

ACT Practice Paper
ACT MATH Practice Paper 3

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. Ms. Hernandez began her math class by saying:

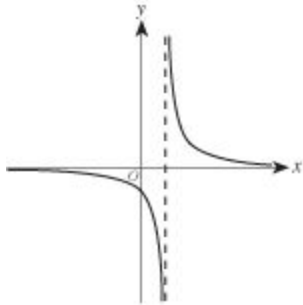
I'm thinking of 5 numbers such that their mean is equal to their median. If 4 of the numbers are 14, 8, 16, and 14, what is the 5th number?

What is the 5th number Ms. Hernandez is thinking of?

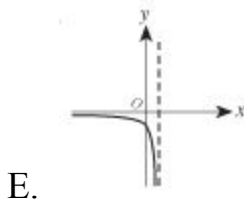
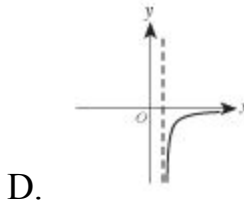
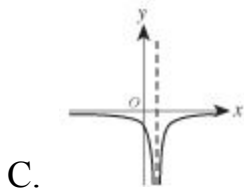
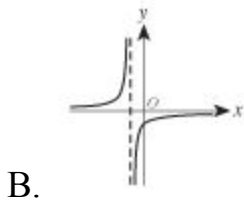
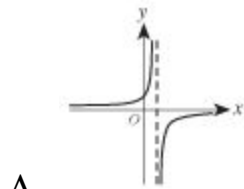
- A. 13
- B. 14
- C. 15
- D. 16
- E. 18

2.

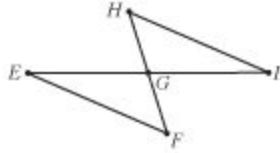
The graph of a certain hyperbola, $y = h(x)$, is shown in the standard (x,y) coordinate plane below.



Among the following graphs, which best represents $y = -h(x)$?



3. In the figure below, $\angle H \cong \angle F$; E, G, and I are collinear; and G is the midpoint of FH



To prove that $HI \cong FE$ given the conditions stated above, which of the following is a logical order for the 5 steps in the table below?

Statement	Reason
1. $HG \cong FG$	The midpoint of a line segment divides the segment into 2 congruent segments
2. $\angle EGF \cong \angle IGH$	Vertical angles are congruent
3. $\triangle GHI \cong \triangle GFE$	Angle-side-angle congruence theorem
4. $\angle EGF$ and $\angle IGH$ are vertical angles	Definition of vertical angles
5. $HI \cong FE$	Corresponding parts of congruent triangles are congruent

- A. 1, 2, 3, 4, 5
- B. 1, 2, 3, 5, 4
- C. 1, 2, 4, 3, 5
- D. 1, 4, 2, 3, 5
- E. 1, 5, 4, 2, 3

4.

Each of the variables t , w , x , y , and z represents a different positive real number. Given the equations below, which of the 4 variables w , x , y , and z necessarily has the greatest value?

$$1.23w = t$$

$$1.01x = t$$

$$0.99y = t$$

$$0.23z = t$$

- A. w
- B. x
- C. y
- D. Z
- E. Cannot be determined from the given information

5.

Which of the following is equivalent to $\frac{5}{k} + \frac{k+3}{k+5}$

- A. $\frac{k+8}{2k+5}$
- B. $\frac{k+8}{k(k+5)}$
- C. $\frac{5(k+3)}{k(k+5)}$
- D. $\frac{k^2+3k}{5k+25}$
- E. $\frac{k^2+8k+25}{k(k+5)}$

6.

In the 2×2 matrix below, b_1 and b_2 are the costs per pound of bok choy (Chinese greens) at Market 1 and Market 2, respectively; r_1 and r_2 are the costs per pound of rice flour at these 2 markets, respectively. In the following matrix product, what does q represent?

