Practice ACT Math Test: 50 Minutes, 45 Questions

1. $\frac{3x}{8} + \frac{2x}{3} = ?$

A. $\frac{25x}{24}$
B. $\frac{5x}{11}$
C. $\frac{6x}{24}$
D. $\frac{8x}{15}$

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

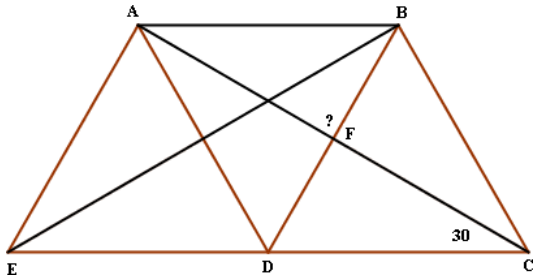
3. Eva is skilled at speed—reading – she is able to read 1000 words of text in only one minute. John reads at a normal pace – 300 words of text in a minute. John just finished a novel that took him a total of 10 hours to read. Approximately how long in hours will it take Eva to read the same book?

A. 3
B. $3\frac{1}{3}$
C. 10
D. 30

4. 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)?

F. 58
G. 124
H. 168
J. 282

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



A. 45
B. 60
C. 75
D. 90

6. 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 ?

F. (2, 10)
G. (4, 2)
H. (7, 2)
J. (7, 4)

7. 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 to reach the point at which the cat is?

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

8. $(3x+4y)^2 = ?$

F. $9x^2+24xy+16y^2$
G. $49x^2y^2$
H. $9x^2+16x^2$
J. $9x^2+12xy+16y^2$

9. 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 $g\big(f(-1)\big)$?

A. -12
B. -4
C. 4
D. 12

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

F. 1

G. 3

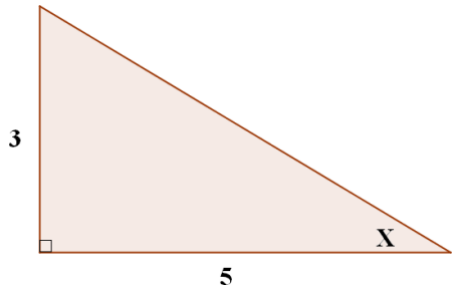
H. 4

J. 6

11. 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. (6, 4)

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



F. 27

G. 31

H. 34

J. 42

13. 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. 15
B. 20
C. 30
D. 60

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

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

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

H. x^3

J. x

15. 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. 2
B. 10
C. 14
D. 100

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

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

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

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

J. $\frac{7}{25}$

17. 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

18. 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. 24

19. 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. 16
C. 63
D. 127

20. 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. 14

21. 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. 3.53 Meters
D. 1.27 Meters

22. 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 (not rounded up) 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?

F. 35
G. 36
H. 37
J. 38

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

A. 120
B. 150
C. 335
D. 1500

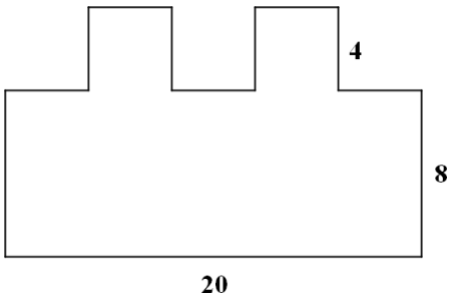
24. The amount of food eaten by a family is directly proportional to their collective body mass. When a family of four eats 100 pounds of food in a month, its collective body mass is 600 pounds. What would be the expected collective body mass for a family that consumed 125 pounds of food in a month?

F. 500
G. 700
H. 750
J. 75,000

25. The greatest common factor between a^2b^3 and a^4b is 12, and *a* and *b* are both integers. Which of the following could be the value of a?

A. -3
B. -2
C. 3
D. 4

26. In the figure to the right, all 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?



F. 32
G. 72
H. 192
J. 210

27. 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?

A. $\frac{1}{2}$
B. $\frac{3}{5}$
C. $\frac{5}{3}$
D. $\frac{5}{2}$

28. What is the equation for *g(x)* if it is perpendicular to the line *f(x)* (with the equation below), assuming that *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. $g(x) = 3x + 2$

29. 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. 0
B. 111
C. 200
D. 1014

30. 4 non-identical lines are on a plane. What is the maximum number of intersecting points they can have?

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

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

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

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

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

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

32. Which of the following is an irrational number?

F. 5

G. $\sqrt{81}$

H. $\sqrt{2}$

J. $\frac{67}{81}$

33. 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. 12.5
D. 13.4

34. 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

35. 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. -2
B. $-\frac{1}{2}$
C. 3
D. 6

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

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

37. 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?

A. 12
B. 14.5
C. 25
D. 29

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

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

39. 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. 85, 96, 108, 112, 119, 129, 145

40.

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

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

41. 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

42. 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 $A \times B$)?

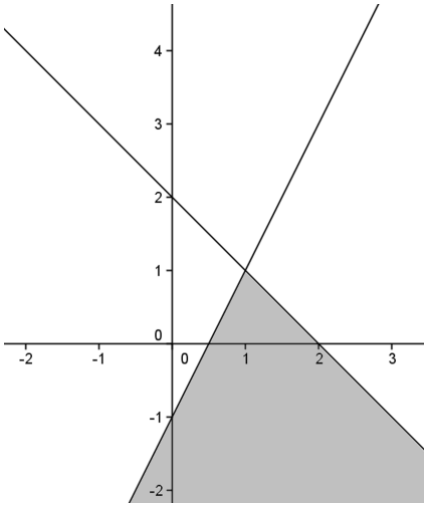
F. 4×2
G. 3×4
H. 3×2
J. 1×4

43.

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

A. -4
B. 0
C. 2
D. 4

44. Which set of inequalities correctly corresponds to the shaded region in the figure?



F. $y \leq -x + 2$ and $y \leq 2x - 1$

G. $y \geq -x + 2$ and $y \geq 2x - 1$

H. $y \leq -x + 2$ or $y \leq 2x - 1$

J. $y \geq -x + 2$ or $y \geq 2x - 1$

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

A. $\frac{7}{11}$

B. 0.683

C. -0.715

D. $-\frac{21}{29}$

Math Test Key

1. A	16. J	31. D
2. G	17. C	32. H
3. A	18. H	33. D
4. J	19. C	34. G
5. D	20. F	35. C
6. H	21. D	36. F
7. B	22. J	37. D
8. F	23. B	38. H
9. C	24. H	39. C
10. H	25. B	40. H
11. B	26. G	41. A
12. G	27. B	42. F
13. B	28. F	43. B
14. J	29. C	44. F
15. B	30. G	45. D