

Practice Test 1

Examinee Agreement and Signature: By testing today, I agree to the terms and conditions set forth in the ACT registration booklet or website for this exam, including the provisions about prohibited behaviors. I also certify that I am the person whose signature appears below.

Today's Date: _____

Your Signature: _____

Print Your Name Here: _____

Your Date of Birth:		
<input type="text"/>	<input type="text"/>	<input type="text"/>
Month	Day	Year

Form 1MC



Directions

This booklet contains tests in English, Mathematics, Reading, and Science. These tests measure skills and abilities highly related to high school course work and success in college. **CALCULATORS MAY BE USED ON THE MATHEMATICS TEST ONLY.**

The questions in each test are numbered, and the suggested answers for each question are lettered. On the answer document, the rows of ovals are numbered to match the questions, and the ovals in each row are lettered to correspond to the suggested answers.

For each question, first decide which answer is best. Next, locate on the answer document the row of ovals numbered the same as the question. Then, locate the oval in that row lettered the same as your answer. Finally, fill in the oval completely. Use a soft lead pencil and make your marks heavy and black. **DO NOT USE INK OR A MECHANICAL PENCIL.**

Mark only one answer to each question. If you change your mind about an answer, erase your first mark thoroughly before marking your new answer. For each question, make certain that you mark in the row of ovals with the same number as the question.

Only responses marked on your answer document will be scored. Your score on each test will be based only on the number of questions you answer correctly during the time allowed for that test. You will NOT be penalized for guessing. **IT IS TO YOUR ADVANTAGE TO ANSWER EVERY QUESTION EVEN IF YOU MUST GUESS.**

You may work on each test ONLY when your test supervisor tells you to do so. If you finish a test before time is called for that test, you should use the time remaining to reconsider questions you are uncertain about in that test. You may NOT look back to a test on which time has already been called, and you may NOT go ahead to another test. To do so will disqualify you from the examination.

Lay your pencil down immediately when time is called at the end of each test. You may NOT for any reason fill in or alter ovals for a test after time is called for that test. To do so will disqualify you from the examination.

Do not fold or tear the pages of your test booklet.

**DO NOT OPEN THIS BOOKLET
UNTIL TOLD TO DO SO.**

**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.

DO YOUR FIGURING HERE.

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.

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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%

DO YOUR FIGURING HERE.

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

GO ON TO THE NEXT PAGE.



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]
Soccer	
Cross-Country	
Football	
	[
0.3	
0.4	
0.2	
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

GO ON TO THE NEXT PAGE.



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

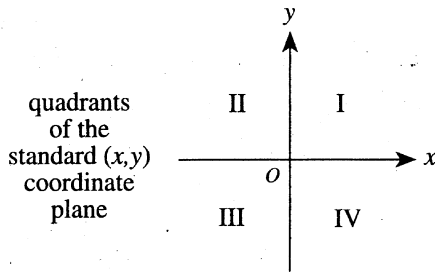
- F. $6x$
- G. $4x$
- H. $2x$
- J. $-2x$
- K. $-4x$

GO ON TO THE NEXT PAGE.



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

GO ON TO THE NEXT PAGE.



21. For all positive integers x , y , and z , which of the following expressions is equivalent to $\frac{x}{y}$?

DO YOUR FIGURING HERE.

- A. $\frac{x \cdot z}{y \cdot z}$
 B. $\frac{x \cdot x}{y \cdot y}$
 C. $\frac{y \cdot x}{x \cdot y}$
 D. $\frac{x - z}{y - z}$
 E. $\frac{x + z}{y + z}$

22. What is the slope-intercept form of $8x - y - 6 = 0$?

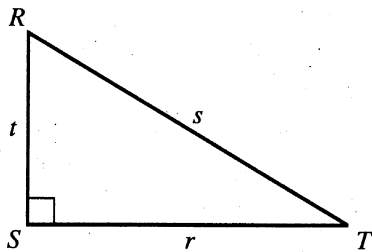
- F. $y = -8x - 6$
 G. $y = -8x + 6$
 H. $y = 8x - 6$
 J. $y = 8x + 6$
 K. $y = 6x - 8$

23. Which of the following is a solution to the equation $x^2 - 36x = 0$?

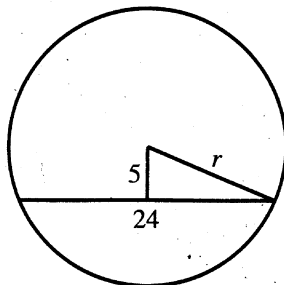
- A. 72
 B. 36
 C. 18
 D. 6
 E. -6

24. For right triangle $\triangle RST$ shown below, what is $\tan R$?

- F. $\frac{r}{s}$
 G. $\frac{r}{t}$
 H. $\frac{t}{r}$
 J. $\frac{t}{s}$
 K. $\frac{s}{t}$



25. A chord 24 inches long is 5 inches from the center of a circle, as shown below. What is the radius of the circle, to the nearest tenth of an inch?



