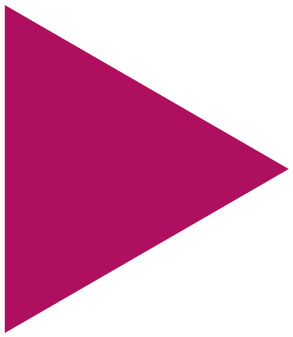
2014–2015

PREPARING FOR THE ACT®

COLLEGE READINESS ASSESSMENT



The ACT®

What's Inside

- Full-Length Practice Tests, including a Writing Test
- Information about the Optional Writing Test
- Strategies to Prepare for the Tests
- What to Expect on Test Day

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ACT®

MATHEMATICS 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.

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1. The weekly fee for staying at the Pleasant Lake Campground is \$20 per vehicle and \$10 per person. Last year, weekly fees were paid for v vehicles and p persons. Which of the following expressions gives the total amount, in dollars, collected for weekly fees last year?

A. $20v + 10p$
B. $20p + 10v$
C. $10(v + p)$
D. $30(v + p)$
E. $10(v + p) + 20p$

2. If $r = 9$, $b = 5$, and $g = -6$, what does $(r + b - g)(b + g)$ equal?

F. -20
G. -8
H. 8
J. 19
K. 20

3. A copy machine makes 60 copies per minute. A second copy machine makes 80 copies per minute. The second machine starts making copies 2 minutes after the first machine starts. Both machines stop making copies 8 minutes after the first machine started. Together, the 2 machines made how many copies?

A. 480
B. 600
C. 680
D. 720
E. 960

4. Marlon is bowling in a tournament and has the highest average after 5 games, with scores of 210, 225, 254, 231, and 280. In order to maintain this exact average, what *must* be Marlon's score for his 6th game?

F. 200
G. 210
H. 231
J. 240
K. 245

5. Joelle earns her regular pay of \$7.50 per hour for up to 40 hours of work in a week. For each hour over 40 hours of work in a week, Joelle is paid $1\frac{1}{2}$ times her regular pay. How much does Joelle earn for a week in which she works 42 hours?

A. \$126.00
B. \$315.00
C. \$322.50
D. \$378.00
E. \$472.50

6. Which of the following mathematical expressions is equivalent to the verbal expression "A number, x, squared is 39 more than the product of 10 and x" ?

F. $2x = 39 + 10x$
G. $2x = 39x + 10x$
H. $x^2 = 39 - 10x$
J. $x^2 = 39 + x^{10}$
K. $x^2 = 39 + 10x$

7. If $9(x - 9) = -11$, then $x = ?$

A. $-\frac{92}{9}$
B. $-\frac{20}{9}$
C. $-\frac{11}{9}$
D. $-\frac{2}{9}$
E. $\frac{70}{9}$

8. Discount tickets to a basketball tournament sell for \$4.00 each. Enrico spent \$60.00 on discount tickets, \$37.50 less than if he had bought the tickets at the regular price. What was the regular ticket price?

F. \$ 2.50
G. \$ 6.40
H. \$ 6.50
J. \$ 7.50
K. \$11.00

9. The expression $(3x - 4y^2)(3x + 4y^2)$ is equivalent to:

A. $9x^2 - 16y^4$
B. $9x^2 - 8y^4$
C. $9x^2 + 16y^4$
D. $6x^2 - 16y^4$
E. $6x^2 - 8y^4$

10. A rectangle has an area of 32 square feet and a perimeter of 24 feet. What is the shortest of the side lengths, in feet, of the rectangle?

F. 1
G. 2
H. 3
J. 4
K. 8

11. In $\triangle ABC$, the sum of the measures of $\angle A$ and $\angle B$ is 47°. What is the measure of $\angle C$?

A. 47°
B. 86°
C. 94°
D. 133°
E. 143°

12. In the school cafeteria, students choose their lunch from 3 sandwiches, 3 soups, 4 salads, and 2 drinks. How many different lunches are possible for a student who chooses exactly 1 sandwich, 1 soup, 1 salad, and 1 drink?

F. 2
G. 4
H. 12
J. 36
K. 72

13. For 2 consecutive integers, the result of adding the smaller integer and triple the larger integer is 79. What are the 2 integers?

A. 18, 19
B. 19, 20
C. 20, 21
D. 26, 27
E. 39, 40

14. A function $f(x)$ is defined as $f(x) = -8x^2$. What is $f(-3)$?

F. −72
G. 72
H. 192
J. −576
K. 576

15. If $3^x = 54$, then which of the following must be true?

A. $1 < x < 2$
B. $2 < x < 3$
C. $3 < x < 4$
D. $4 < x < 5$
E. $5 < x$

16. What is the least common multiple of 70, 60, and 50 ?

F. 60
G. 180
H. 210
J. 2,100
K. 210,000

17. Hot Shot Electronics is designing a packing box for its new line of Acoustical Odyssey speakers. The box is a rectangular prism of length 45 centimeters, width 30 centimeters, and volume 81,000 cubic centimeters. What is the height, in centimeters, of the box?

