

CERT – Grade 10 – MATHEMATICS – TEST 1

40 Minutes—40 Questions

DIRECTIONS: Solve each problem, choose the correct answer, and then fill in the corresponding oval on your answer sheet.

Do not linger over problems that take too much time. Solve as many as you can; then return to the others in the time you have left for this test.

You are permitted to use a calculator on this test. You may use your calculator for any problems you choose,

but some of the problems may be best done without using a calculator.

Note: Unless otherwise stated, all of the following should be assumed:

1. Illustrative figures are NOT necessarily drawn to scale.
2. Geometric figures lie in a plane.
3. The word *line* indicates a straight line.
4. The word *average* indicates arithmetic mean.

DO FIGURING HERE

1. $6 + 10 \div 2 - 3^2 = ?$

- A. 2
- B. 1
- C. 0
- D. -1
- E. -2

2. Hannah took six quizzes in math. She scored 4 twice, 6 once, and 8 three times. What is Hannah's average for the six math quizzes?

- F. $4\frac{1}{3}$
- G. $5\frac{2}{3}$
- H. $6\frac{1}{3}$
- J. $6\frac{2}{3}$
- K. $7\frac{1}{3}$

3. It took Jesse 195 minutes to write an essay for school. How many hours did it take Jesse to write the essay for school?

- A. 3.15
- B. 3.25
- C. 3.45
- D. 4.15
- E. 4.25

4. If a is the least common multiple of 12, 24, and 36, and b is the lowest prime number, what is the sum of a and b ?

- F. 3
- G. 4
- H. 73
- J. 74
- K. 145

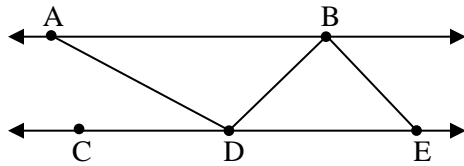
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DO FIGURING HERE

5. Kevin wants to cover a rectangular floor that is 15 feet by 30 feet with carpeting. Assuming no waste, how many square *yards* of carpeting will Kevin need to completely cover the rectangular floor?
- A. 450
 - B. 225
 - C. 150
 - D. 50
 - E. 27

6. In the figure below, line AB is parallel to line CE, points C, D, and E are collinear, and segment BD is congruent to segment BE. If the measure of angle ADC is 35° and the measure of angle DBE is 90° , what is the measure of angle ADB?

- F. 95°
- G. 100°
- H. 105°
- J. 115°
- K. 125°



7. If x , y , and z are whole numbers greater than 2, and if $xyz^2 = 735$, what is the value of $x + y + z$?
- A. 23
 - B. 21
 - C. 19
 - D. 17
 - E. 15

8. If $3x - 7 < 29$, then which of the following must be true?
- F. $x < 12$
 - G. $x < 10$
 - H. $x < 7$
 - J. $x > 10$
 - K. $x > 12$

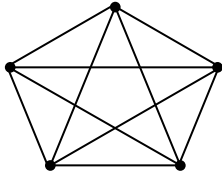
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9. In the standard (x, y) coordinate plane, what is the distance between the points $(2, -10)$ and $(-3, 5)$?
- A. $10\sqrt{5}$
 - B. 20
 - C. $5\sqrt{10}$
 - D. 15
 - E. $5\sqrt{5}$
10. A jar contains only black and white balls. The probability of randomly choosing a white ball from the jar is currently $\frac{5}{12}$. If 1 white ball and 1 black ball are removed from the jar, what will be the new probability of randomly choosing a white ball from the jar?
- F. $\frac{4}{11}$
 - G. $\frac{2}{5}$
 - H. $\frac{6}{13}$
 - J. $\frac{4}{9}$
 - K. It cannot be determined based on the information provided.
11. If $|14 - 2x| = 20$, x could equal which of the following?
- A. -3 only
 - B. 3 only
 - C. -3 or 3 only
 - D. -3 or 17 only
 - E. 3 or 17 only
12. If the ratio of the areas of two circles is 1:10, what is the ratio of the circumference of the smaller circle to the circumference of the larger circle?
- F. 10:1
 - G. 1:10
 - H. $1:\sqrt{10}$
 - J. 1:100
 - K. 1:5

13. If the volume of a cube is 27 m^3 , what is the surface area of the cube, in square meters?

A. 27
 B. 36
 C. 45
 D. 54
 E. 81

14. A convex pentagon has five diagonals as shown below.



How many diagonals does a convex octagon have?

