Practice ACT Math Test -- 60 Minutes, 60 Questions

1. $\dfrac{3m}{8} + \dfrac{2m}{3} = ?$

A. $\frac{m}{24}$

B. $\frac{5}{11}m$

C. $\frac{25}{24}m$

D. $\frac{5}{3}m$

E. $5m$

2. If the perimeter of a square is equal to its area, which of the following could be a side length of the square?

F. 3

G. 4

H. 5

J. 6

K. 7

3. Which of the following is the greatest number?

A. $\left|-27\right|$

B. $\left|(-27)\right|$

C. 6^2

D. -5×-6

E. $-\left|38\right|$

4. Eva is skilled at speed-reading – she is able to read 1000 words of text in only one minute. John reads at a normal pace – 300 words of text in a minute. John just finished a novel that took him a total of 10 hours to read. Approximately how long in hours will it take Eva to read the same book?

F. 3

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

H. 10

J. 30

K. 300,000

5. If there are 16 ounces in a pound, and approximately 0.454 kilograms in a pound, then how many ounces would there be in 8 kilograms (measured to the nearest whole ounce)?

A. 58

B. 124

C. 168

D. 282

E. 320

6. In the figure to the right, triangles ABD, BCD and ADE are all equilateral. What is the degree measure of $\angle BFA$?
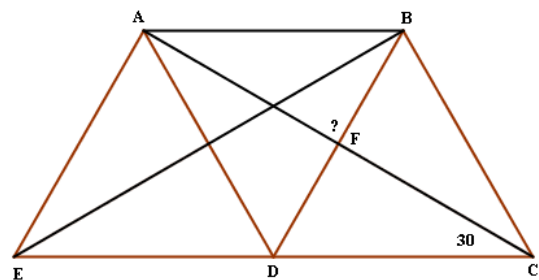
F. 45

G. 60

H. 75

J. 90

K. 135

7. On an x-y coordinate plane, $\overline{AB}$ has a midpoint of C. If point C has coordinates of $(3,4)$ and point A has coordinates of $(-1,6)$, then what are the coordinates of point B?

A. (2, 10)
B. (4, 2)
C. (4, 10)
D. (7, 2)
E. (7, 4)

Questions 8-10 are about the information in this table.

Washington High School's total breakdown of female and male students and junior and senior students is given in the following chart.

	Males	Females	Totals
Juniors	115	145	260
Seniors	125	X	250
Totals	240	270	

8. How many total students are there in both the junior and senior classes at Washington High School?

F. 240
G. 250
H. 510
J. 540
K. 620

9. What is the number of female senior students who go to Washington High School (labeled as "*X*" in the chart)?

A. 115
B. 125
C. 135
D. 155
E. 175

10. What is the probability that a randomly selected junior student at Washington High School will be a male (rounded to the nearest hundredth)?

F. 0.20
G. 0.29
H. 0.38
J. 0.44
K. 0.56

11. A fireperson needs to use a ladder of 25 feet in length to rescue a cat that has become stuck in a tree. The tree is 50 feet high, and the cat is 15 feet off the ground straight up in the trunk of the tree. How far from the bottom of the tree will the ladder have to be in order to reach the point at which the cat is?

A. 15
B. 20
C. 25
D. 30
E. 135

12. $\left(3x^2\right)^4 =$

F. $81x^8$
G. $12x^8$
H. $3x^8$
J. $81x^6$
K. $3x^6$

13. $(3x+4y)^2 = ?$

A. $9x^2 + 24xy + 16y^2$

B. $49x^2y^2$

C. $9x^2 + 16x^2$

D. $9x^2 + 12xy + 16y^2$

E. $3x^2 + 4y^2$

14. The values of $f(x)$ and $g(x)$ are given in the table below.

x	$f(x)$	$g(x)$
-1	3	-4
0	6	-2
1	9	0
2	12	2
3	15	4

What is the value of $g(f(-1))$?

