Directions
For each question, choose the BEST answer from the choices given. If the precise answer is not among the choices, choose the one that best approximates the answer.

Notes
(1) To answer some of these questions, you will need a calculator. You must use at least a scientific calculator, but programmable and graphing calculators are also allowed.

(2) All angle measures on this test are in degrees, so your calculator should be set to degree mode.

(3) Figures in this test are drawn as accurately as possible UNLESS it is stated in a specific question that the figure is not drawn to scale. All figures are assumed to lie in a plane unless otherwise specified.

(4) The domain of any function \( f \) is assumed to be the set of all real numbers \( x \) for which \( f(x) \) is a real number, unless otherwise indicated.

Reference Information: Use the following formulas as needed.

Right circular cone: If \( r \) = radius and \( h \) = height, then

\[
\text{Volume} = \frac{1}{3} \pi r^2 h,
\]

and if \( c \) = circumference of the base and \( \ell \) = slant height, then

\[
\text{Lateral Area} = \frac{1}{2} c\ell.
\]

Sphere: If \( r \) = radius, then

\[
\text{Volume} = \frac{4}{3} \pi r^3
\]

and Surface Area = \( 4\pi r^2 \).

Pyramid: If \( B \) = area of the base and \( h \) = height, then
1. If \(2a + 3 = 6\), then \(\frac{3}{4a+6} = \)
   
   (A) \(\frac{1}{4}\)
   
   (B) \(\frac{1}{2}\)
   
   (C) 1
   
   (D) 2
   
   (E) 3

2. In terms of \(x\), what is the average (arithmetic mean) of \(4x - 2\), \(x + 2\), \(2x + 3\), and \(x + 1\)?

   (A) \(2x - 1\)
   
   (B) \(2x\)
   
   (C) \(2x + 1\)
   
   (D) \(2x + 4\)
   
   (E) \(8x + 4\)

3. If \(4^{2x+2} = 64\), then \(x = \)

   (A) \(\frac{1}{2}\)
   
   (B) 1
   
   (C) \(\frac{3}{2}\)
   
   (D) 2
   
   (E) \(\frac{5}{2}\)

4. What is the least positive integer that is divisible by both 2 and 5 and leaves a remainder of 2 when it is divided by 7?
5. In Figure 1, the area of rectangle $CDEF$ is twice the area of rectangle $ABCF$. If $CD = 2x + 2$, what is the length of $AE$, in terms of $x$?

(A) $2x + 3$
(B) $2x + 4$
(C) $3x + 1$
(D) $3x + 2$
(E) $3x + 3$

6. If $2y^2 + x - 4 = 0$ and $\frac{x}{2} = y^2$, then $x =$

(A) 1
(B) 2
(C) 3
(D) 4
(E) 5

7. If a laser printer can print $x$ pages per minute, how many minutes, in terms of $x$, would it take the laser printer to print a 100-page document?
8. In the table, \( f(x) \) is a linear function. What is the value of \( k \)?

<table>
<thead>
<tr>
<th>( x )</th>
<th>( f(x) )</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>-4</td>
</tr>
<tr>
<td>1</td>
<td>-1</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>( k )</td>
</tr>
<tr>
<td>4</td>
<td>8</td>
</tr>
</tbody>
</table>

(A) 3  
(B) 4  
(C) 5  
(D) 6  
(E) 7

9. Jackie uses 30 percent of her monthly earnings for rent and 50 percent of the remaining amount for food and transportation. If she spends $525 for food and transportation, how much does she pay for rent?

