

ACT Mathematics Mock 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.

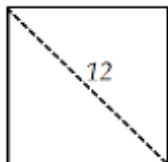
1. Illustrative figures are NOT necessarily drawn to scale.
2. Geometric figures lie in a plane.
3. The word line indicates a straight line.
4. The word average indicates arithmetic mean.

1. If $3(x - 5) = 15$, what does $\frac{x-5}{x+5}$ equal?

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

2. If 25 percent of x is 250, what is x percent of 50?

- F. 50
- G. 500
- H. 520
- J. 550
- K. 585



3. What is the area of the square above?

- A. 64
- B. 72
- C. 100
- D. 121
- E. 144

4. If $\frac{x}{3} = \frac{3x}{z}$ and $z \neq 0$, what is the value of z ?

- F. 9
- G. 6
- H. 4
- J. 3
- K. 2

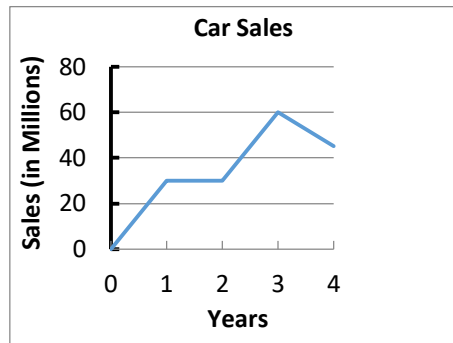
5. If $x > 0$, what is 50% of $30x$?

- A. $1.5x$
- B. $15x$
- C. $150x$
- D. $1500x$
- E. $0.15x$

6. What is the slope of any line parallel to the line $5x + 3y = 6$?

- F. $-\frac{5}{3}$
- G. $-\frac{3}{5}$
- H. 1
- J. $\frac{3}{5}$
- K. $\frac{5}{3}$

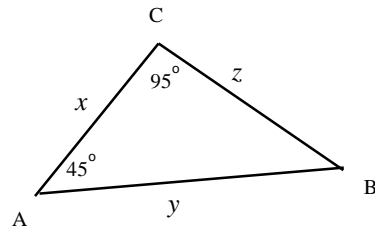
7. From the graph below, John sold how many more cars in year 3 than the sum of cars sold in years 1 and 2?



- A. 0
B. 10
C. 20
D. 25
E. 30
8. If 0.01 percent of y is 1, what is 1 percent of y ?
F. 1
G. 10
H. 0.1
J. 0.01
K. 100
9. $\triangle ABC$ is an equilateral triangle with side length of 8. What is the area of $\triangle ABC$?
A. 64
B. 32
C. $16\sqrt{3}$
D. $16\sqrt{2}$
E. 16
10. What is the smallest positive integer value of x for which $2x - 7 > 0$?
F. 6
G. 5
H. 4
J. 3
K. 2
11. What is the difference, in degrees, between an arc that is $\frac{3}{8}$ of a circle and an arc that is $\frac{1}{3}$ of a circle?
A. 20°
B. 18°
C. 15°
D. 12°
E. 10°
12. In rectangle WXYZ, point A is the midpoint of XY. If the area of $\triangle WXA$ is 2, what is the area of rectangle WXYZ?
F. 6
G. 7
H. 8
J. 9
K. 10
13. If $x = 3$, $y = 5$, what is the value of $2 \times \left(\frac{x}{y}\right)^2 \times y^2$?
A. 5
B. 10
C. 15
D. 16
E. 18
14. If $2x + y = x + 5$, what is y in terms of x ?
F. $5 - x$
G. $x + 5$
H. $1 - 5x$
J. $1 - 2x$
K. $x + 3$
15. If an angle θ measured counter-clockwise from the positive x-axis terminates in the third Quadrant, which of the following is true?
A. Both of $\sin(\theta)$ and $\cos(\theta)$ are negative.
B. Both of $\sin(\theta)$ and $\cos(\theta)$ are positive.
C. $\sin(\theta)$ is negative and $\cos(\theta)$ is positive.
D. $\sin(\theta)$ is positive and $\cos(\theta)$ is negative.
E. None of the above

16. In quadrilateral ABCD, $m\angle A = m\angle B = 128^\circ$, and $m\angle D$ is 10° less than 5 times of $m\angle C$. Find $m\angle D$.

