PRACTICE TEST 1

The following pages contain eight full-length SAT Math Level 2 Practice Tests. Treat each practice test as the actual test and complete it in one 60-minute sitting. Use the following answer sheet to fill in your multiple-choice answers. Once you have completed each practice test:

1. Check your answers using the Answer Key.
2. Review the Answers and Solutions.
3. Fill in the "Diagnose Your Strengths and Weaknesses" sheet, and determine areas that require further preparation.

This page intentionally left blank

PRACTICE TEST 1

MATH LEVEL 2

ANSWER SHEET

Tear out this answer sheet and use it to complete the practice test. Determine the BEST answer for each question. Then, fill in the appropriate oval using a No. 2 pencil.

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

This page intentionally left blank

PRACTICE TEST 1

Time: 60 minutes

Directions: Select the BEST answer for each of the 50 multiple-choice questions. If the exact solution is not one of the five choices, select the answer that is the best approximation. Then, fill in the appropriate oval on the answer sheet.

Notes:

1. A calculator will be needed to answer some of the questions on the test. Scientific, programmable, and graphing calculators are permitted. It is up to you to determine when and when not to use your calculator.
2. Angles on the Level 2 test are measured in degrees and radians. You need to decide whether your calculator should be set to degree mode or radian mode for a particular question.
3. Figures are drawn as accurately as possible and are intended to help solve some of the test problems. If a figure is not drawn to scale, this will be stated in the problem. All figures lie in a plane unless the problem indicates otherwise.
4. Unless otherwise stated, the domain of a function f is assumed to be the set of real numbers x for which the value of the function, $f(x)$, is a real number.
5. Reference information that may be useful in answering some of the test questions can be found below.

Reference Information	
Right circular cone with radius r and height h:	Volume = $\frac{1}{3}\pi r^2 h$
Right circular cone with circumference of base c and slant height ℓ:	Lateral Area = $\frac{1}{2}c\ell$
Sphere with radius r:	Volume = $\frac{4}{3}\pi r^3$ Surface Area = $4\pi r^2$
Pyramid with base area B and height h:	Volume = $\frac{1}{3}Bh$

PRACTICE TEST 1 QUESTIONS

1. If $\sqrt[3]{8x^3 - 5} = 3$, then $x =$
   (A) 4
   (B) 1.59
   (C) 2.35
   (D) 0.40
   (E) 0.06

2. $\dfrac{10!}{3!7!} =$
   (A) 1
   (B) 60
   (C) 120
   (D) 240
   (E) 720

3. Which of the following lines is perpendicular to the line $y = \dfrac{3}{2}x + 7$?
   (A) $y = \dfrac{3}{2}x - 7$
   (B) $y = -\dfrac{3}{2}x + 7$
   (C) $y = \dfrac{2}{3}x + 7$
   (D) $y = -\dfrac{2}{3}x + 7$
   (E) $y = \dfrac{3}{2}x + \dfrac{1}{7}$

4. If $f(x, y) = \dfrac{1}{4}x - y$, then which of the following is equal to $f(8, 3)$?
   (A) $f(12, 2)$
   (B) $f(16, 6)$
   (C) $f(4, 0)$
   (D) $f(2, 1)$
   (E) $f(-12, -2)$

5. If $f(x) = x^2 + 1$, then $f(f(4)) =$
   (A) 17
   (B) 256
   (C) 34
   (D) 290
   (E) 144

USE THIS SPACE AS SCRATCH PAPER

GO ON TO THE NEXT PAGE

6. Assuming $a \neq 0$, $\dfrac{5 - \dfrac{1}{a}}{a^{-1}} =$

   (A) $5a - 1$
   (B) $\dfrac{5a - 1}{a^2}$
   (C) 4
   (D) $\dfrac{1 - 5a}{a^2}$
   (E) $1 - 5a$

7. If $\sec \theta = 2$, then $\cos \theta \sec \theta =$

   (A) 2
   (B) 4
   (C) $\dfrac{1}{4}$
   (D) 1
   (E) 0

8. If $16x^4 - 9 = 4$, then x could equal which of the following?

   (A) 1.34
   (B) –0.95
   (C) 0.87
   (D) 0.90
   (E) 1.05

9. If a hexahedral die is rolled 2 times, what is the probability of *not* rolling a 6 both times?

   (A) $\dfrac{1}{6}$
   (B) $\dfrac{5}{6}$
   (C) $\dfrac{1}{36}$
   (D) $\dfrac{25}{36}$
   (E) $\dfrac{2}{3}$

10. What is the range of $f(x) = \sqrt{4 - x^2}$?

    (A) $y \geq 0$
    (B) $y \geq 2$
    (C) $-2 \leq y \leq 2$
    (D) $0 \leq y \leq 2$
    (E) $y \leq 2$

USE THIS SPACE AS SCRATCH PAPER

GO ON TO THE NEXT PAGE

11. The probability that John wins a game is $\frac{4}{5}$, and, independently, the probability that Meghan wins is $\frac{9}{11}$. What is the probability that Meghan wins and John loses the game?