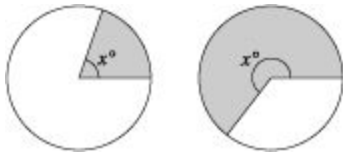
$$[0.5 \ 0.5] \cdot \begin{bmatrix} b_1 & r_1 \\ b_2 & r_2 \end{bmatrix} = [p \ q]$$

- A. The cost of r_1 pounds of rice flour at \$0.50 per pound

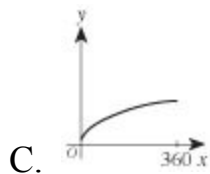
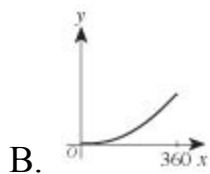
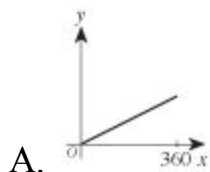
- B. The cost of a half-pound of rice flour at Market 1
- C. The total cost of a half-pound of bok choy and a half-pound of rice flour at Market 1
- D. The total cost of a half-pound of bok choy and a half-pound of rice flour at Market 2
- E. The total cost of a half-pound of rice flour at Market 1 and a half-pound of rice flour at Market 2

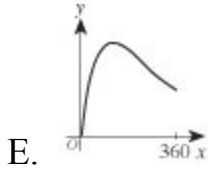
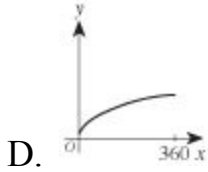
7.

The 2 diagrams below show a circle of radius 1 inch with shaded sectors of angle x° , for 2 different values of x .



One of the following is the graph in the standard (x,y) coordinate plane of the area, y , of a shaded sector with angle x° , for all values of x between 0 and 360. Which is that graph?





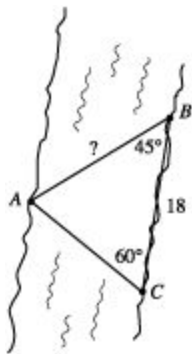
8.

If $h(x) = x^3 + x$ and $g(x) = 2x + 3$, then $g(h(2)) = ?$

- F. 7
- G. 10
- H. 17
- I. 19
- J. 23

9.

In the figure below, points A and B are on opposite banks of a small stream. Point C is on the same bank of the stream as point B and approximately 18 meters from B. The measure of $\angle CBA$ is 45° , and the measure of $\angle BCA$ is 60° .



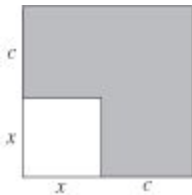
Which of the following expressions gives the approximate distance, in meters, between point A and point B

(Note: For $\triangle PQR$, where p , q , and r are the lengths of the sides opposite $\angle P$, $\angle Q$, and $\angle R$, respectively, $\frac{\sin \angle P}{p} = \frac{\sin \angle Q}{q} = \frac{\sin \angle R}{r}$)

- A. $\frac{\sin 60^\circ}{18 \sin 45^\circ}$
- B. $\frac{\sin 60^\circ}{18 \sin 75^\circ}$
- C. $\frac{18 \sin 45^\circ}{\sin 60^\circ}$
- D. $\frac{18 \sin 60^\circ}{\sin 45^\circ}$
- E. $\frac{18 \sin 60^\circ}{\sin 75^\circ}$

10.

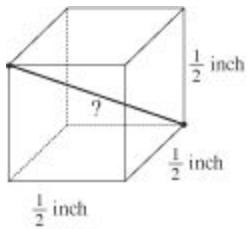
Each side of the smaller square in the figure below is x inches long, and each side of the larger square is c inches longer than a side of the smaller square. The area of the larger square is how many square inches greater than the area of the smaller square?



- A. c^2
- B. xc
- C. $4c$
- D. $(x + c)^2$
- E. $2xc + c^2$

11.