F. -12

G. -4

H. 4

J. 12

K. 15

15. Two line segments are in the X-Y plane. Segment A is formed by the points (-4, 6) and (0, 4). Segment B is formed by points (-6, -6) and (2, -4). Find the coordinates of the point that connects the midpoints of the two line segments.
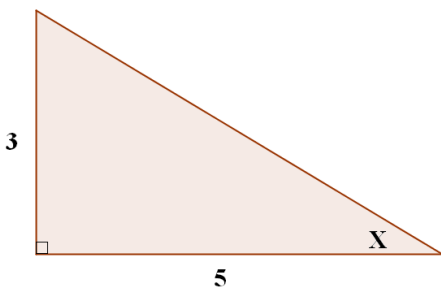
A. (-4, -2)

B. (-2, 0)

C. (0, 2)

D. (4, -6)

E. (6, 4)

16. If $x = 3z - 2$ and $y = 2 + 3z$, how much greater is y than x?

F. 1

G. 2

H. 3

J. 4

K. 6

17. $|2-7| \times |-3+8| = ?$

A. -25

B. 5

C. 23

D. 25

E. 31

18. In the following triangle, what is the measure of angle X to the nearest whole degree?

F. 27

G. 31

H. 34

J. 39

K. 42

19. An airplane that is flying at an altitude of 30,000 feet is beginning to descend at a rate of 1,000 feet per minute. A helicopter is beginning its trip, starting at an altitude of zero feet. The helicopter ascends more slowly than the airplane, going up at a rate of 500 feet per minute. After how many minutes will the airplane and the helicopter be at the same altitude?

A. 10
B. 15
C. 20
D. 30
E. 60

20.   Which of the following is equivalent to $\dfrac{\sqrt[3]{x}}{x^{-\frac{2}{3}}}$?

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

G. $\dfrac{\sqrt[3]{x}}{x}$

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

J. x^3

K. x

21. John walks from his house to school in straight lines. He first walks 6 miles to the west, and then walks 8 miles to the north. If John could have taken a helicopter instead of walking, how far would his journey have been?

A. $\frac{4}{3}$
B. 2
C. 10
D. 14
E. 100

22. Right triangle *ABC* has legs of 24 and 7. What is the *sin* of the triangle's smallest angle?

F. $\dfrac{7}{24}$

G. $\dfrac{25}{7}$

H. $\dfrac{24}{25}$

J. $\dfrac{25}{24}$

K. $\dfrac{7}{25}$

23. A major media outlet uses the Richter Magnitude Scale to report the size of earthquakes. The Richter Scale uses a number between 1 and 10 to signify the relative power of an earthquake. The scale is logarithmic, in that the magnitude of the earthquakes increases exponentially by a multiple of 10 with each single-digit increase in the scale. For instance, and earthquake that is a 3 on the Richter Scale will be 10 times as powerful as one that is a 2. In a recent earthquake, the initial earthquake measured a 7 on the Richter Scale. It had an aftershock that was a 5 on the Richter Scale. How much more powerful was the initial earthquake compared to the aftershock?

A. 10,000,000
B. 100,000
C. 100
D. 20
E. 10

24. A baker is following a recipe to make a chocolate cake. The recipe will serve 10 people, and calls for 3 cups of flour, 3 cups of sugar, and 6 eggs, among other ingredients. The baker realizes he only has 4 eggs in the refrigerator. If he wishes to double the recipe, how many more eggs will he need to purchase?

F. 2
G. 6
H. 8
J. 12
K. 24

25. In a March basketball tournament, there are 64 teams, after the required "play-in game" between the two lowest seeds. Not counting this "play-in game" how many games must be scheduled to determine the national champion, assuming that a team is done after it loses a game?

A. 1
B. 4
C. 16
D. 63.
E. 127

26. A circle of radius 6 is centered at the origin. What is the shortest distance between the point (-8, 8) and the circle?