A. 75
B. 60
C. 48
D. 27
E. 18

18. Four points, *A*, *B*, *C*, and *D*, lie on a circle having a circumference of 15 units. *B* is 2 units counterclockwise from *A*. *C* is 5 units clockwise from *A*. *D* is 7 units clockwise from *A* and 8 units counterclockwise from *A*. What is the order of the points, starting with *A* and going clockwise around the circle?

F. *A*, *B*, *C*, *D*
G. *A*, *B*, *D*, *C*
H. *A*, *C*, *B*, *D*
J. *A*, *C*, *D*, *B*
K. *A*, *D*, *C*, *B*

19. A group of cells grows in number as described by the equation $y = 16(2)^t$, where t represents the number of days and y represents the number of cells. According to this formula, how many cells will be in the group at the end of the first 5 days?

A. 80
B. 160
C. 400
D. 512
E. 1,280

20. The length of a rectangle is 3 times the length of a smaller rectangle. The 2 rectangles have the same width. The area of the smaller rectangle is A square units. The area of the larger rectangle is kA square units. Which of the following is the value of k ?

F. $\frac{1}{9}$

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

H. 1

J. 3

K. 9

21. $(a + 2b + 3c) - (4a + 6b - 5c)$ is equivalent to:

A. $-4a - 8b - 2c$
B. $-4a - 4b + 8c$
C. $-3a + 8b - 2c$
D. $-3a - 4b - 2c$
E. $-3a - 4b + 8c$

22. The dimensions of the right triangle shown below are given in feet. What is $\sin \theta$?

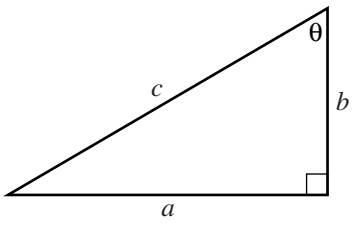
F. $\frac{a}{b}$

G. $\frac{a}{c}$

H. $\frac{b}{c}$

J. $\frac{b}{a}$

K. $\frac{c}{a}$



23. In a basketball passing drill, 5 basketball players stand evenly spaced around a circle. The player with the ball (the passer) passes it to another player (the receiver). The receiver cannot be the player to the passer's immediate right or left and cannot be the player who last passed the ball. A designated player begins the drill as the first passer. This player will be the receiver for the first time on which pass of the ball?

A. 4th
B. 5th
C. 6th
D. 10th
E. 24th

24. Lines p and n lie in the standard (x,y) coordinate plane. An equation for line p is $y = 0.12x + 3{,}000$. The slope of line n is 0.1 greater than the slope of line p. What is the slope of line n ?

F. 0.012
G. 0.02
H. 0.22
J. 1.2
K. 300

25. The expression $-8x^3(7x^6 - 3x^5)$ is equivalent to:

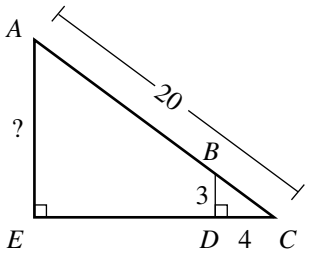
A. $-56x^9 + 24x^8$
B. $-56x^9 - 24x^8$
C. $-56x^{18} + 24x^{15}$
D. $-56x^{18} - 24x^{15}$
E. $-32x^4$

26. $-3\,|-6 + 8\,| = ?$

F. -42
G. -6
H. -1
J. 6
K. 42

27. In right triangle $\triangle ACE$ below, $\overline{BD}$ is parallel to $\overline{AE}$, and $\overline{BD}$ is perpendicular to $\overline{EC}$ at D. The length of $\overline{AC}$ is 20 feet, the length of $\overline{BD}$ is 3 feet, and the length of $\overline{CD}$ is 4 feet. What is the length, in feet, of $\overline{AE}$?

A. 10
B. 12
C. 15
D. 16
E. 17



28. As part of a lesson on motion, students observed a cart rolling at a constant rate along a straight line. As shown in the chart below, they recorded the distance, y feet, of the cart from a reference point at 1-second intervals from $t = 0$ seconds to $t = 5$ seconds.

t	0	1	2	3	4	5
y	14	19	24	29	34	39

Which of the following equations represents this data?