- A. 29.0
 B. 24.5
 C. 16.9
 D. 13.0
 E. 10.9

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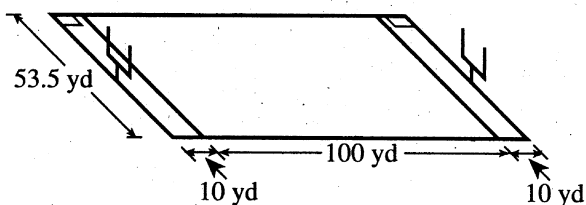


DO YOUR FIGURING HERE.

26. The length L , in meters, of a spring is given by the equation $L = \frac{2}{3}F + 0.03$, where F is the applied force in newtons. What force, in newtons, must be applied for the spring's length to be 0.18 meters?

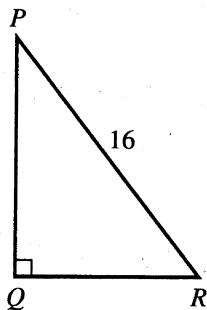
F. 0.13
 G. 0.15
 H. 0.225
 J. 0.255
 K. 0.27

27. After a snowstorm, city workers removed an estimated 10,000 cubic yards of snow from the downtown area. If this snow were spread in an even layer over the entire rectangular football field shown below, about how many yards deep would the layer of snow be?



A. Less than 1
 B. Between 1 and 2
 C. Between 2 and 3
 D. Between 3 and 4
 E. More than 4

28. The hypotenuse of the right triangle $\triangle PQR$ shown below is 16 feet long. The sine of $\angle P$ is $\frac{3}{5}$. About how many feet long is \overline{QR} ?



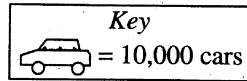
F. 8.0
 G. 9.6
 H. 12.4
 J. 14.3
 K. 15.4












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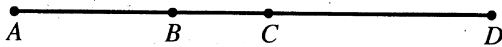
29. The graph below shows the number of cars assembled last year in 4 cities, to the nearest 5,000 cars. According to the graph, what fraction of the cars assembled in all 4 cities were assembled in Coupeville?

DO YOUR FIGURING HERE.



City	Cars assembled
Car Town	   
Coupeville	  
Truck City	 
Sedan Falls	 

- A. $\frac{1}{5}$
 B. $\frac{1}{4}$
 C. $\frac{3}{11}$
 D. $\frac{3}{10}$
 E. $\frac{1}{3}$
30. Points B and C lie on \overline{AD} as shown below. The length of \overline{AD} is 30 units; \overline{AC} is 16 units long; and \overline{BD} is 20 units long. How many units long, if it can be determined, is \overline{BC} ?



- F. 4
 G. 6
 H. 10
 J. 14
 K. Cannot be determined from the given information
31. What is the x -coordinate of the point in the standard (x,y) coordinate plane at which the 2 lines $y = 2x + 6$ and $y = 3x + 4$ intersect?

- A. 1
 B. 2
 C. 4
 D. 6
 E. 10

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32. For all pairs of real numbers M and V where $M = 3V + 6$, $V = ?$

F. $\frac{M}{3} - 6$

G. $\frac{M}{3} + 6$

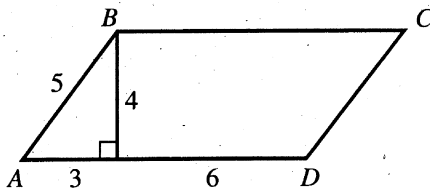
H. $3M - 6$

J. $\frac{M-6}{3}$

K. $\frac{M+6}{3}$

DO YOUR FIGURING HERE.

33. Parallelogram $ABCD$, with dimensions in inches, is shown in the diagram below. What is the area of the parallelogram, in square inches?



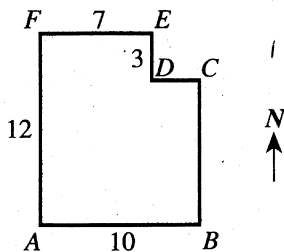
- A. 18
B. 36
C. 39
D. 45
E. 72

34. If $a = b + 2$, then $(b - a)^4 = ?$

- F. -16
G. -8
H. 1
J. 8
K. 16

35. A park has the shape and dimensions in blocks given below. A water fountain is located halfway between point B and point D . Which of the following is the location of the water fountain from point A ?

(Note: The park's borders run east-west or north-south.)