- F. 72
- G. 75
- H. 78
- J. 82
- K. 85

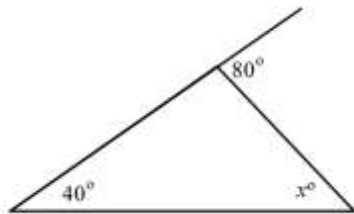


17. Which of the following must be true about x , y , and z in the figure above?

- A. $x < z < y$
- B. $z < x < y$
- C. $x < y < z$
- D. $z < y < x$
- E. $y < z < x$

18. A recipe of a cake for 8 people requires 1.2 pounds of flour. Assuming the amount of flour needed is directly proportional to the number of people eating the cake, how many pounds of flour are required to make a big cake for 240 people?

- F. 20
- G. 25
- H. 30
- J. 35
- K. 36



19. In the triangle above, what is the value of x ?

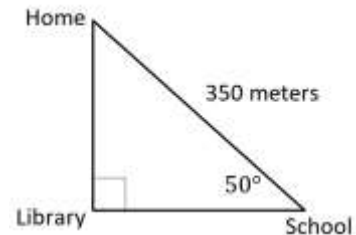
- A. 30

- B. 40
- C. 50
- D. 60
- E. 70

20. If m is a positive number, which of the following is equal to $m^3 \times m^{-3}$?

- F. 0
- G. 1
- H. m^{-6}
- J. m
- K. $6m$

21. Given the dimensions in the figure below, which of the following expresses the distance, in meters, from the train station to school?



- A. $\frac{\sin(50^\circ)}{350}$
- B. $350 \tan(50^\circ)$
- C. $350 \cos(50^\circ)$
- D. $\frac{\cos(50^\circ)}{350}$
- E. $350 \sin(50^\circ)$

22. If 4 less than twice a number is equal to 20. What is 5 more than 3 times the number?

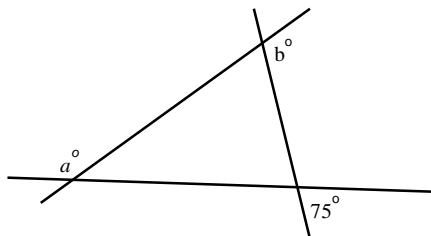
- F. 8
- G. 12
- H. 41
- J. 29
- K. 36

23. If $\sin(A - 30^\circ) = \cos(20^\circ)$, the measure of $\angle A = ?$

- A. 100°
- B. 90°
- C. 80°
- D. 45°
- E. 10°

24. If the side length of a square is an integer and the area of this square is less than 25 but greater than 15, what is the perimeter of the square?
- F. 7
G. 9
H. 12
J. 14
K. 16

25. In the figure below, what is the value of $a + b$?

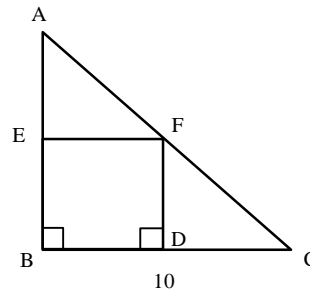


- A. 180
B. 255
C. 268
D. 272
E. 280
26. The chart below shows the results of a swimming race. If all the students started at the same time, who finished second?

<i>Swimming Race Results</i>	
<i>Student</i>	<i>Time (in seconds)</i>
<i>Grant</i>	<i>57.55</i>
<i>Robert</i>	<i>56.94</i>
<i>Larry</i>	<i>55.81</i>
<i>Adam</i>	<i>56.02</i>
<i>Chris</i>	<i>57.41</i>

- F. Grant
G. Robert
H. Larry
J. Adam
K. Chris

27. If $a = \frac{3}{5}xy$, what is the value of y when $x = 2$ and $a = 24$?
- A. 10
B. 20
C. 25
D. 35
E. 40

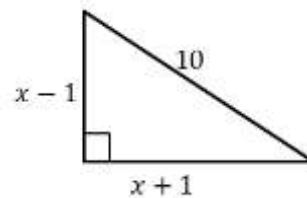


28. In isosceles right triangle $\triangle ABC$ above, $EF \parallel BC$ and length of \overline{AF} is half of the length of \overline{AC} . What is the area of the rectangular region?
- F. 16
G. 25
H. 36
J. 64
K. 81
29. If $|5 - 2x| < 3$, which of the following is a possible value of x ?
- A. 3
B. 4
C. 5
D. 6
E. 7
30. In a certain year at Lion High School, exactly 68 out of the 400 students are taking AP Chemistry. What percent of students are NOT taking AP Chemistry that year?
- F. 15
G. 17
H. 50
J. 83
K. 85