F. $y = t + 14$
G. $y = 5t + 9$
H. $y = 5t + 14$
J. $y = 14t + 5$
K. $y = 19t$

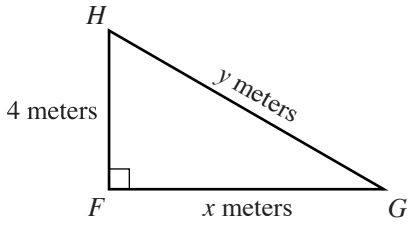
29. The inequality $6(x + 2) > 7(x - 5)$ is equivalent to which of the following inequalities?

A. $x < -23$
B. $x < 7$
C. $x < 17$
D. $x < 37$
E. $x < 47$

30. The sides of a square are 3 cm long. One vertex of the square is at (2,0) on a square coordinate grid marked in centimeter units. Which of the following points could also be a vertex of the square?

F. (−4, 0)
G. (0, 1)
H. (1,−1)
J. (4, 1)
K. (5, 0)

31. For $\triangle FGH$, shown below, which of the following is an expression for y in terms of x ?

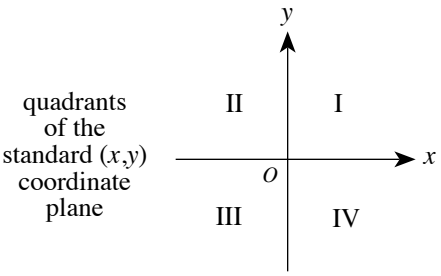


A. $x + 4$
B. $\sqrt{x^2 + 4}$
C. $\sqrt{x^2 + 8}$
D. $\sqrt{x^2 - 16}$
E. $\sqrt{x^2 + 16}$

32. A bag contains 12 red marbles, 5 yellow marbles, and 15 green marbles. How many additional red marbles must be added to the 32 marbles already in the bag so that the probability of randomly drawing a red marble is $\frac{3}{5}$?

F. 13
G. 18
H. 28
J. 32
K. 40

33. What are the quadrants of the standard (x,y) coordinate plane below that contain points on the graph of the equation $4x - 2y = 8$?



A. I and III only
B. I, II, and III only
C. I, II, and IV only
D. I, III, and IV only
E. II, III, and IV only

34. The graph of $y = -5x^2 + 9$ passes through $(1,2a)$ in the standard (x,y) coordinate plane. What is the value of a ?

F. 2
G. 4
H. 7
J. −1
K. −8

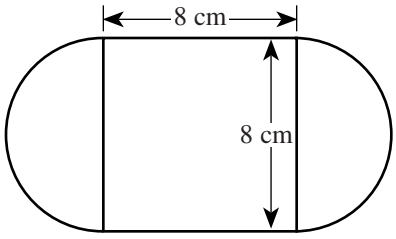
35. Jerome, Kevin, and Seth shared a submarine sandwich. Jerome ate $\frac{1}{2}$ of the sandwich, Kevin ate $\frac{1}{3}$ of the sandwich, and Seth ate the rest. What is the ratio of Jerome's share to Kevin's share to Seth's share?

A. 2:3:6
B. 2:6:3
C. 3:1:2
D. 3:2:1
E. 6:3:2

36. A particular circle in the standard (x,y) coordinate plane has an equation of $(x - 5)^2 + y^2 = 38$. What are the radius of the circle, in coordinate units, and the coordinates of the center of the circle?

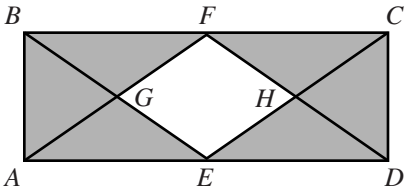
	radius	center
F.	$\sqrt{38}$	(5,0)
G.	19	(5,0)
H.	38	(5,0)
J.	$\sqrt{38}$	(−5,0)
K.	19	(−5,0)

37. The figure below consists of a square and 2 semicircles, with dimensions as shown. What is the outside perimeter, in centimeters, of the figure?



A. $8 + 8\pi$
B. $16 + 8\pi$
C. $16 + 16\pi$
D. $32 + 8\pi$
E. $32 + 16\pi$

38. In the figure below, points E and F are the midpoints of sides $\overline{AD}$ and $\overline{BC}$ of rectangle $ABCD$, point G is the intersection of $\overline{AF}$ and $\overline{BE}$, and point H is the intersection of $\overline{CE}$ and $\overline{DF}$. The interior of $ABCD$ except for the interior of $EGFH$ is shaded. What is the ratio of the area of $EGFH$ to the area of the shaded region?



F. 1:2
G. 1:3
H. 1:4
J. 1:6
K. Cannot be determined from the given information

39. The coordinates of the endpoints of $\overline{CD}$, in the standard (x,y) coordinate plane, are $(-4,-2)$ and $(14,2)$. What is the x-coordinate of the midpoint of $\overline{CD}$?