F. $8\sqrt{2} - 6$
G. 2
H. $8\sqrt{2}$
J. 8
K. 14

27. In a physics experiment, a student is given the following formulas for kinetic and potential energy:

Kinetic Energy $=\frac{1}{2}mv^2$ and Potential Energy $=m\times 9.81\frac{m}{s^2}\times h$ where m = mass, v = velocity, and

h=height. At what height would the potential energy be equivalent to the kinetic energy of a ball that has a mass of 2 kg and a velocity of 5 m/s?

A. 98.1 Meters

B. 25 Meters

C. 10 Meters

D. 3.53 Meters

E. 1.27 Meters

28. Which of the choices is equivalent to the following expression? $9x^2 + 6x - 8$

F. $(9x^2 - 2)(x - 4)$

G. $(3x - 2)(3x + 4)$

H. $(9x - 2)(x + 4)$

J. $(6x - 2)(3x - 4)$

K. $3(x^2 + 2x - 3)$

29. In Mr. Macintosh's math class, students are given 6 tests that make up their grades for the 9 week period. Each test is 40 points. Kristen is in Mr. Macintosh's class, and has taken 5 tests so far, earning an average score of 32 out of 40. She would like to earn an average of 33 on the tests for the 9 weeks. To the nearest whole number, what must be the least amount she must earn on her last test to raise her overall average?

A. 34

B. 35

C. 36

D. 37

E. 38

30. How many degrees does the second hand of a clock sweep through during a 25 second time interval?

F. $\frac{5}{12}$

G. 120

H. 150

J. 335

K. 1500

31. The amount of food eaten by a family is directly proportional to their collective body mass. When a family of four eats 100 pounds of food in a month, its collective body mass is 600 pounds. What would be the expected collective body mass for a family that consumed 125 pounds of food in a month?

A. 500

B. 700

C. 750

D. 75,000

E. 7,500,000

32. The greatest common factor between a^2b^3 and a^4b is 12. Which of the following could be the value of a?
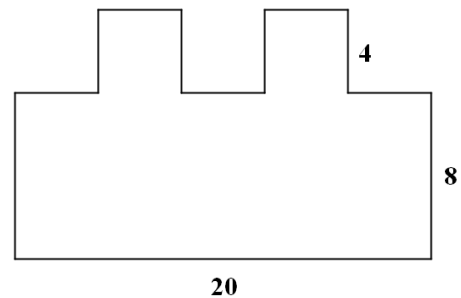
F. -3

G. -2

H. 3

J. 4

K. 24

33. In the figure to the right, all of the line segments meet at right angles, and two squares with sides of length 4 units are placed atop a rectangle with dimensions of 8 units by 20 units. What is the perimeter of the figure?

A. 32
B. 72
C. 160
D. 192
E. 210

34. At the city animal shelter, 40% of the dogs are purebred, and the remaining dogs are mixed. What are the odds that Elmer, a dog randomly selected from the shelter, is a mixed breed?

F. $\frac{2}{5}$
G. $\frac{1}{2}$
H. $\frac{3}{5}$
J. $\frac{5}{3}$
K. $\frac{5}{2}$

35. Angle α is between π and $\frac{3\pi}{2}$. If α has a cosine of $-\frac{3}{5}$, what is the tangent of α?

A. $-\frac{2}{3}$
B. $\frac{3}{4}$
C. $\frac{4}{3}$
D. $\frac{3}{2}$
E. $\frac{5}{3}$

36. What is the equation for the line $g(x)$ perpendicular to the line $f(x)$ (with the equation below), assuming $g(x)$ intersects $f(x)$ at the same point on the y axis?

$$f(x) = 3x - 2$$

F. $g(x) = -\frac{1}{3}x - 2$
G. $g(x) = \frac{1}{3}x - 2$
H. $g(x) = 3x - 2$
J. $g(x) = -\frac{1}{3}x + 2$
K. $g(x) = 3x + 2$

37. The cost (in dollars) to produce x videogames is given by:

$$C(x) = 1000 + 2x$$

The videogames can be sold for $7 apiece. What production quantity will allow the manufacturer to break even, where *Profit = Revenue – Cost*?

