MATHEMATICS TEST

60 Minutes—60 Questions

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

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 best be 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.

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1. Marcus's favorite casserole recipe requires 3 eggs and makes 6 servings. Marcus will modify the recipe by using 5 eggs and increasing all other ingredients in the recipe proportionally. What is the total number of servings the modified recipe will make?

   A.   6
   B.   8
   C.   10
   D.   12
   E.   15

2. The 35-member History Club is meeting to choose a student government representative. The members decide that the representative, who will be chosen at random, CANNOT be any of the 3 officers of the club. What is the probability that Hiroko, who is a member of the club but NOT an officer, will be chosen?

   F.   0

   G. $\frac{4}{35}$

   H. $\frac{1}{35}$

   J. $\frac{1}{3}$

   K. $\frac{1}{32}$

3. For what value of x is the equation $2^{2x+7} = 2^{15}$ true?

   A.   2
   B.   4
   C.   11
   D.   16
   E.   44

4. Let the function f be defined as $f(x) = 5x^2 - 7(4x + 3)$. What is the value of $f(3)$?

   F.   −18
   G.   −26
   H.   −33
   J.   −60
   K.   −75

5. A wallet containing 5 five-dollar bills, 7 ten-dollar bills, and 8 twenty-dollar bills is found and returned to its owner. The wallet's owner will reward the finder with 1 bill drawn randomly from the wallet. What is the probability that the bill drawn will be a twenty-dollar bill?

   A. $\frac{1}{20}$

   B. $\frac{4}{51}$

   C. $\frac{1}{8}$

   D. $\frac{2}{5}$

   E. $\frac{2}{3}$

6. The ABC Book Club charges a $40 monthly fee, plus $2 per book read in that month. The Easy Book Club charges a $35 monthly fee, plus $3 per book read in that month. For each club, how many books must be read in 1 month for the total charges from each club to be equal?
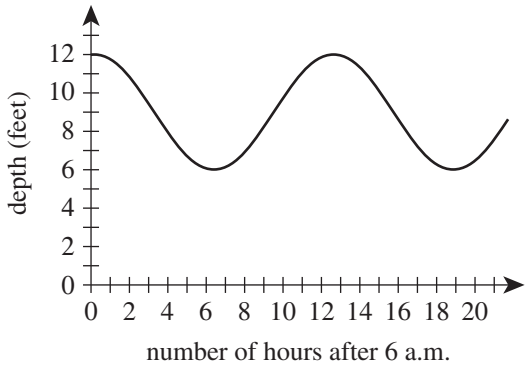
   F.   1
   G.   4
   H.   5
   J.   6
   K.   75

7. In parallelogram $ABCD$ below, $\overline{AC}$ is a diagonal, the measure of $\angle ABC$ is 40°, and the measure of $\angle ACD$ is 57°. What is the measure of $\angle CAD$?

   A.   40°
   B.   57°
   C.   77°
   D.   83°
   E.   97°
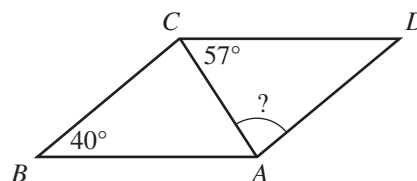
8. When $x = \frac{1}{2}$, what is the value of $\frac{8x - 3}{x}$?

   F. $\frac{1}{2}$

   G. 2

   H. $\frac{5}{2}$

   J. 5

   K. 10

9. In the standard (x,y) coordinate plane, what is the midpoint of the line segment that has endpoints $(3,8)$ and $(1,-4)$?

   A. $(-2,-12)$

   B. $(-1, -6)$

   C. $\left(\frac{11}{2}, -\frac{3}{2}\right)$

   D. $(2, 2)$

   E. $(4,-12)$

10. The fluctuation of water depth at a pier is shown in the figure below. One of the following values gives the positive difference, in feet, between the greatest water depth and the least water depth shown in this graph. Which value is it?

number of hours after 6 a.m.

   F. 3
   G. 6
   H. 9
   J. 12
   K. 19

11. What is the slope of the line through $(-2,1)$ and $(2,-5)$ in the standard (x,y) coordinate plane?

   A. $\frac{3}{2}$

   B. 1

   C. -1

   D. $-\frac{3}{2}$

   E. -4

12. In Cherokee County, the fine for speeding is $17 for each mile per hour the driver is traveling over the posted speed limit. In Cherokee County, Kirk was fined $221 for speeding on a road with a posted speed limit of 30 mph. Kirk was fined for traveling at what speed, in miles per hour?

   F. 13
   G. 17
   H. 43
   J. 47
   K. 60

13. What is the sum of the solutions of the 2 equations below?
$$8x = 12$$
$$2y + 10 = 22$$

   A. $2\frac{2}{5}$

   B. $7\frac{1}{2}$

   C. 9

   D. 10

   E. $17\frac{1}{2}$

14. The average of 5 distinct scores has the same value as the median of the 5 scores. The sum of the 5 scores is 420. What is the sum of the 4 scores that are NOT the median?

   F. 315
   G. 320
   H. 336
   J. 350
   K. 360

15. What is the value of the expression below?
$$\big|\,|-8 + 4| - |3 - 9|\,\big|$$

   A. -18
   B. -2
   C. 0
   D. 2
   E. 18

16. Which of the following expressions is equivalent to $x^{\frac{2}{3}}$?

   F. $\frac{x^2}{3}$

   G. $\frac{x(2)}{3}$

   H. $\sqrt{x^3}$

   J. $\sqrt[3]{x}$

   K. $\sqrt[3]{x^2}$