A. 0
B. 2
C. 5
D. 9
E. 10

40. What is the surface area, in square inches, of an 8-inch cube?

F. 512
G. 384
H. 320
J. 256
K. 192

41. The equations below are linear equations of a system where a, b, and c are positive integers.

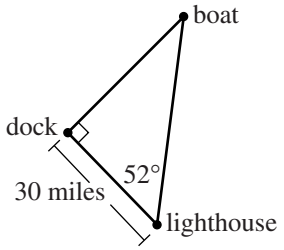
$$ay + bx = c$$
$$ay - bx = c$$

Which of the following describes the graph of at least 1 such system of equations in the standard (x,y) coordinate plane?

I. 2 parallel lines
II. 2 intersecting lines
III. A single line

A. I only
B. II only
C. III only
D. I or II only
E. I, II, or III

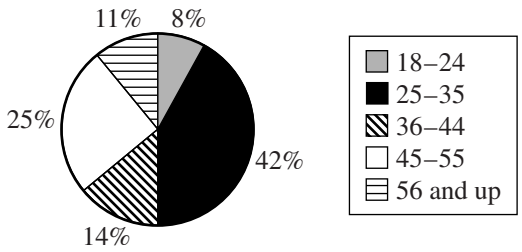
42. According to the measurements given in the figure below, which of the following expressions gives the distance, in miles, from the boat to the dock?



F. $30 \tan 52°$
G. $30 \cos 52°$
H. $30 \sin 52°$
J. $\frac{30}{\cos 52°}$
K. $\frac{30}{\sin 52°}$

43. The circle graph below shows the distribution of registered voters, by age, for a community. Registered voters are randomly selected from this distribution to be called for jury duty. What are the odds (in the age range:not in the age range) that the first person called for jury duty is in the age range of 25–35 years?

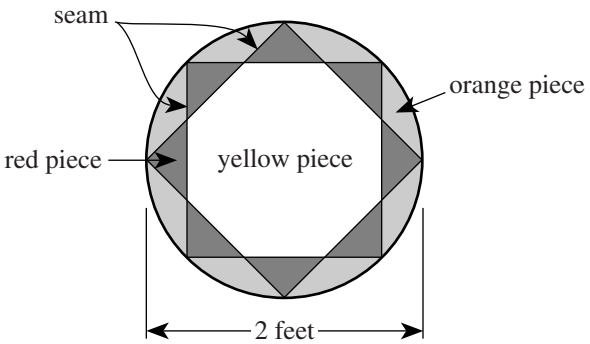
Distribution of Registered Voters by Age



A. 1:3
B. 7:8
C. 7:43
D. 21:29
E. 42:25

Use the following information to answer questions 44–46.

The figure below shows the design of a circular stained-glass panel on display at Hopewell's Antique Shop. Seams separate the pieces of the panel. All red triangular pieces shown are congruent and have a common vertex with each adjoining triangular piece. The 2 squares shown are inscribed in the circle. The diameter of the panel is 2 feet.



44. The design of the stained-glass panel has how many lines of symmetry in the plane of the panel?

F. 2
G. 4
H. 8
J. 16
K. Infinitely many

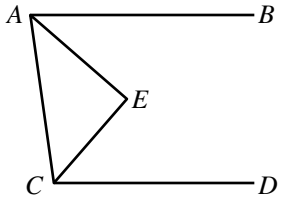
45. What is the area of the stained-glass panel, to the nearest 0.1 square foot?

A. 3.1
B. 4.0
C. 6.2
D. 8.0
E. 12.6

46. Kaya wants to install a new circular stained-glass window in her living room. The design of the window will be identical to that of the panel. The diameter of the new window will be 75% longer than the diameter of the panel. The new window will be how many feet in diameter?

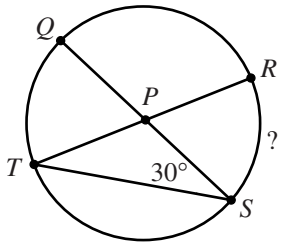
F. 1.50
G. 2.50
H. 2.75
J. 3.50
K. 4.00

47. In the figure below, $\overline{AB} \parallel \overline{CD}$, $\overline{AE}$ bisects $\angle BAC$, and $\overline{CE}$ bisects $\angle ACD$. If the measure of $\angle BAC$ is 82°, what is the measure of $\angle AEC$?



A. 86°
B. 88°
C. 90°
D. 92°
E. Cannot be determined from the given information

48. In the circle shown below, chords $\overline{TR}$ and $\overline{QS}$ intersect at P, which is the center of the circle, and the measure of $\angle PST$ is 30°. What is the degree measure of minor arc $\overset{\frown}{RS}$?