A. -500
B. 0
C. 111
D. 200
E. 1014

38. 4 non-identical lines are on a plane. What is the maximum number of intersecting points they can have?

F. 0
G. 4
H. 6
J. 7
K. 8

39. $x^3 + y^3 = ?$

A. $(x-y)(x^2 + xy - y^2)$

B. $\sqrt{9x^2 + 9y^2}$

C. $\sqrt[3]{x^6 + y^6}$

D. $(x+y)(x^2 - xy + y^2)$

E. $(x-y)(x+y)^2$

40. Which of the following is an irrational number?

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

G. $\sqrt{81}$

H. $\frac{3}{7}$

J. $\sqrt{2}$

K. $\frac{37}{41}$

41. A concrete sidewalk is to be placed just outside the border of a rectangular plot of ground, 50 feet by 125 feet. The sidewalk is to be 3 feet wide and go completely around the outside of the plot. The thickness of the sidewalk is to be four inches. About how many cubic yards of concrete will be required to complete the sidewalk?

A. 7.1

B. 8.6

C. 10.2

D. 12.5

E. 13.4

42. A cylindrical shaped tank is to be filled with water at the rate of 2 gallons per minute. The diameter of the tank is 2 feet, and its height is 4 feet. There are 7.48 gallons in one cubic foot of water. Approximately how many minutes will it take to fill the tank completely, assuming it starts empty?

F. 36
G. 47
H. 52
J. 61
K. 75

43. The first term in a sequence is 3. The even numbered terms are twice the term immediately before them. The odd numbered terms after the first are the term immediately before them multiplied by $-\frac{1}{2}$. What is the 61st term in this sequence?

A. -6
B. -3
C. $-\frac{1}{2}$
D.   3
E. 6

44. A rhombus with side equal to 10 has one angle equal to 45 degrees. Find the approximate ratio of the longer diagonal to the shorter diagonal.

F. 2.4
G. 2.8
H. 3.2
J. 3.6
K. 4.0

45. With imaginary numbers, $i^2 = -1$. Which of the following is equivalent to $\sqrt{-3 \times 4}$?

A. $\sqrt{12}$
B. -12
C. $2i\sqrt{3}$
D. $\sqrt{12}i$
E. $i^2\sqrt{12}$

46. A track is to be constructed with two straight sections for sprints and two semicircles at the ends for longer distances, such as the 400 meter run. If it is desired to have the straight sections be 110 meters long, what is the least possible radius, to the nearest meter, of the two semicircles to make the 400 meter long track?

F. 12
G. 14.5
H. 25
J. 29
K. 58

47. If the diagonals of a rhombus have lengths a and b, what is the area of the rhombus?

A. $\dfrac{ab}{2}$
B. ab
C. ab^2
D. $(ab)^2$
E. $\dfrac{ab}{4}$

Questions 48-51 use the graph to the right and the information that follows. An overhead view of a merry-go-round is given in the graph. Each ring is a circle onto which the animals are placed. The inner ring has a radius of 4 feet, the middle ring a radius of 8 feet, and the outer ring a radius of 12 feet. 4 elephants are placed on the inner ring, 6 unicorns on the middle ring, and 10 horses on the outer ring.
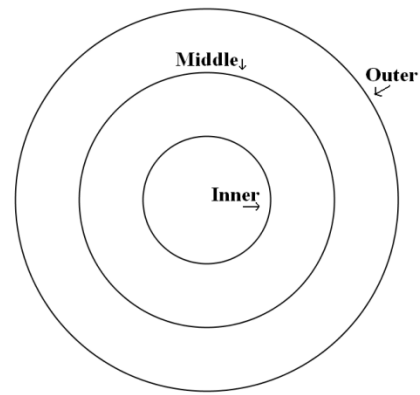
48. If David walks around the entire merry-go-round right on the outer edge three times, how far will he go?