- A. $3\frac{1}{2}$ blocks east and 6 blocks north
B. 5 blocks east and $4\frac{1}{2}$ blocks north
C. 5 blocks east and 6 blocks north
D. $8\frac{1}{2}$ blocks east and $4\frac{1}{2}$ blocks north
E. 9 blocks east and $7\frac{1}{2}$ blocks north

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36. The larger of two numbers exceeds twice the smaller number by 8. The sum of twice the larger and 3 times the smaller number is 65. If x is the smaller number, which equation below determines the correct value of x ?

- F. $3(2x + 8) + 2x = 65$
 G. $3(2x - 8) + 2x = 65$
 H. $(4x + 8) + 3x = 65$
 J. $2(2x + 8) + 3x = 65$
 K. $2(2x - 8) + 3x = 65$

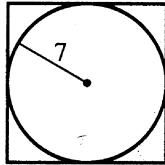
DO YOUR FIGURING HERE.

37. Members of the fire department lean a 30-foot ladder against a building. The side of the building is perpendicular to the level ground so that the base of the ladder is 10 feet away from the base of the building. To the nearest foot, how far up the building does the ladder reach?

- A. 10
 B. 20
 C. 28
 D. 31
 E. 40

38. A square is circumscribed about a circle of 7-foot radius, as shown below. What is the area of the square, in square feet?

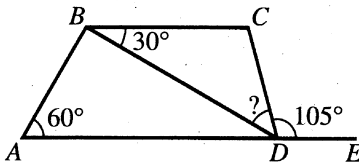
- F. 49
 G. 56
 H. 98
 J. 49π
 K. 196



39. The ratio of the side lengths for a triangle is exactly 12:14:15. In a second triangle similar to the first, the shortest side is 8 inches long. To the nearest tenth of an inch, what is the length of the longest side of the second triangle?

- A. 11.0
 B. 10.0
 C. 9.3
 D. 6.4
 E. Cannot be determined from the given information

40. In the figure below, $ABCD$ is a trapezoid, E lies on \overleftrightarrow{AD} , and angle measures are as marked. What is the measure of $\angle BDC$?

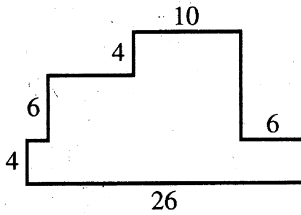


- F. 15°
 G. 25°
 H. 30°
 J. 35°
 K. 45°

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41. In the figure shown below, each pair of intersecting line segments meets at a right angle, and all the lengths given are in inches. What is the perimeter, in inches, of the figure?



- A. 40
B. 52
C. 56
D. 66
E. 80

42. Of the 804 graduating seniors in a certain high school, approximately $\frac{2}{5}$ are going to college and approximately $\frac{1}{4}$ of those going to college are going to a state university. Which of the following is the closest estimate for how many of the graduating seniors are going to a state university?

- F. 80
G. 90
H. 160
J. 200
K. 320

43. If x and y are positive integers such that the greatest common factor of x^2y^2 and xy^3 is 45, then which of the following could y equal?

- A. 45
B. 15
C. 9
D. 5
E. 3

44. If 115% of a number is 460, what is 75% of the number?

- F. 280
G. 300
H. 320
J. 345
K. 400

45. What is the distance in the standard (x,y) coordinate plane between the points $(1,0)$ and $(0,5)$?

- A. 4
B. 6
C. 16
D. 36
E. $\sqrt{26}$

DO YOUR FIGURING HERE.

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46. The ratio of the radii of two circles is 4:9. What is the ratio of their circumferences?

F. 2:3
 G. 4:9
 H. 16:81
 J. $4:8\pi$
 K. $9:18\pi$

DO YOUR FIGURING HERE.

47. A circle in the standard (x,y) coordinate plane is tangent to the x -axis at 5 and tangent to the y -axis at 5. Which of the following is an equation of the circle?

A. $x^2 + y^2 = 5$
 B. $x^2 + y^2 = 25$
 C. $(x - 5)^2 + (y - 5)^2 = 5$
 D. $(x - 5)^2 + (y - 5)^2 = 25$
 E. $(x + 5)^2 + (y + 5)^2 = 25$

48. In the complex numbers, where $i^2 = -1$,

$$\frac{1}{1+i} \cdot \frac{1-i}{1-i} = ?$$

F. $i - 1$

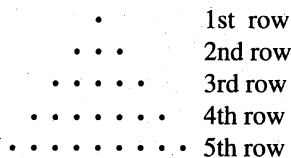
G. $1 + i$

H. $1 - i$

J. $\frac{1-i}{2}$

K. $\frac{1+i}{2}$

49. Which of the following statements describes the total number of dots in the first n rows of the triangular arrangement illustrated below?



- A. This total is always equal to 25 regardless of the number of rows.
 B. This total is equal to twice the number of rows.
 C. This total is equal to 5 times the number of rows.
 D. This total is equal to the square of the number of rows.
 E. There is no consistent relationship between this total and the number of rows.

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