(A) $\frac{18}{55}$
(B) $\frac{45}{44}$
(C) $\frac{36}{55}$
(D) $\frac{16}{25}$
(E) $\frac{9}{55}$

12. In Figure 1, what is the value of θ?

(A) 49.8°
(B) 57.8°
(C) 40.2°
(D) 32.2°
(E) 32.9°

13. $\log_2 16\sqrt{2} =$

(A) $\frac{7}{2}$
(B) 5
(C) 4
(D) 2
(E) $\frac{9}{2}$

14. Which of the following is a polynomial with roots 0, 4, and i?

(A) $x^3 - 4x^2 + x - 4$
(B) $x^3 - (4 + i)x^2 + 4ix$
(C) $x^4 - 4x^3 + x^2 - 4x$
(D) $x^2 - 4x$
(E) $x^4 - 4x^3 - x^2 + 4x$

USE THIS SPACE AS SCRATCH PAPER

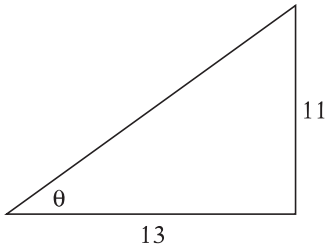

Figure 1

15. In Figure 2, $x =$

(A) $r \sin \theta$
(B) $r \cos \theta$
(C) $r - y$
(D) r^2
(E) $y \tan \theta$

16. If θ is an acute angle and $\sin \theta = \frac{3}{4}$, then $\cos 2\theta =$

(A) $-\frac{1}{8}$
(B) $-\frac{7}{25}$
(C) 1
(D) -2
(E) $-\frac{1}{2}$

17. For all x such that $x > 0$, $f(x) = \log_3 x$. What does $f^{-1}(x)$ equal?

(A) x^3
(B) 3^x
(C) $\sqrt[3]{x}$
(D) $\log_x 3$
(E) $3^{\frac{1}{x}}$

18. What are the asymptote(s) of $f(x) = \frac{6x^2}{4 - x^2}$?

(A) $x = 2$ and $x = -2$
(B) $y = -6$
(C) $x = 2$
(D) $x = 2$, $x = -2$, and $y = -6$
(E) $y = -5$

19. If $3^{5-x} = 81^{x+1}$, what does x equal?

(A) $\frac{1}{3}$
(B) 3
(C) $\frac{4}{5}$
(D) $\frac{1}{2}$
(E) $\frac{1}{5}$

USE THIS SPACE AS SCRATCH PAPER

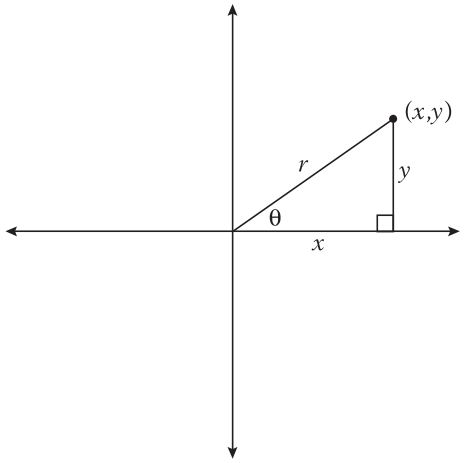

Figure 2

GO ON TO THE NEXT PAGE

20. The graph of $16x^2 + 8y^2 - 32x + 8y = 0$ is which of the following?
    (A) a hyperbola
    (B) an ellipse
    (C) a parabola
    (D) a circle
    (E) a semicircle

21. If $f(x) = 2x + 5$ and $g(x) = \frac{1}{6 + x}$, then $fg(12) =$
    (A) 29
    (B) $\frac{1}{18}$
    (C) $\frac{29}{18}$
    (D) 47
    (E) 11

22. Seven integers are arranged from least to greatest. If the median is 9 and the only mode is 7, what is the least possible range for the 7 numbers?
    (A) 4
    (B) 5
    (C) 6
    (D) 8
    (E) 12

23. The graph of $x^2 - xy = 4$ has which of the following symmetries?
    (A) Symmetric with respect to the x-axis
    (B) Symmetric with respect to the y-axis
    (C) Symmetric with respect to the origin
    (D) Symmetric with respect to both axes
    (E) None

24. Which of the following is *not* equivalent to i^{21}?
    (A) i^{17}
    (B) i^{9}
    (C) i^{105}
    (D) i^{45}
    (E) i^{31}

25. Cost is a function of the number of units produced as given by: $C(n) = 0.01n^2 - 90n + 25{,}000$. How many units, n, produce a minimum cost C?
    (A) 500
    (B) 4,500
    (C) 9,000
    (D) 18,000
    (E) −177,500