F. 30°
G. 45°
H. 60°
J. 90°
K. Cannot be determined from the given information

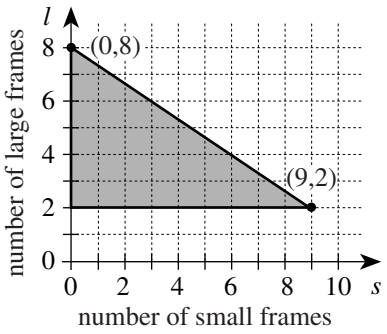
49. For what value of a would the following system of equations have an infinite number of solutions?

$$2x - y = 8$$
$$6x - 3y = 4a$$

A. 2
B. 6
C. 8
D. 24
E. 32

Use the following information to answer questions 50–52.

Marcia makes and sells handcrafted picture frames in 2 sizes: small and large. It takes her 2 hours to make a small frame and 3 hours to make a large frame. The shaded triangular region shown below is the graph of a system of inequalities representing weekly constraints Marcia has in making the frames. For making and selling s small frames and l large frames, Marcia makes a profit of $30s + 70l$ dollars. Marcia sells all the frames she makes.



50. The weekly constraint represented by the horizontal line segment containing (9,2) means that each week Marcia makes a minimum of:

F. 2 large frames.
G. 9 large frames.
H. 2 small frames.
J. 9 small frames.
K. 11 small frames.

51. For every hour that Marcia spends making frames in the second week of December each year, she donates \$3 from that week's profit to a local charity. This year, Marcia made 4 large frames and 2 small frames in that week. Which of the following is closest to the percent of that week's profit Marcia donated to the charity?

A. 6%
B. 12%
C. 14%
D. 16%
E. 19%

52. What is the maximum profit Marcia can earn from the picture frames she makes in 1 week?

F. \$410
G. \$460
H. \$540
J. \$560
K. \$690

53. The *determinant* of a matrix $\begin{bmatrix} a & b \\ c & d \end{bmatrix}$ equals $ad - cb$. What must be the value of x for the matrix $\begin{bmatrix} x & 8 \\ x & x \end{bmatrix}$ to have a determinant of -16 ?

A. -4
B. -2
C. $-\frac{8}{5}$
D. $\frac{8}{3}$
E. 4

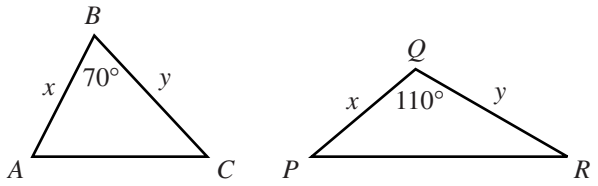
54. A formula for finding the value, A dollars, of P dollars invested at $i\%$ interest compounded annually for n years is $A = P(1 + 0.01i)^n$. Which of the following is an expression for P in terms of i, n, and A ?

F. $A - 0.01i^n$
G. $A + 0.01i^n$
H. $\left(\frac{A}{1 + 0.01i}\right)^n$
J. $\frac{A}{(1 - 0.01i)^n}$
K. $\frac{A}{(1 + 0.01i)^n}$

55. If x and y are real numbers such that $x > 1$ and $y < -1$, then which of the following inequalities *must* be true?

A. $\frac{x}{y} > 1$
B. $|x|^2 > |y|$
C. $\frac{x}{3} - 5 > \frac{y}{3} - 5$
D. $x^2 + 1 > y^2 + 1$
E. $x^{-2} > y^{-2}$

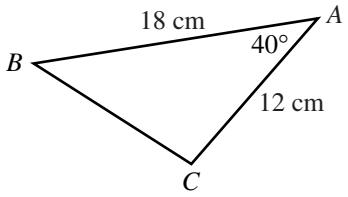
56. Triangles $\triangle ABC$ and $\triangle PQR$ are shown below. The given side lengths are in centimeters. The area of $\triangle ABC$ is 30 square centimeters. What is the area of $\triangle PQR$, in square centimeters?



F. 15
G. 19
H. 25
J. 30
K. 33

57. Triangle $\triangle ABC$ is shown in the figure below. The measure of $\angle A$ is 40°, AB = 18 cm, and AC = 12 cm. Which of the following is the length, in centimeters, of $\overline{BC}$?

(Note: For a triangle with sides of length a, b, and c opposite angles $\angle A$, $\angle B$, and $\angle C$, respectively, the law of sines states $\frac{\sin \angle A}{a} = \frac{\sin \angle B}{b} = \frac{\sin \angle C}{c}$ and the law of cosines states $c^2 = a^2 + b^2 - 2ab \cos \angle C$.)



