c.** $4 \div \dfrac{5}{7}$

54. Write a division sentence, and solve.

How many times does go into ?

55. Write a real-life situation to match this fraction division: $1\dfrac{3}{4} \div 3 = \dfrac{7}{12}$

56. How many 3/4-cup servings can you get from 7 1/2 cups of coffee?

57. A rectangular room measures 12 1/2 feet by 15 1/3 feet. It is divided into three equal parts.
    Calculate the area of one of those parts.

58. The perimeter of a rectangular screen is 15 1/2 inches, and the ratio of its width to its height is 3:2.
    Find the width and height of the screen.

Integers

59. Compare the numbers, writing **<** or **>** in the box. **a.** 0 ☐ −3   **b.** −2 ☐ −8

60. Write a comparison to match each situation (with < or >).

    a. The temperature −7°C is warmer than −12°C.

    b. Harry has $5. Emily owes $5.

61. Find the difference between the two temperatures.
    a. −13°C and 10°C   **b.** −9°C and −21°C

62. Write using mathematical symbols, and simplify (solve) if possible.

    a. The opposite of 7   **b.** the absolute value of −6
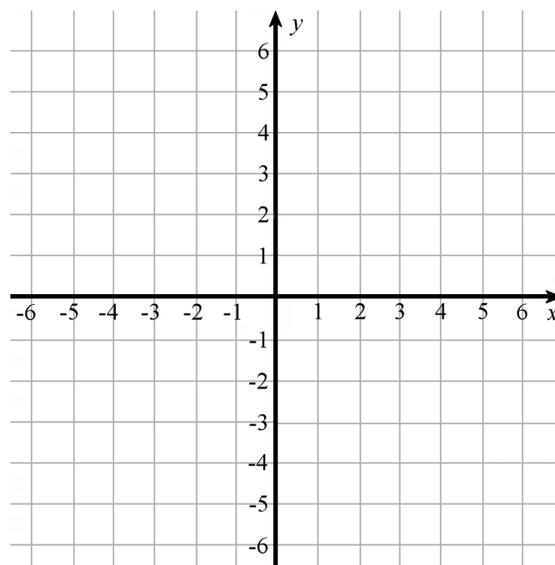
    c. the absolute value of 5   **d.** the absolute value of the opposite of 6

63. **a.** Plot the point (−5, 3).

    b. Reflect the point in the *x*-axis .
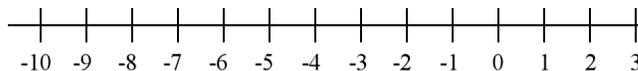
    c. Now, reflect the point you got in (b) in the *y*-axis.

    d. Join the three points with line segments.
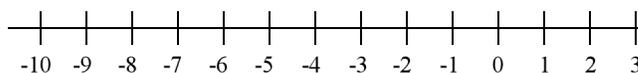   What is the area of the resulting triangle?

64. Draw a number line jump for each addition or subtraction
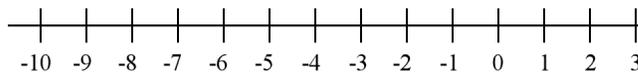   sentence, and solve.

    a. −2 + 5 = _____

    b. −2 − 4 = _____

    c. −1 − 5 = _____

15

65. Write an addition or subtraction in the box to match each situation, and fill in the blanks.

    a. Elijah has saved $10. He wants to buy shoes for $14.
    That would make his money situation to be _____.

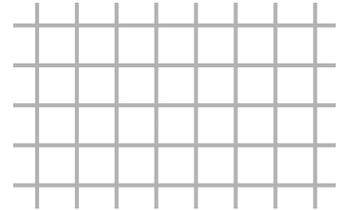   **b.** A fish was swimming at the depth of 2 m. Then it sank 1 m.
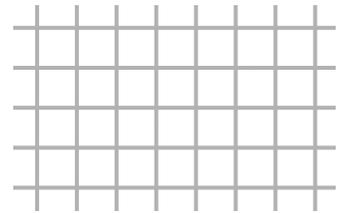   Now he is at the depth of _____ m.

Geometry

66. Draw in the grid a right triangle with a base of 4 units and a height of 3 units.
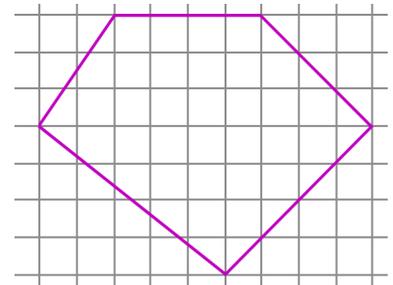
    Calculate its area.

