NOTE TO TEACHERS: • *Calculators may be used for questions unless indicated otherwise.* • *Two formula sheets are provided on the last two pages for grades 6, 7, 8, 11 and the Grad.* • *The learning standard addressed in each question is included after the answer.* • *In most cases, for answers requiring a constructed response, several suggested solutions are included. There may be (probably are) other solutions possible.*

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EIGHTH GRADE MATH

1. **One fourth of the students at Hazel Park Junior High chose to take a foreign language elective course of either Spanish, French or German. Of those students, two thirds chose Spanish. What fraction of all the students at Hazel Park Junior High chose Spanish as a foreign language elective?**
(no calculator)

A. 1/6
B. 1/5
C. 3/7
D. 11/12

2. **A number to the 8th power divided by the same number to the 4th power equals 625. What is the number?**

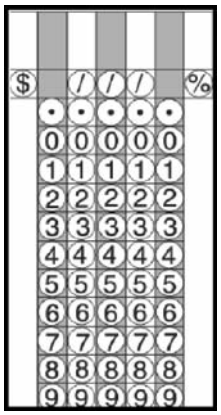
A. 5
B. 11
C. 15
D. 25

3. **What is the value of $\frac{m^2}{9} + m^2 - 15$, when m = 3?**

A. -9
B. -5
C. 3
D. 5

4. **What is the 100th term of the arithmetic sequence?**
Put your answer in the grid below.

-3, -7, -11, -15, ...

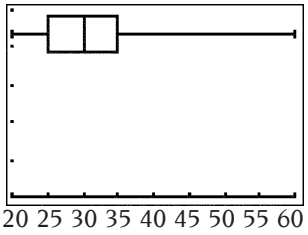


5. **A teacher at Highland Junior High entered a 72, 76, 80 and a 76 for a student's recent math test scores. The student needed to make up a math test due to an excused absence. When the student made up the test, she received a 100. Which of the following is a true statement?**

A. The mean score remained the same.
B. The mean score increased and the median remained the same.
C. The median score increased and the mean score remained the same.
D. Both the mean score and the median score increased.

6. **Given the following data, determine which box-and-whisker plot is correct.**

25, 30, 20, 35, 40, 40, 45, 25, 60, 50, 55, 55

A.


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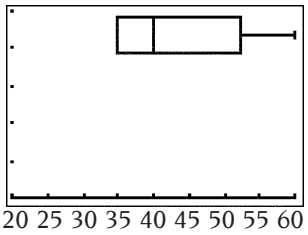

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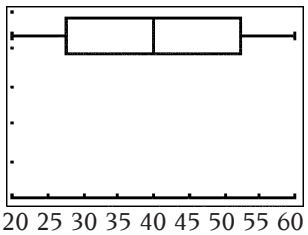

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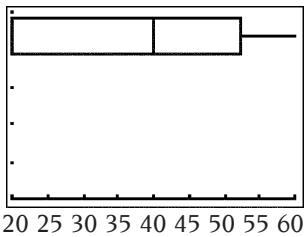
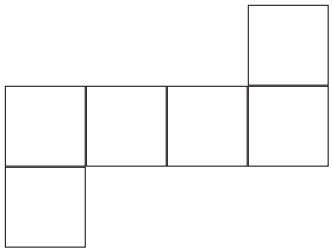


EIGHTH GRADE MATH

7. Which three-dimensional figure can the following net be used to make?



A. cube
B. cone
C. square pyramid
D. triangular prism

8. Which of the following numbers is between 25% and 40%?

A. 1/5
B. 1/3
C. 3/5
D. 11/15

9. You place a black ball, red ball, blue ball and a yellow ball in a bag. If you pull out a blue ball and then replace it, what is the theoretical probability that you will pull out the blue ball again on your second try?

A. 12.5%
B. 25%
C. 50%
D. 62.5%

10. Technology Abounds is having a 5% sale on their 3GB iPods. Tommy is thinking of buying a 2GB iPod for $123.99 or the 3GB iPod originally priced at $213.99. Tommy must also pay a 6 1/2% sales tax. Compare the costs of the two iPods and explain which iPod Tommy should purchase from Technology Abounds if he wants the better buy.

11. Two squares have a ratio of corresponding sides that is 1:3. What is the ratio of the areas?

A. 1:3
B. 1:6
C. 1:9
D. 1:5

12. Which of the following is an irrational number?

A. $\sqrt{9}$
B. $\sqrt{36}$
C. $\sqrt{200}$
D. $\sqrt{256}$

13. Which operation will make this correct?

45___(6 + 3) + 4^3 = 69

A. –
B. +
C. x
D. ÷

14. In the linear equation y = -3x + 5, the value -3 represents which of the following?

A. the slope of the line
B. the y- coordinate of the y-intercept
C. the x-coordinate of the y-intercept
D. the quadrant in which the line lies

15. Which of the following is NOT a function?

A. { (7, 7), (6, 5), (5, 4) }
B. { (7, 5), (6, 5), (5, 4) }
C. { (7, 5), (5, 6), (5, 4) }
D. { (7, 7), (6, 6), (5, 5) }

16. The radius of the planet Saturn in miles is 37,500. Which expression represents the radius of Saturn in miles in scientific notation?