A. 12 sin 40°

B. 18 sin 40°

C. $\sqrt{18^2 - 12^2}$

D. $\sqrt{12^2 + 18^2}$

E. $\sqrt{12^2 + 18^2 - 2(12)(18) \cos 40°}$

58. What is the sum of the first 4 terms of the arithmetic sequence in which the 6th term is 8 and the 10th term is 13 ?

F. 10.5
G. 14.5
H. 18
J. 21.25
K. 39.5

59. In the equation $x^2 + mx + n = 0$, m and n are integers. The *only* possible value for x is –3. What is the value of m ?

A. 3
B. –3
C. 6
D. –6
E. 9

60. The solution set of which of the following equations is the set of real numbers that are 5 units from –3 ?

F. $|x + 3| = 5$
G. $|x - 3| = 5$
H. $|x + 5| = 3$
J. $|x - 5| = 3$
K. $|x + 5| = 3$

END OF TEST 2

STOP! DO NOT TURN THE PAGE UNTIL TOLD TO DO SO.

DO NOT RETURN TO THE PREVIOUS TEST.

Scoring Keys for the ACT Practice Tests

Use the scoring key for each test to score your answer document for the multiple-choice tests. Mark a "1" in the blank for each question you answered correctly. Add up the numbers in each subscore area and enter the total number correct for each subscore area in the blanks provided. Also enter the total number correct for each test in the blanks provided. The total number correct for each test is the sum of the number correct in each subscore area.

Test 1: English—Scoring Key

	Key	Subscore Area* UM	RH		Key	Subscore Area* UM	RH
1.	B	___		39.	C		___
2.	J	___		40.	J		___
3.	D		___	41.	B	___	
4.	F	___		42.	F		___
5.	B		___	43.	B	___	
6.	J	___		44.	J		___
7.	D		___	45.	A	___	
8.	F	___		46.	J	___	
9.	A		___	47.	C	___	
10.	H	___		48.	F		___
11.	A		___	49.	B	___	
12.	H	___		50.	F	___	
13.	D	___		51.	B		___
14.	G	___		52.	J		___
15.	B		___	53.	D	___	
16.	G	___		54.	H		___
17.	C	___		55.	A	___	
18.	G		___	56.	H	___	
19.	D		___	57.	B		___
20.	F		___	58.	H	___	
21.	B	___		59.	A		___
22.	J	___		60.	G		___
23.	C	___		61.	A	___	
24.	F		___	62.	H	___	
25.	C	___		63.	A	___	
26.	G	___		64.	H		___
27.	A		___	65.	D		___
28.	G		___	66.	G		___
29.	C		___	67.	A		___
30.	J		___	68.	J		___
31.	B		___	69.	A		___
32.	J		___	70.	G	___	
33.	D		___	71.	D	___	
34.	H	___		72.	J	___	
35.	B	___		73.	C	___	
36.	H	___		74.	G	___	
37.	C	___		75.	D		___
38.	F	___					

Number Correct (Raw Score) for:

Usage/Mechanics (UM) Subscore Area _____ (40)

Rhetorical Skills (RH) Subscore Area _____ (35)

Total Number Correct for English Test (UM + RH) _____ (75)

*UM = Usage/Mechanics
RH = Rhetorical Skills

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Test 2: Mathematics—Scoring Key

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

Number Correct (Raw Score) for:

Pre-Alg./Elem. Alg. (EA) Subscore Area _____ (24)

Inter. Alg./Coord. Geo. (AG) Subscore Area _____ (18)

Plane Geo./Trig. (GT) Subscore Area _____ (18)

Total Number Correct for Math Test (EA + AG + GT) _____ (60)

*EA = Pre-Algebra/Elementary Algebra
AG = Intermediate Algebra/Coordinate Geometry
GT = Plane Geometry/Trigonometry

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TABLE 1

Explanation of Procedures Used to Obtain Scale Scores from Raw Scores

On each of the four multiple-choice tests on which you marked any responses, the total number of correct responses yields a raw score. Use the table below to convert your raw scores to scale scores. For each test, locate and circle your raw score or the range of raw scores that includes it in the table below. Then, read across to either outside column of the table and circle the scale score that corresponds to that raw score. As you determine your scale scores, enter them in the blanks provided on the right. The highest possible scale score for each test is 36. The lowest possible scale score for any test on which you marked any responses is 1.

Next, compute the Composite score by averaging the four scale scores. To do this, add your four scale scores and divide the sum by 4. If the resulting number ends in a fraction, round it to the nearest whole number. (Round down any fraction less than one-half; round up any fraction that is one-half or more.) Enter this number in the blank. This is your Composite score. The highest possible Composite score is 36. The lowest possible Composite score is 1.

