ACT® Math Practice Test 2

Mathematics Test · 50 Minutes — 45 Questions

DIRECTIONS: Solve each problem, choose the correct answer, and then circle or fill in the corresponding letter on your answer sheet.

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.

Answer Sheet

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

All questions are original practice items written for Boost Your Test Score and modeled on the content and difficulty of released ACT Mathematics tests. ACT® is a registered trademark of ACT Education Corp., which is not affiliated with and does not endorse this material.

1. The top of a wooden drying rack is shaped like a trapezoid. The parallel sides are 24 inches and 38 inches long, and the distance between them is 15 inches. What is the area, in square inches, of the top of the rack?

A. 372

B. 465

C. 570

D. 930

2. The table below shows the prices four stores charge for the same T-shirt. Which store offers the lowest total price for exactly 6 of these T-shirts?

Store	Price
A	$12 each
B	3 for $33
C	$13 each; every 3rd shirt half price
D	$70 for a 6-pack

F. Store A

G. Store B

H. Store C

J. Store D

3. The expression $(k + 2m)(3k - 2m)$ is equivalent to:

A. $3k^2 - 4m^2$

B. $3k^2 - 4km - 4m^2$

C. $3k^2 + 4km - 4m^2$

D. $3k^2 + 8km - 4m^2$

DO YOUR FIGURING HERE.

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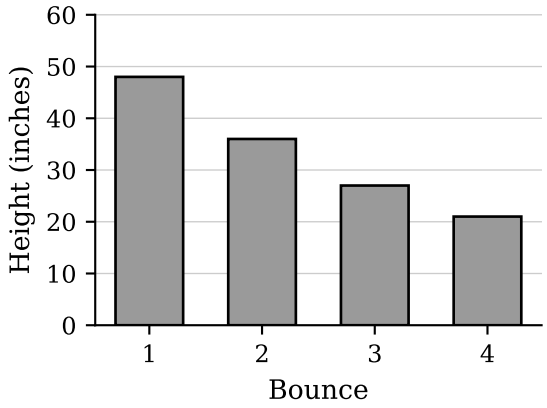
4. A ball was dropped from a table, and the maximum height of each of its first 4 rebounds was recorded in the bar graph below. What is the mean of these 4 rebound heights, in inches?



F. 27

G. 31.5

H. 33

J. 36

5. Dana earns $16 per hour for up to 40 hours of work per week. For each hour over 40 hours, she earns $1\frac{1}{2}$ times her regular hourly rate. How much does Dana earn in a week in which she works 47 hours?

A. $752

B. $784

C. $808

D. $1,128

DO YOUR FIGURING HERE.

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6. A class has 9 juniors and 6 seniors. The teacher will randomly select 2 students, one at a time, without replacement. Given that the first student selected is a senior, what is the probability that the second student selected is also a senior?

F. $\frac{2}{15}$
G. $\frac{1}{7}$
H. $\frac{1}{3}$
J. $\frac{5}{14}$

7. What value of w satisfies the equation $4(2w + 3) = \frac{3}{2}(4w - 6)$?

A. -10.5
B. -1.5
C. 1.5
D. 10.5

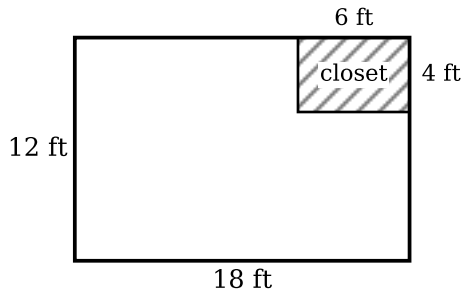
8. Which of the following is equal to $\sqrt{75} - 2\sqrt{12} + \frac{\sqrt{27}}{3}$?

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

DO YOUR FIGURING HERE.

GO ON TO THE NEXT PAGE.