F. 12 π

G. 36 π

H. 64 π

J. 72 π

K. 128 π

49. The amusement park wishes to paint the floor of the merry-go-round. Each can of paint covers 20 square feet. What is the minimum W of cans of paint that the park must purchase in order to fully cover the floor of the merry-go-round, assuming no partial cans may be purchased?

A. 18

B. 22

C. 23

D. 40

E. 225

50. Caitlin has her heart set on riding an elephant. If the animals are randomly assigned to the riders, and the merry-go-round has a full group of riders wishing to go on the ride, what is the percentage chance that Caitlin will be able to ride the elephant?

F. 12.5
G. 15
H. 16.67
J. 20
K. 25

51. On a typical merry-go-round ride, the ride lasts 3 minutes, and the merry-go-round turns 20 times. How much greater is the distance that a horse, which is on the outer ring, will travel as opposed to a unicorn, which is on the middle ring, during that 3 minute ride?

A. 20 π
B. 80 π
C. 100 π
D. 140 π
E. 160 π

52. The expression $\dfrac{\sqrt{1-\cos^2\theta}}{\sqrt{1-\sin^2\theta}}$ is equivalent to which of the following?

F. $\sin\theta$
G. $\cos\theta$
H. $\tan\theta$
J. $\cot\theta$
K. $\sec\theta$

53. Which of the following sets of numbers will have the smallest standard deviation?

A. 1, 3, 5, 7, 9, 11, 13
B. 2, 3, 17, 19, 29, 84, 112
C. 11, 12, 12, 13, 14, 14, 15
D. 6, 9, 11, 17, 25, 39, 49
E. 85, 96, 108, 112, 119, 129, 145

54.

Range of Test Scores	Number of Scores in Given Range
36-40	5
30-35	8
25-29	4
20-24	11
1-19	4

Given the range of test scores in the table above, which of the following could be a median value for the set of test scores?

F. 33
G. 30
H. 28
J. 24
K. Cannot be determined with the given information.

55. If line *m* and line *n*, drawn in the *x-y* coordinate plane, are parallel to each other and have different *y*-intercepts, how many points of intersection will the two lines have?

A. None
B. 1
C. 2
D. Infinite
E. Cannot be determined with the given information.

56. Matrix A with dimensions 3×4 would have a defined product if multiplied by matrix B with which of the following dimensions (i.e., the result of $A \times B$)?

F. 4×2

G. 3×4

H. 3×2

J. 1×4

K. 5×3
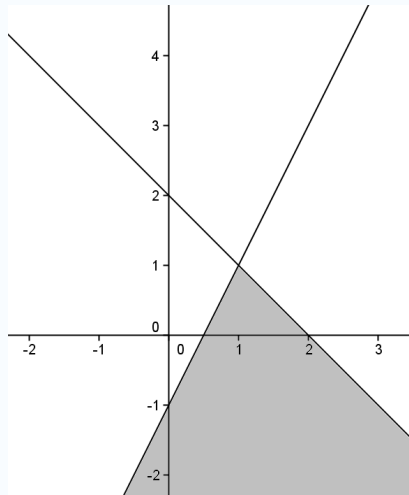
57. $\dfrac{\tan \theta \cos \theta}{\sin \theta} = ?$

A. 0

B. 1

C. $\cos^2 \theta$

D. $\sin^2 \theta$

E. -2

58. $\log_2 \frac{x}{y} + \log_2 \frac{y}{x} = ?$

F. -8

G. -4

H. 0

J. 2

K. 4

59. What set of equations correctly expresses the shaded region?

A. $y \geq -x + 2$ *and* $y \geq 2x - 1$

B. $y \leq -x + 2$ *or* $y \leq 2x - 1$

C. $y \geq -x + 2$ *or* $y \geq 2x - 1$

D. $x \leq -y + 2$ *and* $x \leq -2y + 1$

E. $y \leq -x + 2$ *and* $y \leq 2x - 1$

60. Which of the following has the largest absolute value?

F. 0.683

G. $-\dfrac{2}{3}$

H. $\dfrac{7}{11}$

J. -0.715

K. $-\dfrac{21}{29}$

Key

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