A. 3.75×10^{-4}
B. 37.5×10^{3}
C. 375×10^{2}
D. 3.75×10^{4}

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EIGHTH GRADE MATH

17. Which values of k make the equation true?

$|k| + 3 = 12$

A. 9
B. 9 and -9
C. 9 and -15
D. 15 and -15

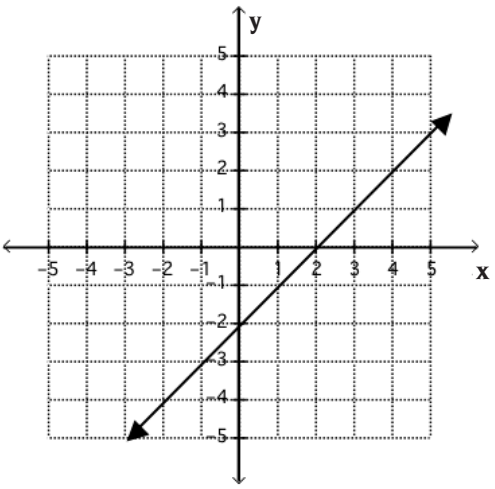
18. Which ordered pair represents the solution to the following linear system?

$y = x - 2$

$y = 3x$

A. (-2, -6)
B. (-1, -3)
C. (0, -2)
D. (1,3)

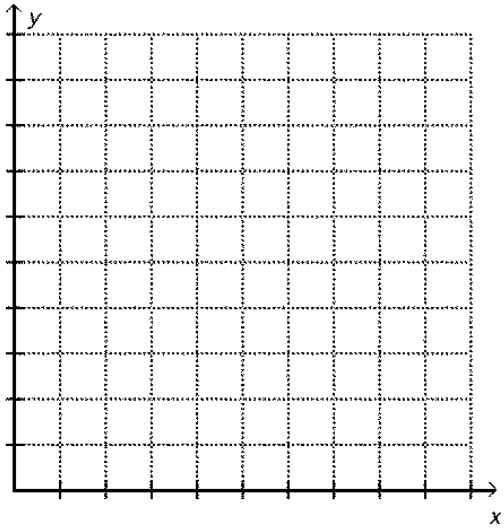
Use the graph below for problem 19.



19. What is the equation of the above line?

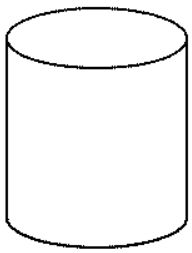
A. y = 3x - 5
B. y = x + 2
C. y = x – 2
D. y = -3x + 5

20. Yang's tutor from the college costs $10 per visit plus $20 per hour spent tutoring. Write an equation that represents Yang's daily cost (*y*) if he spends (*x*) amount of hours with his tutor in one visit. Graph the equation (label your axis) **and explain what the slope represents.**



EIGHTH GRADE MATH

21. What is the volume of the cylinder where the diameter of the base is 4" and the height is 10"?

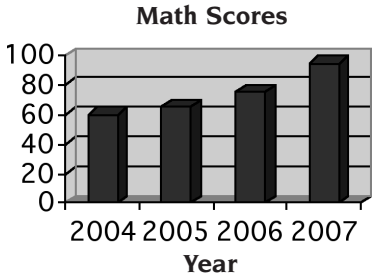


A. 20 in^2
B. 40 in^2
C. 160 in^3
D. 400 in^3

22. Which algebraic expression represents the phrase "a number less than 7?"

A. $x - 7$
B. $7x$
C. $x/7$
D. $7 - x$

Use the following bar graph of the average math scores per year to answer question number 23.

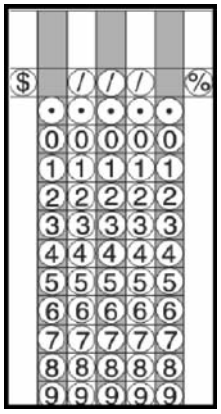


23. Which of the following in the bar graph above is a false statement?

A. 2004 had the lowest of the average math scores from 2004 through 2007.
B. The average math scores increased over the four year period.
C. There is approximately a ten-point increase in the average test scores between 2005 and 2006.
D. There is not enough information in the bar graph that allows for any conclusions to be drawn.

24. A Humboldt Junior High basketball star scored 18, 21, 32 and 17 points in the first four games of the season. He is aiming to score 22 points per game for the season. How many points does he need to score in his next game to achieve this?

Put your answer in the grid below.



25. If a student chooses a number from 1 to 10, and another student has one guess to try to get it, how many times would you expect the student to get it right if they did this 20 times?

A. 0
B. 2
C. 10
D. 20

26. A waitress, Mai, received a 17% tip on a $136.78 dinner. How much money did Mai receive?

A. $21.00
B. $21.25
C. $23.25
D. $25.25

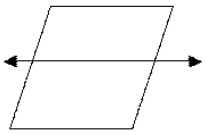
27. One mile is about 1.6 kilometers. Emma lives 4 miles from school. About how many kilometers does she live from school?