A cube with edges $\frac{1}{2}$ inch long is shown below. What is the length, in inches, of a diagonal that runs from one corner of the cube to the opposite corner?



- A. $\frac{1}{4}$
- B. $\frac{3}{4}$
- C. $\frac{3}{2}$
- D. $\frac{\sqrt{2}}{2}$
- E. $\frac{\sqrt{3}}{2}$

12. Which of the following is equivalent to $\sin \theta \csc(-\theta)$ wherever $\sin \theta \csc(-\theta)$ is defined?

- A. -1
- B. 1
- C. $-\tan \theta$
- D. $\tan \theta$
- E. $-\sin^2 \theta$

SET TWO

1. Of the following expressions, which is equal to $6(\sqrt{10})$?

- A. $\sqrt{6}$

- B. $\sqrt{360}$
- C. $10\sqrt{6}$
- D. $\sqrt{600}$
- E. 36

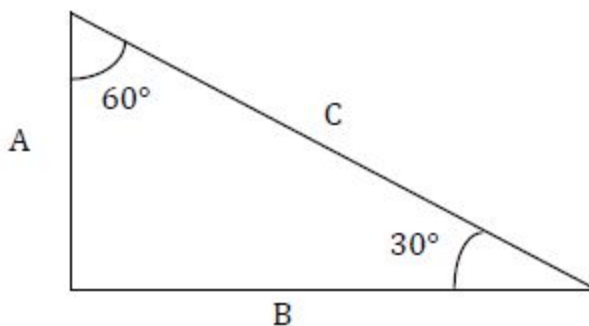
2. A box of laundry detergent contains 16.5 oz of product. What is the maximum number of loads that can be washed if each load requires a minimum of $\frac{3}{4}$ oz of detergent?

- A. 16.5 loads
- B. 18 loads
- C. 50 loads
- D. 10 loads
- E. 22 loads

3. There are n musicians in a marching band. All play either a drum or a brass instrument. If p represents the fraction of musicians playing drums, how many play a brass instrument?

- A. $(p + 1)n$
- B. $(p - 1)n$
- C. $pn - 1$
- D. $(1 - p)n$
- E. $P(n - 1)$

4. Given the triangle shown in the figure, what is the length of the side A?



- A. $(B + C)/2$
- B. $B/2$

- C. $2B$
- D. $2C$
- E. $C/2$

5. Which of the following can be divided by 3, with no remainder?

- A. 555
- B. 2018
- C. 739
- D. 46
- E. 8912

6. A bullet travels at 5×10^6 feet per hour. If it strikes its target in 2×10^{-4} hours, how far has it traveled?

- A. 50 feet
- B. 25 feet
- C. 100 feet
- D. 200 feet
- E. 1000 feet

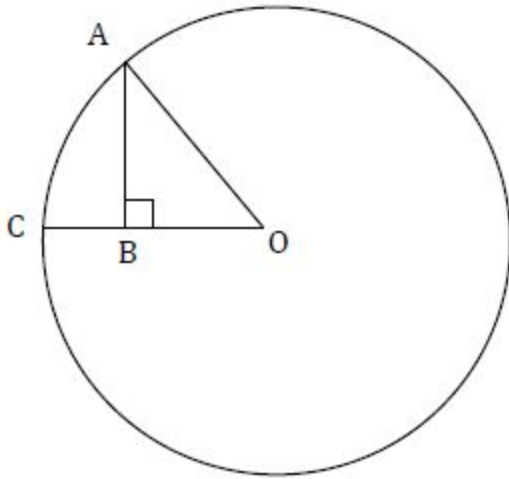
7. If the two lines $2x + y = 0$ and $y = 3$ are plotted on a typical xy coordinate grid, at which point will they intersect?