9. The floor plan below shows a rectangular room that is 18 feet by 12 feet, with a 6-foot-by-4-foot closet in one corner that will NOT be carpeted. Carpet costs $3.25 per square foot. What is the cost of carpeting the rest of the room?



A. $546
B. $624
C. $702
D. $780

10. A choir of 168 members has only altos and sopranos. The number of altos is 3 more than twice the number of sopranos. What is the ratio of altos to sopranos?

F. $2 : 1$
G. $55 : 113$
H. $111 : 57$
J. $113 : 55$

11. For the function $f(x) = 3 \cdot 2^{x-1} - 5$, what value of x makes $f(x) = 43$?

A. 4
B. 5
C. 6
D. 16

DO YOUR FIGURING HERE.

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12. Which of the following is the domain of $f(t) = \dfrac{\sqrt{t-2}}{t-5}$?

F. $t \geq 2$

G. $t > 2$ and $t \neq 5$

H. $t \geq 2$ and $t \neq 5$

J. $t \neq 5$

13. Leo walks from his back door 9 yards east, then 4 yards north, then 15 yards east, then 6 yards north to reach a shed. How many yards shorter is the straight-line path from the back door to the shed than the path he walked?

A. 2

B. 4

C. 6

D. 8

14. For a set of test scores, the standard score of a raw score x is $z = \dfrac{x - \mu}{\sigma}$, where μ is the mean and σ is the standard deviation. The mean of the scores is 72, and the standard deviation is 8. What raw score has a standard score of -1.25 ?

F. 62

G. 64

H. 70.75

J. 82

DO YOUR FIGURING HERE.

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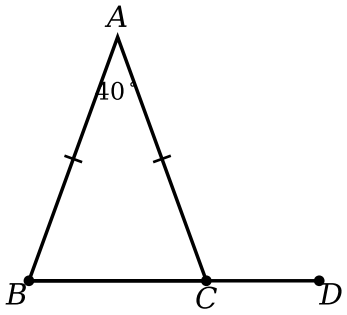
15. In $\triangle ABC$ below, $\overline{AB} \cong \overline{AC}$ and $\angle A$ measures $40°$. Side $\overline{BC}$ is extended past C to point D. What is the measure of $\angle ACD$?



A. $70°$
B. $100°$
C. $110°$
D. $140°$

16. A point is chosen at random inside a square with side length 10 units. To the nearest hundredth, what is the probability that the point is within 3 units of the center of the square?

F. 0.03
G. 0.09
H. 0.19
J. 0.28

17. In the standard (x, y) coordinate plane, line ℓ is perpendicular to the line $3x - 4y = 12$ and passes through the point $(6, -1)$. What is the y-intercept of line ℓ ?

A. -9
B. -1
C. 7
D. 9

DO YOUR FIGURING HERE.

GO ON TO THE NEXT PAGE.

18. What is the 500th digit after the decimal point in the repeating decimal $0.\overline{318427}$?

F. 1
G. 3
H. 4
J. 8

19. Which of the following functions fits all the values in the table below?

x	0	1	2	3
y	5	8	12.8	20.48

A. $y = 5 + 3x$
B. $y = 5(1.6)^x$
C. $y = 1.6(5)^x$
D. $y = 5x^{1.6}$

20. Biologists caught, tagged, and released 60 fish in a lake. Two weeks later, they caught 45 fish from the same lake, and 9 of them were tagged. Assuming the proportion of tagged fish in the second catch matches the proportion in the lake, about how many fish are in the lake?

F. 108
G. 240
H. 300
J. 540

21. Which of the following points (x, y) satisfies both $x + 2y \le 6$ and $y > 2x - 3$?

A. $(4,\ 1)$
B. $(3,\ 2)$
C. $(-2,\ 5)$
D. $(2,\ 2)$

DO YOUR FIGURING HERE.

GO ON TO THE NEXT PAGE.