(A) $400  
(B) $450  
(C) $500  
(D) $550  
(E) $600
In Figure 2, if congruent right triangles $ABD$ and $DCA$ share leg $\overline{AD}$, then $x =$

(A) 90  
(B) 100  
(C) 110  
(D) 120  
(E) 130

11. If $\frac{x+1}{2} + \frac{4x-1}{4} = 5.5$, then $x =$

(A) 2.5  
(B) 3.0  
(C) 3.5  
(D) 4.0  
(E) 4.5

12. If $a \downarrow b = \sqrt{a}$, then $10 \downarrow 3$ =

(A) 1.12  
(B) 1.69  
(C) 2.15  
(D) 2.71  
(E) 3.33
13. Which of the following ordered pairs is the solution to the equations $2y + x = 5$ and $-2y + x = 9$?

(A) $(-7, -1)$  
(B) $(-1, 7)$  
(C) $(7, -1)$  
(D) $(-7, 1)$  
(E) $(1, 7)$

14. What is the solution set for the equation $|2x - 3| = 13$?

(A) $\{ -8 \}$  
(B) $\{ -5 \}$  
(C) $\{ -5, -8 \}$  
(D) $\{ -5, 8 \}$  
(E) $\{ 5, -8 \}$

15. \[
\frac{6!}{2!3!} =
\]

(A) 1  
(B) 6  
(C) 15  
(D) 30  
(E) 60

16. \[ \text{Figure 3} \]

In Figure 3, the length of $\overline{AC}$ is 3 times the length of $\overline{CD}$. If $B$ is the midpoint of $\overline{AC}$, and the length of $\overline{CD}$ is 5, what is the length of $\overline{BD}$?

(A) 10  
(B) 12.5  
(C) 13.5  
(D) 15  
(E) 17.5

17. Which of the following lines is parallel to $y = -2x + 3$ and has a $y$-intercept of 4?
(A) \( y = -2x + 4 \)
(B) \( y = -2x - 4 \)
(C) \( y = 2x - 4 \)
(D) \( y = 2x + 4 \)
(E) \( y = \frac{1}{2}x + 4 \)

In Figure 4, the area of quadrilateral \( ABCD \) is

(A) 32
(B) 33
(C) 34
(D) 35
(E) 36

19. If \( f(x) = x^2 + x \) and \( g(x) = \sqrt{x} \), then \( f(g(3)) = \)
20. At a certain software company, the cost, \(C\), of developing and producing a computer software program is related to the number of copies produced, \(x\), by the equation \(C = 30,000 + 2x\). The company's total revenues, \(R\), are related to the number of copies produced, \(x\), by the equation \(R = 6x - 10,000\). How many copies must the company produce so that the total revenue is equal to the cost?

- (A) 5,000
- (B) 6,000
- (C) 7,500
- (D) 9,000
- (E) 10,000

21. If the two squares shown in Figure 5 are identical, what is the degree measure of angle \(ADE\)?

- (A) 120
- (B) 135
- (C) 150
- (D) 165
- (E) 175
22. Points

\[ A (\sqrt{2}, 4), \quad B (6, -\sqrt{3}), \]

and \( C \) are collinear. If \( B \) is the midpoint of line segment \( AC \), approximately what are the \((x, y)\) coordinates of point \( C \)?

- (A) \((3.71, 1.13)\)
- (B) \((3.71, 5.73)\)
- (C) \((7.41, -7.46)\)
- (D) \((10.59, -7.46)\)
- (E) \((10.59, 5.73)\)

23. What is the solution set to the equation \(4 + x^2 = 2x^2 - 5\)?

- (A) \(\{x: x = 3\}\)
- (B) \(\{x: x = -3\}\)
- (C) \(\{x: x = \pm 3\}\)
- (D) \(\{x: x = -1\}\)
- (E) \(\{x: x = 1\}\)

24. Which of the following triplets can be the lengths of the sides of a triangle?

- (A) 2, 3, 5
- (B) 1, 4, 2
- (C) 7, 4, 4
- (D) 5, 6, 12
- (E) 9, 20, 8
In Figure 6, if \( \sin x = 0.500 \), what is the approximate value of \( \tan x \)?

(A) 0.577
(B) 0.707
(C) 1.000
(D) 1.155
(E) 2.000
26. 