31. If John gives Sally \$5, Sally will have twice the amount of money that John will have. Originally, there was a total of \$30 between the two of them. How much money did John initially have?
- A. 25
B. 21
C. 18
D. 15
E. 12
32. Mrs. Matt provides some markers to her Arts class. If each student takes 3 markers, there will be 2 markers left. If 6 students take 4 markers each and the rest of students take 1 marker each, there will be no markers left. How many students are in Mrs. Matt's Arts class?
- F. 8
G. 7
H. 6
J. 5
K. 4
33. Which of the following is an equation of the line that is perpendicular to the y -axis and passes through the point $(1, -1)$?
- A. $y = 1$
B. $y = -1$
C. $y = x$
D. $y = -x$
E. $y = 0$
34. Joan has \$23 and wants to buy a dozen of red pens at \$0.50 each and two dozens of blue pens at \$0.75 each. Without counting sales tax, how much more money does she need?
- F. \$1.00
G. \$1.75
H. \$1.50
J. \$2.00
K. \$2.30

35. Which of the following is the square of $-\sqrt{7}$?
- A. $x^2 + \sqrt{14}x + 7$
B. $x^2 - \sqrt{14}x + 7$
C. $x^2 + 2\sqrt{7}x + 7$
D. $x^2 - 2\sqrt{7}x + 7$
E. $x^2 - 14$

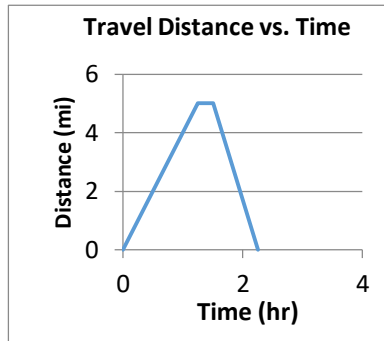
36. $\frac{2}{\sqrt{3}} + \frac{3}{\sqrt{2}} = ?$
- F. $\frac{5}{\sqrt{5}}$
G. $\frac{5}{\sqrt{6}}$
H. $\frac{5}{\sqrt{3}+\sqrt{2}}$
J. $\frac{2\sqrt{2}+3\sqrt{3}}{\sqrt{5}}$
K. $\frac{2\sqrt{2}+3\sqrt{3}}{\sqrt{6}}$



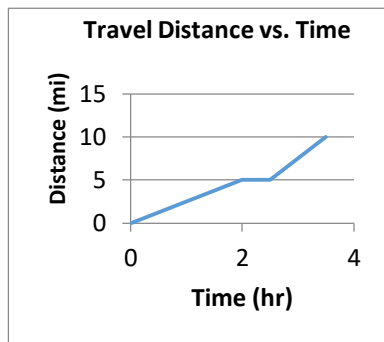
37. The figure above is a right triangle. If $x > 1$, what is the value of x ?
- A. 5
B. 6
C. 7
D. 9
E. 10
38. How many more minutes would it take to burn a full 640-gallon tank of gasoline for a certain rocket engine that can burn a full 480-gallon tank in 15 minutes?
- F. 5
G. 10
H. 15
J. 20
K. 25

39. Mia began a one-way 10-mile bicycle trip by riding very slowly for 5 miles. She rested for 30 minutes and then rode quickly for the rest of the trip. Which of the following graphs could correctly represent the trip?

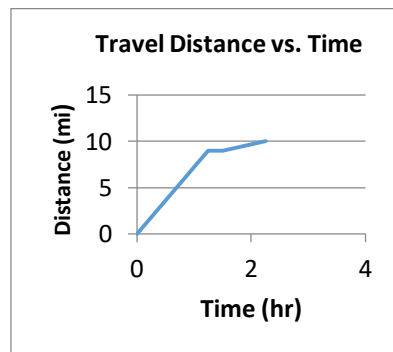
A.



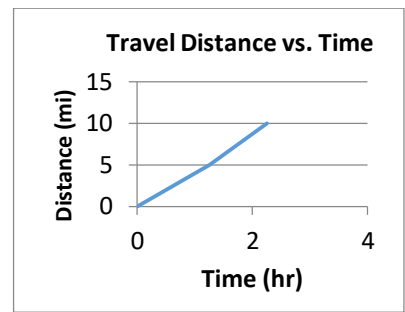
B.