F. 20
 G. 19
 H. 17
 J. 16
 K. 14

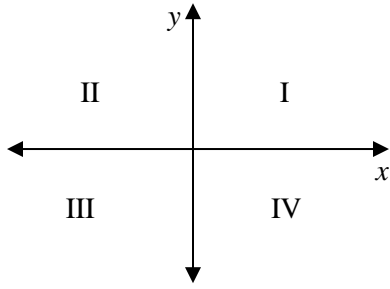
15. A baker needs 2 pounds of flour and 3 sticks of butter to make 64 cupcakes. At these rates, how many pounds of flour and how many sticks of butter would the baker need to make 352 cupcakes?

| | Flour (pounds) | Butter (sticks) |
|----|-------------------|--------------------|
| A. | 11 | 16.5 |
| B. | 11 | 8.25 |
| C. | 5.5 | 16.5 |
| D. | 5.5 | 8.25 |
| E. | 10 | 15 |

16. Mark's deli offers customers 2 different types of bread (white and rye), 4 different cold cuts (ham, turkey, salami, and bologna), and 4 different condiments (mustard, ketchup, mayonnaise, and relish). Assuming a customer picks one type of bread, one cold cut, and one condiment only, how many different combinations of bread, cold cut, and condiment are possible?

F. 10
 G. 12
 H. 16
 J. 32
 K. 60

17.



DO FIGURING HERE

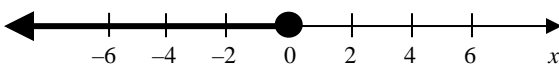
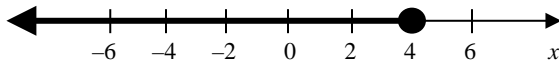
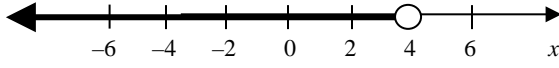
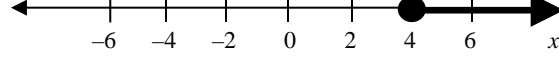
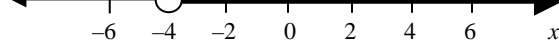
Line m , not shown, has a negative slope and a positive y -intercept. Line m does NOT have points in which of the following quadrants?

- A. Quadrant I only
- B. Quadrants I and II only
- C. Quadrants III and IV only
- D. Quadrants I and III only
- E. Quadrant III only

18. Ann works 3.5 hours per day 3 days per week. If Ann earns \$6.50 per hour, how much money will she earn during a 7-week period?

- F. \$487.25
- G. \$477.75
- H. \$432.25
- J. \$144.00
- K. \$123.50

19. Which of the following graphs shows the solution set for the inequality $4 - 2x \leq -4$?

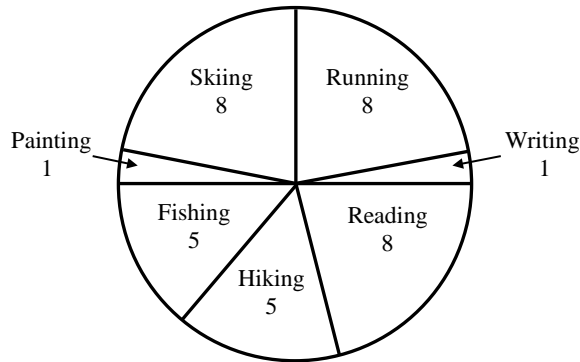
- A. 
- B. 
- C. 
- D. 
- E. 

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Use the information that follows to answer questions 20-22.

DO FIGURING HERE

Jenna conducted a survey of the students in her class to determine which of 7 hobbies were the most popular among members of the class. Each student in the class selected 1 of the 7 hobbies as his or her favorite. The circle graph below shows the number of students who selected each of the hobbies as a favorite. A total of 36 students participated in the survey.