In Figure 7, if line \( l \) has a slope of 1 and passes through the origin, which of the following points has \((x, y)\) coordinates such that \( \frac{x}{y} > 1 \)?

(A) \( A \)
(B) \( B \)
(C) \( C \)
(D) \( D \)
(E) \( E \)

27. On a recent chemistry test, the average (arithmetic mean) score among 5 students was 83, where the lowest and highest possible scores were 0 and 100, respectively. If the teacher decides to increase each student’s score by 2 points, and if none of the students originally scored more than 98, which of the following must be true?

I. After the scores are increased, the average score is 85.
II. When the scores are increased, the difference between the highest and lowest scores increases.
III. After the increase, all 5 scores are greater than or equal to 25.

(A) \( I \) only
(B) \( II \) only
(C) \( I \) and \( II \) only
(D) \( I \) and \( III \) only
(E) \( I, II, \) and \( III \)

28. If \( a > b \) and \( c > d \), which of the following must be true?

(A) \( ac > bd \)
(B) \( a + b > c + d \)
(C) \( a + c > b + d \)
(D) \( a - b > c - d \)
(E) \( ad > bc \)

29. \( 1 - 2 \sin^2 \theta - 2 \cos^2 \theta = \)
30. Sheila leaves her house and starts driving due south for 30 miles, then drives due west for 60 miles, and finally drives due north for 10 miles to reach her office. Which of the following is the approximate straight-line distance, in miles, from her house to her office?

(A) 63
(B) 67
(C) 71
(D) 75
(E) 80

31. If \( f(x) = x^2 - 1 \), \( g(x) = (x - 1)^{-1} \), and \( x \neq 1 \), then \( f(x)g(x) = \)

(A) \( 2x + 1 \)
(B) \( x + 1 \)
(C) \( x - 1 \)
(D) \( x^3 - 1 \)
(E) \( 2x - 1 \)

32. If an empty rectangular water tank that has dimensions 100 centimeters, 20 centimeters, and 40 centimeters is to be filled using a right cylindrical bucket with a base radius of 9 centimeters and a height of 20 centimeters, approximately how many buckets of water will it take to fill the tank?

(A) 14
(B) 16
(C) 18
(D) 20
(E) 22

33. Sarah is scheduling the first four periods of her school day. She needs to fill those periods with calculus, art, literature, and physics, and each of these courses is offered during each of the first four periods. How many different schedules can Sarah choose from?
In Figure 8, \( \overline{AE} \) is parallel to \( \overline{BD} \). What is the approximate length of \( \overline{DE} \)?

(A) 2.33  
(B) 2.67  
(C) 3.33  
(D) 3.67  
(E) 6.67

35. If \( f(x) = \sqrt{x^2 - 4} \), what is the domain?

(A) All real numbers  
(B) All \( x \) such that \( x \geq 2 \)  
(C) All \( x \) such that \( x \leq -2 \)  
(D) All \( x \) such that \( -2 \leq x \leq 2 \)  
(E) All \( x \) such that \( x \leq -2 \) or \( x \geq 2 \)

36. What is the area of a triangle with vertices (1,1), (3,1), and (5,7)?
37. Which of the following inequalities is equivalent to \(-2(x + 5) < -4\)?

(A) \(x > -3\)
(B) \(x < -3\)
(C) \(x > 3\)
(D) \(x < 3\)
(E) \(x > 7\)

38. If \(i = \sqrt{-1}\), for which of the following values of \(n\) does \(i^n + (-i)^n\) have a positive value?

(A) 23
(B) 24
(C) 25
(D) 26
(E) 27

39. The maximum value of the function \(f(x) = 1 – \cos x\) between 0 and \(2\pi\) is

(A) 0
(B) 1
(C) 1.5
(D) 2
(E) 2.5
In Figure 9, if \( y > 60 \) and \( AB = BC \), which of the following must be true?