ACT Test 67C	Your Scale Score
English	_____
Mathematics	_____
Reading	_____
Science	_____
Sum of scores	_____
Composite score (sum ÷ 4)	_____

NOTE: If you left a test completely blank and marked no items, do not list a scale score for that test. If any test was completely blank, do not calculate a Composite score.

Scale Score	Raw Scores				Scale Score
	Test 1 English	Test 2 Mathematics	Test 3 Reading	Test 4 Science	
36	75	59-60	40	40	**36**
35	73-74	57-58	39	39	**35**
34	71-72	55-56	38	38	**34**
33	70	54	—	37	**33**
32	69	53	37	—	**32**
31	68	52	36	36	**31**
30	67	50-51	35	35	**30**
29	66	49	34	34	**29**
28	64-65	47-48	33	33	**28**
27	62-63	45-46	32	31-32	**27**
26	60-61	43-44	31	30	**26**
25	58-59	41-42	30	28-29	**25**
24	56-57	38-40	29	26-27	**24**
23	53-55	36-37	27-28	24-25	**23**
22	51-52	34-35	26	23	**22**
21	48-50	33	25	21-22	**21**
20	45-47	31-32	23-24	19-20	**20**
19	42-44	29-30	22	17-18	**19**
18	40-41	27-28	20-21	16	**18**
17	38-39	24-26	19	14-15	**17**
16	35-37	19-23	18	13	**16**
15	33-34	15-18	16-17	12	**15**
14	30-32	12-14	14-15	11	**14**
13	29	10-11	13	10	**13**
12	27-28	8-9	11-12	9	**12**
11	25-26	6-7	9-10	8	**11**
10	23-24	5	8	7	**10**
9	20-22	4	7	6	**9**
8	17-19	—	6	5	**8**
7	14-16	3	5	4	**7**
6	11-13	—	4	3	**6**
5	9-10	2	3	—	**5**
4	6-8	—	—	2	**4**
3	5	1	2	1	**3**
2	3-4	—	1	—	**2**
1	0-2	0	0	0	**1**

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TABLE 2

Explanation of Procedures Used to Obtain Scale Subscores from Raw Scores

For each of the seven subscore areas, the total number of correct responses yields a raw score. Use the table below to convert your raw scores to scale subscores. For each of the seven subscore areas, locate and circle either the raw score or the range of raw scores that includes it in the table below. Then, read across to either outside column of the table and circle the scale subscore that corresponds to that raw score. As you determine your scale subscores, enter them in the blanks provided on the right. The highest possible scale subscore is 18. The lowest possible scale subscore is 1.

If you left a test completely blank and marked no responses, do not list any scale subscores for that test.

ACT Test 67C	Your Scale Subscore
English	
Usage/Mechanics	_____
Rhetorical Skills	_____
Mathematics	
Pre-Algebra/Elementary Algebra	_____
Intermed. Algebra/Coord. Geometry	_____
Plane Geometry/Trigonometry	_____
Reading	
Social Studies/Sciences	_____
Arts/Literature	_____

	Raw Scores							
	Test 1 English		Test 2 Mathematics			Test 3 Reading		
Scale Subscore	Usage/ Mechanics	Rhetorical Skills	Pre-Algebra/ Elem. Algebra	Inter. Algebra/ Coord. Geometry	Plane Geometry/ Trigonometry	Social Studies/ Sciences	Arts/ Literature	**Scale Subscore**
18	39-40	35	23-24	18	18	20	20	**18**
17	37-38	34	22	17	17	19	18-19	**17**
16	35-36	33	21	16	16	18	—	**16**
15	34	31-32	20	15	14-15	17	17	**15**
14	32-33	29-30	19	13-14	13	16	16	**14**
13	31	27-28	18	12	11-12	15	15	**13**
12	29-30	25-26	17	10-11	10	14	14	**12**
11	27-28	22-24	16	9	9	12-13	13	**11**
10	24-26	20-21	15	7-8	7-8	11	12	**10**
9	22-23	18-19	13-14	6	6	9-10	11	**9**
8	20-21	15-17	11-12	4-5	5	8	10	**8**
7	18-19	13-14	9-10	—	4	6-7	9	**7**
6	16-17	12	6-8	3	3	5	8	**6**
5	14-15	10-11	5	2	—	4	6-7	**5**
4	12-13	8-9	3-4	—	2	3	5	**4**
3	9-11	5-7	2	1	—	2	3-4	**3**
2	6-8	3-4	1	—	1	1	2	**2**
1	0-5	0-2	0	0	0	0	0-1	**1**

TABLES 3A and 3B

Norms Tables

Use the norms tables below (3A and 3B) to determine your estimated percent at or below for each of your multiple-choice scale scores (3A), and for your Writing scores (3B), if applicable.