20. To the nearest 0.1%, what percent of the students who participated in the survey selected “Hiking” as their favorite hobby?
- F. 1.4%
 - G. 5.0%
 - H. 13.9%
 - J. 22.2%
 - K. 50.0%
21. According to the graph, what is the ratio of the number of students who selected “Fishing” as their favorite hobby to the number of students who selected “Reading” as their favorite hobby?
- A. 1:5
 - B. 5:5
 - C. 5:8
 - D. 8:5
 - E. 8:1
22. In the circle graph above, what is the angle measure of the sector that represents the number of students who selected “Writing” as their favorite hobby?
- F. 1°
 - G. 5°
 - H. 9°
 - J. 10°
 - K. 12°

GO ON TO THE NEXT PAGE

23. Which of the following is the equation of a horizontal line that passes through the point $(5, 7)$?

- A. $y = 5$
- B. $y = 7$
- C. $x = 5$
- D. $x = 7$
- E. $y + 7 = x + 5$

24. Given the length of sides XY and XZ as shown in triangle XYZ below, what is the length of side YZ?

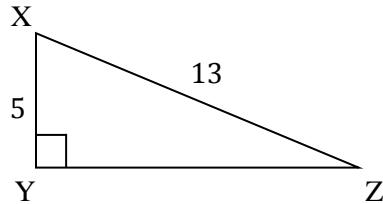
F. $5\sqrt{13}$

G. 12

H. $\sqrt{194}$

J. 18

K. $5\sqrt{5}$



25. For all positive integers x , y , and z , which of the following expressions equals $\frac{x}{z}$?

A. $\frac{x}{yx} \cdot \frac{zy}{yx}$

B. $\frac{x}{y} + \frac{y}{z}$

C. $\frac{x \cdot z}{z \cdot x}$

D. $\frac{x+y}{z+y}$

E. $\frac{x}{y} \div \frac{z}{y}$

26. The figure below shows a triangle inscribed in a circle with center O. Given that the radius of the circle is 5 and that chord XY has length 6, what is the area of triangle XYZ ?

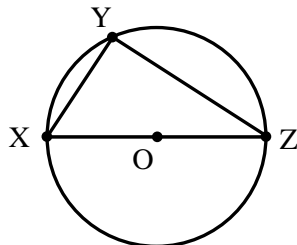
F. 24

G. $10\sqrt{6}$

H. 25

J. 30

K. 36



27. For all real numbers H and W , if $H = 6 - 4(W + 1)$, then $W = ?$

- A. $\frac{H}{4} - \frac{3}{2}$
- B. $\frac{H}{4} + 6$
- C. $\frac{H}{2} - 1$
- D. $\frac{H - 10}{-4}$
- E. $\frac{2 - H}{4}$

28. Line segment AB is located in the standard (x, y) coordinate plane. The coordinates of endpoint A are $(5, 6)$ and the coordinates of endpoint B are $(17, -22)$. If point M is the midpoint of segment AB , what is the y -coordinate of point M ?

- F. 11
- G. 6
- H. -6
- J. -8
- K. -14





29. Lines $2x + 12 = 2y$ and $y = 4x - 3$ intersect on a standard (x, y) coordinate plane. What is the x -coordinate of the point where the two lines intersect?



- A. 3
- B. 6
- C. 9
- D. -3
- E. -6

30. If $x^2 - 16x = -64$, then x could equal which of the following?

- F. 16 only
- G. 8 only
- H. -8 or 8 only
- J. -16 only
- K. -16 or 16 only

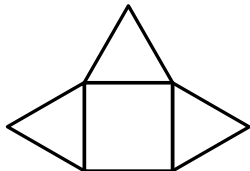
31. The chart below displays information regarding the number of picture frames sold by a store in a given month.

| Month | Number Sold |
|----------|---|
| January |  |
| February |  |
| March |  |
| April |  |

 = 100 Frames  = 50 Frames

According to the chart, what fraction of the frames sold during the four-month period were sold in March?