I. \( \alpha + y = 180 \)
II. \( y > z \)
III. \( \alpha = y + z \)

(A) I only
(B) II only
(C) III only
(D) I and II
(E) II and III

41. If \( f(x) = \frac{1}{x} \), and \( 0 < x < 1 \), what is the range of \( f(x) \)?

(A) All real numbers
(B) All real numbers between 0 and 1
(C) All real numbers greater than 0
(D) All real numbers greater than 1
(E) All real numbers greater than or equal to 1

42. Two identical spheres of radius 6 intersect so that the distance between their centers is 10. The points of intersection of the two spheres form a circle. What is the area of this circle?
43. If a remainder of 4 is obtained when \( x^3 + 2x^2 - x - k \) is divided by \( x - 2 \), what is the value of \( k \)?

(A) 4
(B) 6
(C) 10
(D) 12
(E) 14

44. Ms. Hobbes has a portfolio that includes $50,000 in stock, $75,000 in cash, and no other holdings. If she wishes to redistribute her holdings so that 80 percent of the portfolio is in cash, how many dollars of stock must she convert to cash?

(A) 10,000
(B) 15,000
(C) 20,000
(D) 25,000
(E) 30,000

45. A sphere of radius 5 has the same volume as a cube with an edge of approximately what length?

(A) 5.00
(B) 5.50
(C) 6.24
(D) 8.06
(E) 9.27

46. The equation \( x^2 = y^2 \) is represented by which of the following graphs?
47. If point $A(3,5)$ is located on a circle in the coordinate plane, and the center of the circle is the origin, which of the following points must lie outside this circle?

(A) (1.0, 6.0)
(B) (1.5, 5.5)
(C) (2.5, 4.5)
(D) (4.0, 4.0)
(E) (5.0, 3.0)
48. If \( f(x) = 3x - 1 \), \( n \) represents the slope of the line with the equation of a line that is perpendicular to the line with the equation \( y = f(x) \), then \( np = \)

(A) -9

(B) \(- \frac{1}{9}\)

(C) \(\frac{1}{9}\)

(D) 9

(E) It cannot be determined from the information given.

49. The parabola with the equation \( y = 4x - \frac{1}{2}x^2 \) has how many points with \((x, y)\) coordinates that are both positive integers?

(A) 3

(B) 4

(C) 7

(D) 8

(E) Infinitely many
In Figure 10, each of the three circles is tangent to the other two, and the triangle is tangent to two of the circles. If the length of one side of the triangle is \( x \), what is the radius, in terms of \( x \), of one of the circles?

(A) \( \frac{x}{1+2\sqrt{3}} \)

(B) \( \frac{x}{2+2\sqrt{3}} \)

(C) \( \frac{x}{1+\sqrt{3}} \)

(D) \( \frac{2x}{1+\sqrt{3}} \)

(E) \( \frac{2x}{1+2\sqrt{3}} \)
Answer Key

PRACTICE TEST 1

1. A
2. C
3. A
4. B
5. E
6. B
7. E
8. C
9. B
10. D
11. C
12. C
13. C
14. D
15. E
16. B
17. A
18. E
19. C
20. E
21. A
22. D
23. C
24. C
25. A
26. E
27. D
28. C
29. B
30. A
31. B
32. B
33. D
34. B
35. E
36. A
37. A
38. B
39. D
40. E
41. D
42. E
43. C
44. D
45. D
46. C
47. A
48. B
49. A
50. B
Useful Links:


SAT Subjects Tests: [http://www.cracksat.net/sat2/](http://www.cracksat.net/sat2/)


For more SAT information, please visit [http://www.cracksat.net](http://www.cracksat.net)

SAT Downloads:

**New SAT Downloads:**


SAT real tests download:


SAT official guide tests download:


SAT subject tests download:


PSAT downloads:

[http://www.cracksat.net/psat/download/](http://www.cracksat.net/psat/download/)

**ACT real tests and online practice tests:**


**1000+ College Admission Essay Samples:**