In the far left column of the multiple-choice norms table (3A), circle your scale score for the English Test (from page 56). Then read across to the percent at or below column for that test; circle or put a check mark beside the corresponding percent at or below. Use the same procedure for each test and subscore area. Use the far right column of scale scores in Table 3A, for your Science Test and Composite scores. Follow the same procedure on the Writing Test norms to get your estimated percent at or below for your Writing subscore and Combined English/Writing score.

As you mark your percents at or below, enter them in the blanks provided at the right. You may also find it helpful to compare your performance with the national mean (average) score for each of the tests, subscore areas, and the Composite as shown at the bottom of the norms tables.

	Your Estimated Percent At or Below on Practice Test
English	_____
Usage/Mechanics	_____
Rhetorical Skills	_____
Mathematics	_____
Pre-Algebra/Elem. Alg.	_____
Alg./Coord. Geometry	_____
Plane Geometry/Trig.	_____
Reading	_____
Soc. Studies/Sciences	_____
Arts/Literature	_____
Science	_____
Composite	_____
Combined English/Writing	_____
Writing	_____

3A

National Distributions of Cumulative Percents for ACT Test Scores
ACT-Tested High School Graduates from 2011, 2012, and 2013

Score	ENGLISH	Usage/Mechanics	Rhetorical Skills	MATHEMATICS	Pre-Algebra/Elem. Alg.	Alg./Coord. Geometry	Plane Geometry/Trig.	READING	Soc. Studies/Sciences	Arts/Literature	SCIENCE	COMPOSITE	*Score*
36	99			99				99			99	99	36
35	99			99				99			99	99	35
34	99			99				99			99	99	34
33	97			98				97			99	99	33
32	96			97				95			98	98	32
31	94			96				93			97	97	31
30	92			95				90			96	95	30
29	90			93				87			95	93	29
28	88			91				85			93	90	28
27	85			88				82			90	87	27
26	82			84				79			87	83	26
25	78			79				75			83	79	25
24	74			73				72			77	74	24
23	68			67				66			70	68	23
22	63			60				61			63	62	22
21	57			55				55			56	55	21
20	50			51				48			47	49	20
19	44			47				42			38	42	19
18	39	99	99	41	99	99	99	36	99	99	32	35	18
17	34	97	98	35	96	99	99	30	97	97	25	28	17
16	30	92	98	26	92	98	98	25	93	92	20	22	16
15	25	88	92	14	88	95	95	20	87	86	16	17	15
14	19	83	86	06	82	91	90	15	82	79	12	11	14
13	15	78	79	02	75	83	82	11	76	73	09	07	13
12	12	72	71	01	66	72	73	07	68	66	06	03	12
11	09	65	60	01	58	63	62	04	58	58	04	01	11
10	06	56	49	01	48	50	51	02	49	49	02	01	10
09	04	44	40	01	40	36	38	01	40	40	01	01	09
08	02	36	28	01	33	23	25	01	29	32	01	01	08
07	01	28	20	01	22	13	15	01	20	23	01	01	07
06	01	20	13	01	10	07	09	01	11	17	01	01	06
05	01	13	09	01	04	04	05	01	06	10	01	01	05
04	01	08	05	01	01	02	03	01	02	04	01	01	04
03	01	04	02	01	01	01	01	01	01	02	01	01	03
02	01	01	01	01	01	01	01	01	01	01	01	01	02
01	01	01	01	01	01	01	01	01	01	01	01	01	01
Mean	**20.4**	10.2	10.5	**21.0**	10.9	10.6	10.5	**21.2**	10.8	10.7	**20.8**	**21.0**	
S.D.	**6.5**	4.0	3.5	**5.3**	3.6	2.9	3.1	**6.2**	3.6	3.9	**5.2**	**5.3**	

Note: These norms are the source of national norms, for multiple-choice tests, printed on ACT score reports during the 2013–2014 testing year. Sample size: 5,088,372.

3B

National Distributions of Cumulative Percents for ACT Writing Test Scores
ACT-Tested High School Graduates from 2011, 2012, and 2013

Score	Combined English/Writing	Writing
36	99	
35	99	
34	99	
33	99	
32	99	
31	98	
30	95	
29	93	
28	90	
27	87	
26	84	
25	79	
24	75	
23	70	
22	61	
21	55	
20	47	
19	41	
18	35	
17	30	
16	25	
15	19	
14	15	
13	11	
12	9	99
11	6	99
10	4	99
9	3	95
8	2	88
7	1	52
6	1	38
5	1	12
4	1	7
3	1	3
2	1	2
1	1	
Mean	20.7	7.0
S.D.	5.8	1.6

Note: These norms are the source of the Writing Test norms printed on the ACT score reports of students who take the optional Writing Test during 2013–2014. Sample size: 2,778,952.