67. Draw in the grid a parallelogram with an area of 15 square units.
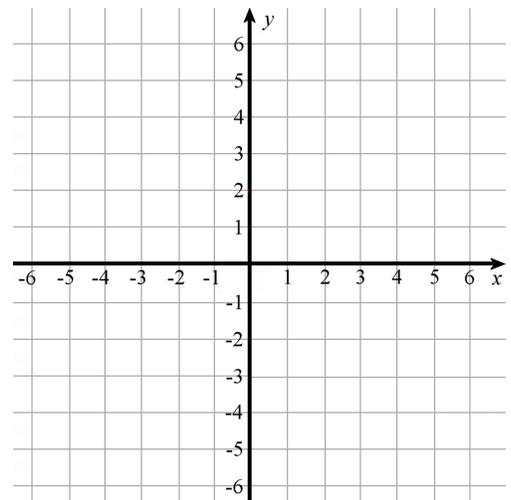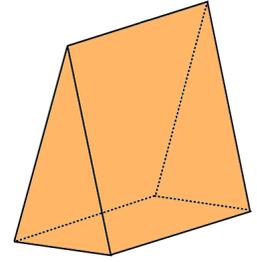
68. Find the area of this polygon, in square units.

69. Draw a quadrilateral in the grid with vertices
    $(-5, 5)$, $(-5, -3)$, $(2, -1)$, and $(2, 4)$.

    What is the quadrilateral called?

    Find its area.

70. Name this solid. Draw a sketch of its net.

71. **a.** Name the solid that can be built from this net.

    b. Calculate its surface area.

11.2 cm

13 cm

15 cm

20 cm
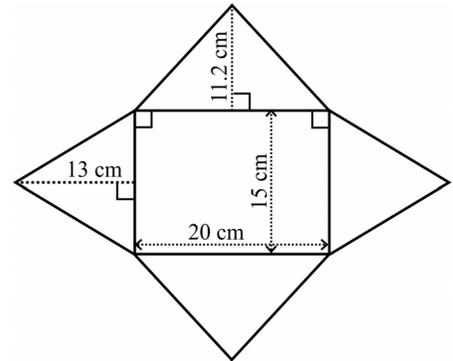
72. The edges of each little cube measure **1/2 cm**. What is the total volume of these figures, in cubic units?

a.

b.
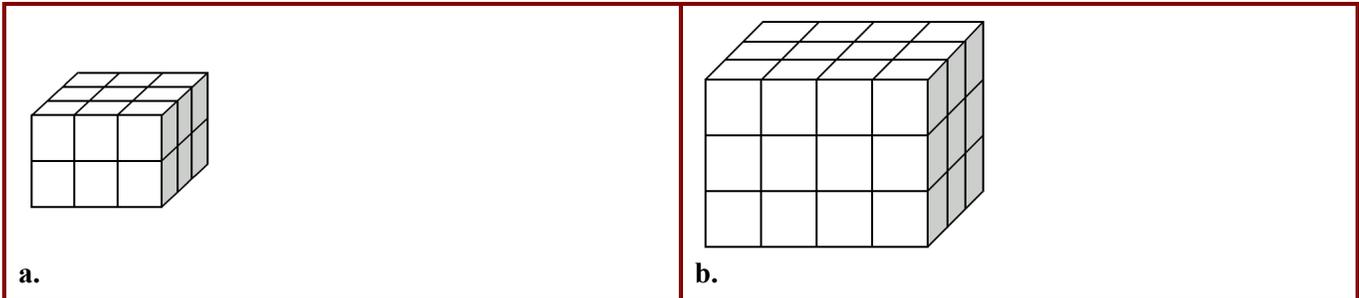
73. A box containing a construction toy measures 1 3/4 in. by 8 1/2 in. by 6 inches.

    a. Calculate its volume.

    b. Would 12 of these boxes fit into a crate with the inside
        measurements of 1 ft by 1 ft by 1 ft?
        Justify your reasoning.

Statistics

74. **a.** Make a stem-and-leaf plot of this data.

    55 59 61 62 64 65 65 68 69 70 72 74 77 83 89 94

    (The ages of people in a senior chess club)

  b. Find the median.

  c. Find the interquartile range.

Stem	Leaf

75. **a.** Describe the shape of this distribution.

  b. Which measure of center would be best to describe this distribution?

Prices of Online Biology Courses

76. **a.** Create a dot plot from this data.

    9 10 5 6 4 8 7 3 8 1 7 7 5 7 8 9 5 6 6 7

    (points on a math quiz of a group of students)

  b. Describe the shape of the distribution.

  c. Describe the spread of the data.

  d. Choose a measure of center to describe the data, and determine its value.