22. What is the area, in square inches, of a regular hexagon with sides 6 inches long?

F. $18\sqrt{3}$
G. $27\sqrt{3}$
H. $36\sqrt{3}$
J. $54\sqrt{3}$

23. Given that p is a positive number, n is a negative number, and $|p| > |n|$, which of the following expressions has the greatest value?

A. $p - n$
B. $p + n$
C. $n - p$
D. $|n| - |p|$

24. Given the matrices $X = \begin{bmatrix} 3 & -1 \\ 0 & 4 \end{bmatrix}$ and $Y = \begin{bmatrix} -2 & 3 \\ 4 & -1 \end{bmatrix}$, which of the following is the product XY ?

F. $\begin{bmatrix} -6 & -3 \\ 0 & -4 \end{bmatrix}$
G. $\begin{bmatrix} -6 & 14 \\ 12 & -4 \end{bmatrix}$
H. $\begin{bmatrix} -2 & 10 \\ 16 & -4 \end{bmatrix}$
J. $\begin{bmatrix} -10 & 10 \\ 16 & -4 \end{bmatrix}$

DO YOUR FIGURING HERE.

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25. Three students sold yearbook ads. Lena sold 3 times as many ads as Jo, and Ray sold 4 more ads than Lena. Together they sold 60 ads. How many ads did Ray sell?

A. 8

B. 24

C. 28

D. 32

26. A rectangular box has inside dimensions of 3 inches by 4 inches by 12 inches. What is the length, in inches, of the longest straight rod that fits inside the box?

F. 12

G. 13

H. 15

J. 19

27. A sector of a circle with radius 9 centimeters has a central angle of 140°. What is the perimeter, in centimeters, of the sector?

A. 7π

B. $9 + 7\pi$

C. $18 + 7\pi$

D. 31.5π

28. In a carnival game, a player spins a spinner once. The player wins \$10 with probability $\frac{1}{8}$, wins \$2 with probability $\frac{3}{8}$, and loses \$3 otherwise. What is the expected value, in dollars, of one spin for the player?

F. -0.50

G. 0.25

H. 0.50

J. 1.00

DO YOUR FIGURING HERE.

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29. What is the value of $\dfrac{(6.4 \times 10^5)(2.5 \times 10^{-8})}{8 \times 10^{-4}}$?

A. 2×10^{-7}

B. 2×10^{0}

C. 2×10^{1}

D. 2×10^{11}

30. Given that $i = \sqrt{-1}$, which of the following is equivalent to $\dfrac{5+i}{2-i}$?

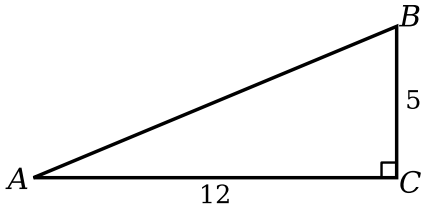
F. $\dfrac{9+7i}{5}$

G. $\dfrac{11+7i}{5}$

H. $\dfrac{9+3i}{3}$

J. $\dfrac{11+3i}{5}$

31. In right triangle ABC below, $AC = 12$, $BC = 5$, and $\angle C$ is a right angle. What is $\tan(2A)$?



A. $\dfrac{60}{169}$

B. $\dfrac{5}{6}$

C. $\dfrac{119}{120}$

D. $\dfrac{120}{119}$

DO YOUR FIGURING HERE.

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32. Kai's first 7 quiz scores were 58, 72, 75, 81, 81, 86, and 94. On the 8th quiz, Kai scored 95. Compared with the first 7 scores, which statistics of all 8 scores are greater?

