



## 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.

1. Kaya ran  $1\frac{2}{5}$  miles on Monday and  $2\frac{1}{3}$  miles on Tuesday. What was the total distance, in miles, Kaya ran during those 2 days?

- A.  $3\frac{2}{15}$
- B.  $3\frac{3}{8}$
- C.  $3\frac{2}{5}$
- D.  $3\frac{7}{15}$
- E.  $3\frac{11}{15}$

2.  $3x^3 \cdot 2x^2y \cdot 4x^2y$  is equivalent to:

- F.  $9x^7y^2$
- G.  $9x^{12}y^2$
- H.  $24x^7y^2$
- J.  $24x^{12}y$
- K.  $24x^{12}y^2$

3. Mr. Dietz is a teacher whose salary is \$22,570 for this school year, which has 185 days. In Mr. Dietz's school district, substitute teachers are paid \$80 per day. If Mr. Dietz takes a day off without pay and a substitute teacher is paid to teach Mr. Dietz's classes, how much less does the school district pay in salary by paying a substitute teacher instead of paying Mr. Dietz for that day?

- A. \$ 42
- B. \$ 80
- C. \$ 97
- D. \$105
- E. \$122

4. So far, a student has earned the following scores on four 100-point tests this grading period: 65, 73, 81, and 82. What score must the student earn on the fifth and last 100-point test of the grading period to earn an average test grade of 80 for the 5 tests?

- F. 75
- G. 76
- H. 78
- J. 99
- K. The student cannot earn an average of 80.

**DO YOUR FIGURING HERE.**

**GO ON TO THE NEXT PAGE.**



DO YOUR FIGURING HERE.

5. The oxygen saturation level of a river is found by dividing the amount of dissolved oxygen the river water currently has per liter by the dissolved oxygen capacity per liter of the water and then converting to a percent. If the river currently has 7.3 milligrams of dissolved oxygen per liter of water and the dissolved oxygen capacity is 9.8 milligrams per liter, what is the oxygen saturation level, to the nearest percent?
- A. 34%
  - B. 70%
  - C. 73%
  - D. 74%
  - E. 98%

6. A rectangular lot that measures 150 ft by 200 ft is completely fenced. What is the approximate length, in feet, of the fence?
- F. 300
  - G. 350
  - H. 400
  - J. 700
  - K. 1,400

7. The expression  $a[b + (c - d)]$  is equivalent to:
- A.  $ab + ac - ad$
  - B.  $ab + ac + ad$
  - C.  $ab + ac - d$
  - D.  $ab + c + d$
  - E.  $ab + c - d$

8. If  $4x + 3 = 9x - 4$ , then  $x = ?$

- F.  $\frac{7}{5}$
- G.  $\frac{5}{7}$
- H.  $\frac{7}{13}$
- J.  $\frac{1}{5}$
- K.  $-\frac{1}{5}$

9. What 2 numbers should be placed in the blanks below so that the difference between consecutive numbers is the same?

17, \_\_\_\_\_, \_\_\_\_\_, 41

- A. 23, 29
- B. 24, 34
- C. 25, 33
- D. 26, 35
- E. 27, 31

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10. If  $x$  is a real number such that  $x^3 = 64$ , then  $x^2 + \sqrt{x} = ?$

F. 4  
 G. 10  
 H. 18  
 J. 20  
 K. 47

DO YOUR FIGURING HERE.

11. A formula for the volume  $V$  of a sphere with radius  $r$  is

$$V = \frac{4}{3}\pi r^3.$$

If the radius of a spherical rubber ball is

$1\frac{1}{4}$  inches, what is its volume to the nearest cubic inch?

A. 5  
 B. 7  
 C. 8  
 D. 16  
 E. 65

12. If a marble is randomly chosen from a bag that contains exactly 8 red marbles, 6 blue marbles, and 6 white marbles, what is the probability that the marble will NOT be white?

F.  $\frac{3}{4}$   
 G.  $\frac{3}{5}$   
 H.  $\frac{4}{5}$   
 J.  $\frac{3}{10}$   
 K.  $\frac{7}{10}$

13. The number of students participating in fall sports at a certain high school can be shown by the following matrix.

Tennis	Soccer	Cross-Country	Football
[ 40	60	80	80 ]

The athletic director estimates the ratio of the number of sports awards that will be earned to the number of students participating with the following matrix.

Tennis	0.3
Soccer	0.4
Cross-Country	0.2
Football	0.5

Given these matrices, what is the athletic director's estimate for the number of sports awards that will be earned for these fall sports?

A. 80  
 B. 88  
 C. 91  
 D. 92  
 E. 99

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Use the following information to answer questions 14–15.

DO YOUR FIGURING HERE.

The following chart shows the current enrollment in all the mathematics classes offered by Eastside High School.

Course title	Section	Period	Enrollment
Pre-Algebra	A	3	23
Algebra I	A	2	24
	B	3	25
	C	4	29
Geometry	A	1	21
	B	2	22
Algebra II	A	4	28
Pre-Calculus	A	6	19

14. What is the average number of students enrolled per section in Algebra I?

F. 24  
G. 25  
H. 26  
J. 27  
K. 29

15. The school owns 2 classroom sets of 30 calculators each, which students are required to have during their mathematics class. There are 2 calculators from one set and 6 calculators from the other set that are not available for use by the students because these calculators are being repaired. For which of the following class periods, if any, are there NOT enough calculators available for each student to use a school-owned calculator without having to share?

A. Period 2 only  
B. Period 3 only  
C. Period 4 only  
D. Periods 3 and 4 only  
E. There are enough calculators for each class period.

16. What expression must the center cell of the table below contain so that the sums of each row, each column, and each diagonal are equivalent?

$x$	$8x$	$-3x$
$-2x$	?	$6x$
$7x$	$-4x$	$3x$

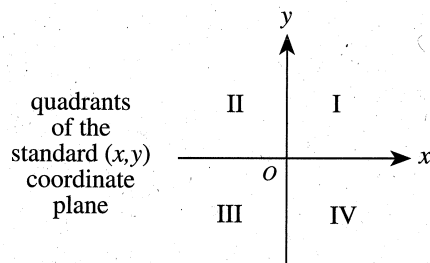
F.  $6x$   
G.  $4x$   
H.  $2x$   
J.  $-2x$   
K.  $-4x$

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17. Point  $A$  is to be graphed in a quadrant, not on an axis, of the standard  $(x,y)$  coordinate plane below.

**DO YOUR FIGURING HERE.**



If the  $x$ -coordinate and the  $y$ -coordinate of point  $A$  are to have opposite signs, then point  $A$  *must* be located in:

- A. Quadrant II only.  
 B. Quadrant IV only.  
 C. Quadrant I or III only.  
 D. Quadrant I or IV only.  
 E. Quadrant II or IV only.
18. Kareem has 4 sweaters, 6 shirts, and 3 pairs of slacks. How many distinct outfits, each consisting of a sweater, a shirt, and a pair of slacks, can Kareem select?
- F. 13  
 G. 36  
 H. 42  
 J. 72  
 K. 216
19. At a refinery, 100,000 tons of sand are required to produce each 60,000 barrels of a tarry material. How many tons of sand are required to produce 3,000 barrels of this tarry material?
- A. 5,000  
 B. 18,000  
 C. 20,000  
 D. 40,000  
 E. 50,000
20. If a rectangle measures 54 meters by 72 meters, what is the length, in meters, of the diagonal of the rectangle?
- F. 48  
 G. 63  
 H. 90  
 J. 126  
 K. 252

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