- A. $\frac{3}{10}$
 B. $\frac{1}{4}$
 C. $\frac{1}{5}$
 D. $\frac{1}{6}$
 E. $\frac{1}{10}$
32. If the perimeter of a square is 25 inches long, what is the area of the square?
- F. 25 in^2
 G. 20 in^2
 H. $\frac{625}{16} \text{ in}^2$
 J. $4\sqrt{5} \text{ in}^2$
 K. $\frac{25}{4} \text{ in}^2$
33. The figure below is composed of a square and 3 equiangular triangles. If the area of the square is 49, what is the perimeter of the composite figure?

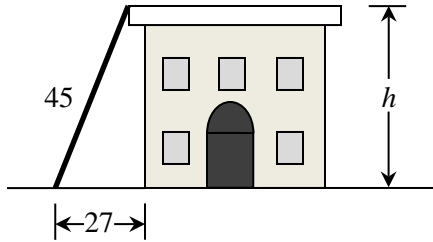


- A. 49
 B. 56
 C. 63
 D. 70
 E. 77

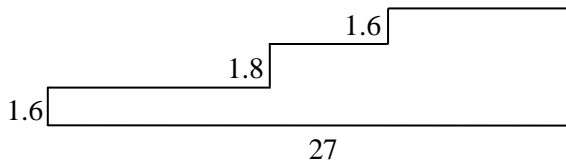
DO FIGURING HERE

34. A 45-foot ladder is leaning against a tall building as shown below. If the bottom of the ladder is 27 feet from the base of the building, how tall is the building, h , to the nearest foot?

- F. 40
- G. 39
- H. 38
- J. 37
- K. 36



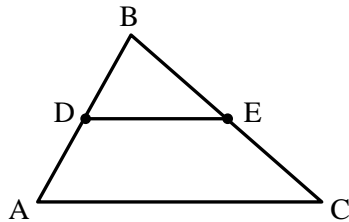
35. In the figure below, all angles shown are right angles and the line segment lengths are given in centimeters. What is the perimeter of the figure?



- A. 33 cm
- B. 55 cm
- C. 64 cm
- D. 68 cm
- E. It cannot be determined based on the information given.

36. In triangle ABC below, D is the midpoint of side AB and E is the midpoint of side BC. If the measure of angle ABC is 80° and the measure of angle BCA is 45° , what is the measure of angle EDB ?

- F. 45°
- G. 47.5°
- H. 50°
- J. 52.5°
- K. 55°

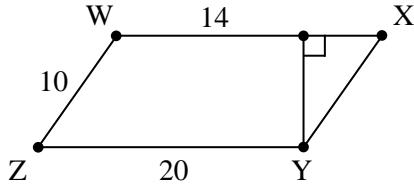


37. The larger of two numbers is 6 more than the smaller number. The sum of 3 times the larger number and twice the smaller number is 33. Which equation correctly identifies x as the larger number?

- A. $3x + 2(x - 6) = 33$
- B. $(3x)(2x - 16) = 33$
- C. $3(x + 6) + 2x = 33$
- D. $(3x + 12) = 33 - 2x$
- E. $6x = 33 + 2x$

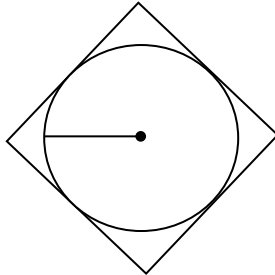
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38. Given the diagram as labeled below, what is the area, in square units, of parallelogram WXYZ ?



- F. 120
G. 140
H. 150
J. 160
K. 190
39. The area of the circle inscribed in the square below is $30\pi \text{ ft}^2$. What is the area of the square?

- A. 81 ft^2
B. 90 ft^2
C. 100 ft^2
D. 116 ft^2
E. 120 ft^2



40. $(1.2 \times 10^5)^2 + (3.11 \times 10^{10}) = ?$

- F. 4.55×10^{10}
G. 4.55×10^{20}
H. 5.51×10^{20}
J. 4.31×10^{10}
K. 4.31×10^{100}

DO FIGURING HERE

END OF TEST