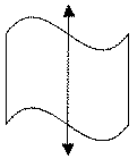
A. about 1.6 kilometers
B. about 4 kilometers
C. about 5.6 kilometers
D. about 6.4 kilometers

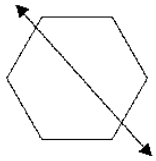
28. Polygon ABCD is congruent to Polygon EFGH. Given that AD = 7x + 3 and EH = 6x + 5. Find the length AD.

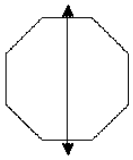
A. 2
B. 8
C. 13
D. 17

29. Which figure shows a line of symmetry?

A. 

C. 

B. 

D. 

30. A statue of Mr. Ed Leader, who is 6 ft. tall, was unveiled in honor of his dedication to the MCAII tests. He was curious to find how high the statue stood. Mr. Ed Leader and his previous math teacher from Capitol Hill School measured the shadows cast. The shadow length of Mr. Ed Leader was 15 ft. and the statue was 45 ft. Explain or show how they can use a proportion to find the height of the statue.

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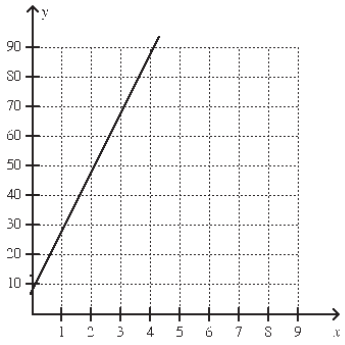
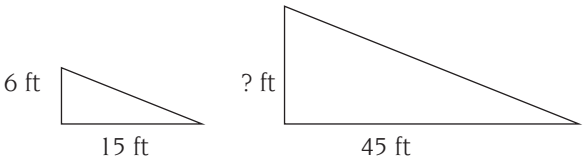
EIGHTH GRADE MATH ANSWERS

1. A (number sense – use rational and irrational numbers to solve real-world problems)
2. A (computation & operation – multiply and divide expressions involving exponents with a common base)
3. B (algebra – multiply and divide expressions of the form ax^n)
4. -399 (patterns & functions – recognize when a list of numbers forms an arithmetic or geometric progression and able to determine subsequent terms in the progression)
5. B (data & statistics – compute the quartiles of a data set)
6. C (data & statistics – construct and analyze box-and-whisker plots)
7. A (spatial sense – know how to find the surface areas of cubes)
8. B (number sense – represent and compare rational and irrational numbers symbolically)
9. B (probability – understand that p is the probability of an event occurring)
10. The 2GB is at $66.03 per GB. The 3GB is at $72.17 per GB. Therefore, the 2GB is the better buy. (number sense – use rational and irrational numbers to solve real-world and mathematical problems)
11. C (geometry – use the concept of similarity in simple two-dimensional figures to solve real-world and mathematical problems involving proportionality)
12. C (number sense – classify numbers as rational or irrational)
13. D (computation & operation – apply the correct order of operations and grouping symbols)
14. A (patterns & functions – represent quantitative relationships graphically and use the graphs to solve real-world and mathematical problems)
15. C (patterns & functions – represent quantitative relationships graphically and use the graphs to solve real-world and mathematical problems)
16. D (computation & operation – use scientific notation with positive and negative powers of 10, with appropriate treatment of significant digits, to solve real-world and mathematical problems)
17. B (patterns & functions – represent quantitative relation ships graphically and use the graphs to solve real-world and mathematical problems)
18. B (algebra – apply the correct order of operations including addition, subtraction, multiplication, division, grouping symbols, and powers, to simplify and evaluate algebraic expressions)
19. C (algebra - apply the correct order of operations including addition, subtraction, multiplication, division, grouping symbols, and powers, to simplify and evaluate algebraic expressions)
20. The slope, 20, represents Yang's hourly rate of $20 per hour. (algebra - apply the correct order of operations including addition, subtraction, multiplication, division, grouping symbols, and powers, to simplify and evaluate algebraic expressions)



21. B (geometry – know how to solve the surface area and volume of cubes, prisms, and cylinders)
22. D (algebra – apply the correct order of operations including subtraction to simplify and evaluate algebraic expressions)
23. D (data & statistics – construct and analyze graphs)
24. 22 (data & statistics – compute the quartiles of a data set)
25. B (probability – use a variety of experiments to explore the relationship between experimental and theoretical probabilities and the effect of the sample size)
26. C (number sense – use rational and irrational numbers to solve real-world and mathematical problems)
27. D (measurement – use the concept of similarity in simple two-dimensional figures to solve real-world and mathematical problems involving proportionality)
28. A (geometry – apply the relationship between changes in one or more linear distances in a planar figure and the change in area)
29. D (geometry – predict the position and orientation of simple geometric shapes)



30. 6ft/?ft = 15ft/45ft *or* since 15 x 3 = 45 then 6 x 3 = 18 The height of the statue is 18ft. (geometry – use the concept of similarity in simple two-dimensional figures to solve real-world and mathematical problems involving proportionality)