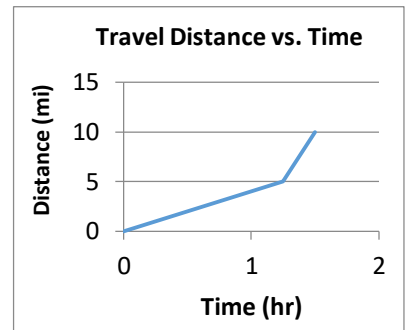
C.



D.



E.



40. If $x(x - 4) = -4$, what is the value of $x^2 + 3x - 5$?

F. 7
G. 5
H. 3
J. 1
K. 0

41. The price of a pair of shoes was first increased by 10 percent and then decreased by 25 percent. The final price was what percent of the original price?

A. 80%
B. 82.5%
C. 85%
D. 87.5%
E. 90%

42. If $x = -5$ and $y = 3$, what is the value of $x^2(2y + x)$?

F. -275
G. -75
H. -25
J. 25
K. 50

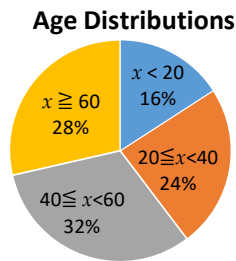
43. A family spent \$350 on utilities in January. Due to the weather, they spent

20% more in February. How much did they spend on utilities in February?

- A. 380
- B. 400
- C. 420
- D. 460
- E. 520

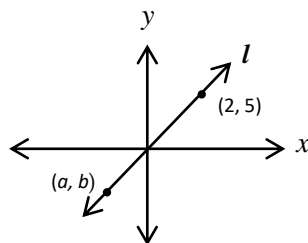
44. In the quadratic equation $x^2 + kx + 36 = 0$, one root is twice the other root. Fine any possible value of k .

- F. $\{-21.37, 21.37\}$
- G. $\{-12.73, 12.73\}$
- H. $\{-10.73, 10.73\}$
- J. $\{0, 10\}$
- K. $\{8.37, 9.37\}$



45. If there are 4,180 residents ranging in age from 40 to 59 in Green Village County according to the graph above, approximately how many residents are under the age of 20?

- A. 2,000
- B. 2,100
- C. 2,200
- D. 2,300
- E. 2,400

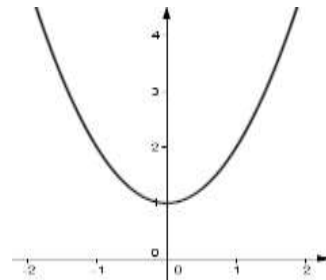


46. In the figure above, line l passes through the origin. What is the value of $\frac{b}{a}$?

- F. 1
- G. 1.5
- H. 2
- J. 2.5
- K. 3

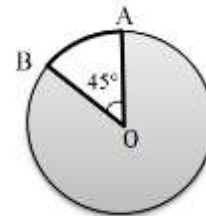
47. If $\log_3 20 = x$, what is the approximate value of x ?

- A. 2.73
- B. 2.45
- C. 1.76
- D. 1.34
- E. 1.21



48. The figure above is a parabola of the equation $y = ax^2 + 3$, where a is a constant. If graphed on the same axes, which of the following describes the graph of $y = 2ax^2 + 3$ as compared to the graph above?

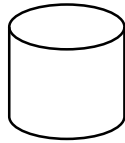
- F. The new graph will move to the right.
- G. The new graph will move to the left.
- H. The new graph will be narrower.
- J. The new graph will be wider.
- K. The new graph will be the same.



49. The circle above has an area of 16π . What is the perimeter of the shaded region?

- A. $8 - \frac{1}{3}\pi$
- B. $8 + 7\pi$
- C. $8 + \frac{2}{3}\pi$
- D. $8 + \frac{1}{3}\pi$
- E. $8 - 7\pi$

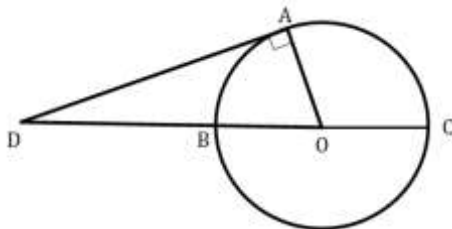
50. In the figure below, a circular cylinder has radius 3 and height 5. What is the volume of the smallest rectangular box that can store this circular cylinder inside?