- 1.5, 3
- 1.5, 0
- 4, 1
- 1.5, 3
- 4.5, 1

8. Which of the following equations describes a line that is parallel to the x -axis?

- A. $y = -3x$
- B. $(x + y) = 0$
- C. $y = 2x$
- D. None of these answer choices
- E. $y = 3$

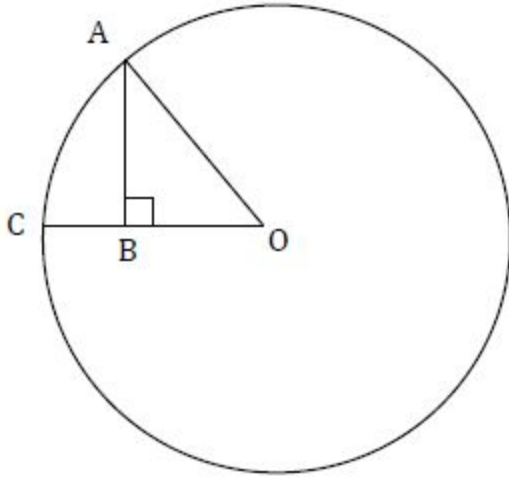
9. The following question(s) are based on the following diagram of a circle, where O is the center and OA and OC are radii:



If the length of segment AB = x, and the length of segment OB = y, which of the following expressions describes the radius of the circle?

- A. $x + y$
- B. $\sqrt{(x^2 + y^2)}$
- C. $x^2 + y^2$
- D. $y + 4$
- E. $\sqrt{(x^2 + 1)}$

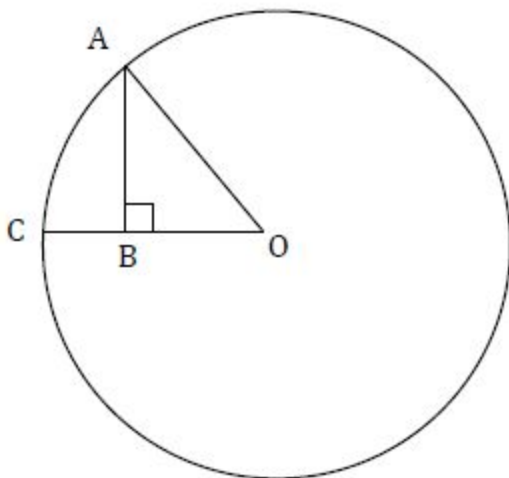
10. The following question(s) are based on the following diagram of a circle, where O is the center and OA and OC are radii:



If the length of segment AB equals that of segment OB, what is the $\angle AOC$?

- A. Same as $\angle BAO$
- B. All are true.
- C. "45 degrees" and "Same as $\angle BAO$ " are true, but not "Same as $\angle ABO$ "
- D. 45 degrees
- E. Same as $\angle ABO$

11. The following question(s) are based on the following diagram of a circle, where O is the center and OA and OC are radii:



Which of the following must be true?

- A. $OA = OC$
- B. $OB = BC$
- C. None of these.
- D. $OB = OC$
- E. $AB = OC$

12. A blouse normally sells for \$138, but is on sale for 25% off. What is the cost of the blouse?

- A. \$125
- B. \$34.50
- C. \$103.50
- D. \$113
- E. \$67

13. Which number is equivalent to 2^{-3} ?

- A. $1/8$
- B. $1/12$
- C. $1/16$
- D. $1/4$
- E. $1/2$

14. A straight line with slope +4 is plotted on a standard Cartesian (xy) coordinate system so that it intersects the y-axis at a value of $y = 1$. Which of the following points will the line pass through?

- A. (2, 9)
- B. (4, 1)
- C. (0, -1)
- D. (0, 0)
- E. (1, 4)

15. A crane raises one end of a 3300 lb steel beam. The other end rests upon the ground. If the crane supports 30% of the beam's weight, how many pounds does it support?

- A. 1100 lbs
- B. 2310 lbs

C. 990 lbs

D. 330 lbs

E. 700 lbs