F. The mean only

G. The mean and the range only

H. The mean, the median, and the range only

J. The mean, the median, the mode, and the range

33. For $f(x) = \dfrac{2x + 3}{x - 1}$, what is the value of $f^{-1}(5)$?

A. $\dfrac{3}{8}$

B. $\dfrac{8}{3}$

C. $\dfrac{7}{2}$

D. $\dfrac{13}{4}$

34. In a town of 5,000 people, 2% have a certain condition. A screening test correctly gives a positive result for 95% of people who have the condition, and it incorrectly gives a positive result for 4% of people who do not have it. If everyone is tested and a person with a positive result is chosen at random, what is the probability, to the nearest thousandth, that the person does NOT have the condition?

F. 0.040

G. 0.196

H. 0.326

J. 0.674

DO YOUR FIGURING HERE.

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35. Pipe A can fill a tank in 6 hours, and Pipe B can fill it in 9 hours. A drain can empty the full tank in 12 hours. If the tank starts empty and both pipes and the drain are all open, how many hours will it take to fill the tank?

A. 4

B. $\frac{18}{5}$

C. $\frac{36}{7}$

D. $\frac{36}{5}$

36. In a circle, chord $\overline{AB}$ is 16 centimeters long and is 6 centimeters from the center. Chord $\overline{CD}$ of the same circle is 8 centimeters from the center. How long, in centimeters, is $\overline{CD}$?

F. 8

G. 10

H. 12

J. 16

37. A rectangular floor measures 8 feet by 11 feet. It will be covered with square tiles that are 18 inches on each side, laid in rows parallel to the walls. Tiles may be cut to fit along the edges, but a cut-off piece can NOT be used anywhere else. What is the minimum number of tiles needed?

A. 40

B. 42

C. 44

D. 48

DO YOUR FIGURING HERE.

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38. The graph of a function of the form $y = a\cos(bx) + c$ has a maximum at $(0, 1)$, and the next minimum is at $(2, -3)$. Which of the following could be the function?

F. $y = 2\cos\left(\frac{\pi}{2}x\right) - 1$

G. $y = 2\cos(2x) - 1$

H. $y = 4\cos\left(\frac{\pi}{2}x\right) + 1$

J. $y = 2\cos(\pi x) - 1$

39. Given $f(x) = x^2 - 9$ and $g(x) = |x| - 1$, what are all the values of x for which $f\big(g(x)\big) = 0$?

A. -4 and 4 only

B. -4, -2, 2, and 4

C. 4 only

D. -2 and 2 only

40. The value V, in dollars, of a car t years after purchase is modeled by $V = 28{,}000(0.85)^t$. According to the model, at the end of which year will the car's value first be less than half of its purchase price?

F. 3rd

G. 4th

H. 5th

J. 6th

41. The equation $18x^2 - 3x = 10$ has 2 solutions. What is the greater of the 2 solutions?

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

B. $\frac{5}{6}$

C. $\frac{5}{3}$

D. $\frac{10}{9}$

DO YOUR FIGURING HERE.

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42. What is the solution set of $\log_3(x+6) + \log_3 x = 3$?

F. $\{-9\}$

G. $\{9\}$

H. $\{-9, 3\}$

J. $\{3\}$

43. If $\sin\theta = \frac{3}{5}$ and $90^\circ < \theta < 180^\circ$, what is the value of $\sin(2\theta)$?

A. $-\dfrac{24}{25}$

B. $-\dfrac{7}{25}$

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

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

44. In a language club of 120 students, 70 take Spanish, 55 take French, and 40 take Latin. Of these, 25 take both Spanish and French, 18 take both Spanish and Latin, 15 take both French and Latin, and 8 take all three. How many students in the club take none of the three languages?

F. 5

G. 13

H. 25

J. 37

DO YOUR FIGURING HERE.

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45. For real numbers a, b, and c such that $a > b > c$ and $b > 0$, which of the following statements is(are) always true?

I. $|a| > |b|$

II. $|b| > |c|$

III. $ac < bc$

A. I only

B. I and II only

C. I and III only

D. I, II, and III

DO YOUR FIGURING HERE.

END OF TEST

STOP! Check your work on this test only.