- F. 120
- G. 150
- H. 180
- J. 200
- K. 240

51. A water balloon is shaped as a sphere with a radius of 3 inches. If more water is added to the original sphere so that the radius is increased by another 3 inches, then the volume of this new sphere is how many times greater than the volume of the original sphere?

- A. 4
- B. 8
- C. 9
- D. 16
- E. 18



52. Point O is the center of the circle in the figure above. If $DA = 12$ and $DB = 8$, what is the area of the circle?

- F. 84
- G. 82.5
- H. 78.5
- J. 68

K. 64.5

53. If $\cos(x) = a$ and $0 < x < 90^\circ$, then $\tan(x) = ?$

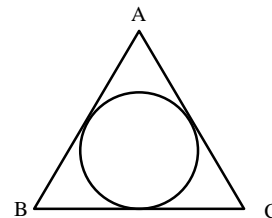
- A. $\frac{1}{a^2}$
- B. $\frac{a}{\sqrt{1-a^2}}$
- C. $\frac{\sqrt{1-a^2}}{a}$
- D. $\frac{a}{1-a^2}$
- E. $\frac{a^2}{\sqrt{1-a^2}}$

54. The roots of $2x^2 + kx + 1 = 0$ are r and s , where k is a constant. If $\frac{1}{r} + \frac{1}{s} = 12$, what is the value of k ?

- F. 12
- G. 10
- H. -12
- J. -10
- K. 24

55. If 14% of x is equal to 7% of y , which of the following is equivalent to y ?

- A. 200% of x
- B. 20% of x
- C. 2% of x
- D. 98% of x
- E. 980% of x



56. In the figure above, $\triangle ABC$ is an equilateral triangle with side of length 8. What is the radius of a circle that is inscribed inside of $\triangle ABC$?

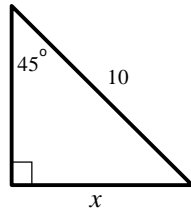
- F. $\frac{\sqrt{3}}{3}$
- G. $\frac{2\sqrt{3}}{3}$
- H. $\frac{4\sqrt{3}}{3}$
- J. $\frac{3\sqrt{3}}{4}$
- K. $\frac{\sqrt{3}}{4}$

57. Which of the following coordinate pairs represents the center of the circle $x^2 + y^2 - 6x + 4y - 12 = 0$?
- A. $(-3, -2)$
 - B. $(-3, 2)$
 - C. $(3, -2)$
 - D. $(2, -3)$
 - E. $(-2, 3)$

58. Of the following, which is the closest approximation of the cost per ticket when one purchases a book of 6?

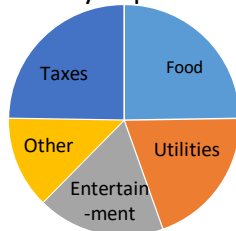
<i>Bus Ticket Price</i>	
<i>Number of Bus Tickets</i>	<i>Price</i>
1	7.5
<i>Book of 6</i>	40
<i>Book of 12</i>	75

- F. \$6.67
- G. \$6.75
- H. \$9.80
- J. \$6.83
- K. \$6.90



59. What is the value of x in the figure above?
- A. 5
 - B. $5\sqrt{3}$
 - C. 8
 - D. $5\sqrt{2}$
 - E. 10

Monthly Expenses



60. The pie graph above shows Ellen's family's monthly expenses and the proportion of each expense out of all of their expenditures. If the family's total expenses are \$3,000 per month, approximately how much do they pay on taxes per month?
- F. \$500
 - G. \$600
 - H. \$650
 - J. \$700
 - K. \$750

ACT Math Mock Test Answers

1. A	6. F	11. C	16. K	21. C	26. J	31. D	36. K	41. B	46. J	51. B	56. H
2. G	7. A	12. H	17. A	22. H	27. B	32. F	37. C	42. J	47. A	52. H	57. C
3. B	8. K	13. E	18. K	23. A	28. G	33. B	38. F	43. C	48. H	53. C	58. F
4. F	9. C	14. F	19. B	24. K	29. A	34. F	39. B	44. G	49. B	54. H	59. D
5. B	10. H	15. A	20. G	25. B	30. J	35. D	40. G	45. B	50. H	55. A	60. K