USE THIS SPACE AS SCRATCH PAPER

GO ON TO THE NEXT PAGE

26. $\sqrt[5]{\sqrt[4]{\sqrt[3]{\sqrt{n}}}} =$

(A) $n^{\frac{1}{17}}$

(B) $n^{\frac{1}{19}}$

(C) $n^{\frac{1}{60}}$

(D) $n^{\frac{1}{120}}$

(E) $n^{\frac{77}{60}}$

27. Which of the following is the equation of a line with x-intercept $(6, 0)$ and y-intercept $(0, -15)$?

(A) $y = \frac{5}{2}x - 15$

(B) $y = -\frac{5}{3}x - 15$

(C) $y = -\frac{5}{2}x - 6$

(D) $y = -\frac{2}{5}x + 15$

(E) $y = \frac{5}{2}x - 6$

28. Which of the following describes the right and left behavior of the graph of $f(x) = -3x^7 + 2x^5 - 3x + 6$?

(A) Rises right and left
(B) Falls right and left
(C) Falls left, rises right
(D) Rises left, falls right
(E) Cannot be determined

29. If $x + 2$ is a factor of $x^4 + x^3 + 3x^2 + kx - 10$, then $k =$

(A) -5
(B) -13
(C) 15
(D) 13
(E) 5

30. By the Rational Root Test, how many possible rational roots does $f(x) = 6x^3 - 5x^2 + 4x - 15$ have?

(A) 6
(B) 12
(C) 16
(D) 24
(E) 32

USE THIS SPACE AS SCRATCH PAPER

GO ON TO THE NEXT PAGE

31. In Figure 3, two segments are tangent to a circle of radius 3. Points S and T are the points of tangency. What is the length of ST?

(A) 6
(B) 1.9
(C) 5.8
(D) 1.6
(E) 2.9

32. \$2,500 is invested at a rate of 4.5% compounded monthly. The value of the investment in t years can be modeled by the equation $A = 2500\left(1 + \frac{0.045}{12}\right)^{12t}$. How long will it take for the investment to double?

(A) 10.2 years
(B) 15.4 years
(C) 18.8 years
(D) 25 years
(E) 185.2 years

33. If the 2nd term of an arithmetic sequence is 7, and the 6th term is 23, then what is the 90th term of the sequence?

(A) 270
(B) 356
(C) 359
(D) 360
(E) 363

34. The product of 45,454,545,454,545 and 1,234 contains how many digits?

(A) 14
(B) 15
(C) 16
(D) 17
(E) 18

USE THIS SPACE AS SCRATCH PAPER

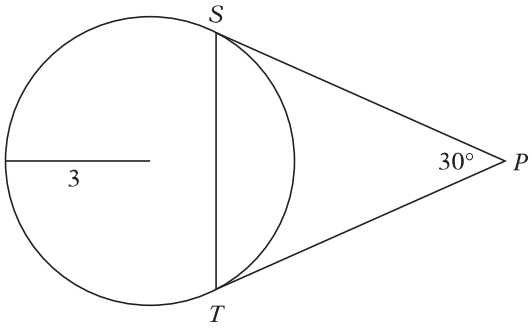

Figure 3

GO ON TO THE NEXT PAGE

35. Which of the following equations has the graph shown in Figure 4?

(A) $y = \sin\frac{1}{2}x$
(B) $y = 2 \sin x$
(C) $y = \sin 2x$
(D) $y = \frac{1}{2} \sin x$
(E) $y = \frac{1}{2} \sin 2x$

36. In ΔABC in Figure 5, $AB = 3.4$ cm, $x = 43°$, and $y = 29°$. What is the length of side BC?

(A) 4.8
(B) 2.4
(C) 4.3
(D) 2.8
(E) 5.7

37. Pam has a term average of 84% in history. If this makes up 75% of her overall grade and the final exam makes up the remaining 25%, what will her overall grade be if she receives a 92% on the final exam?

(A) 90%
(B) 88%
(C) 87.5%
(D) 86%
(E) 85%

38. What is the length of the segment connecting A(−4, 2, 1) to B(7, 5, −3)?

(A) 5.8
(B) 12.1
(C) 11.6
(D) 132
(E) 146

39. A line has parametric equations $x = 8 - t$ and $y = 10 + 2t$ where t is the parameter. What is the slope of the line?

(A) −1
(B) −2
(C) 26
(D) 2
(E) $\frac{1}{2}$

USE THIS SPACE AS SCRATCH PAPER

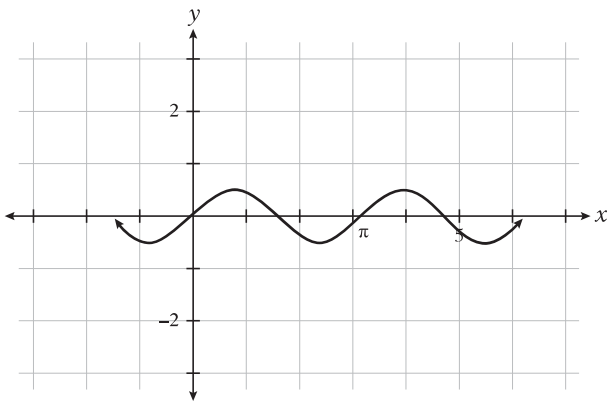

Figure 4

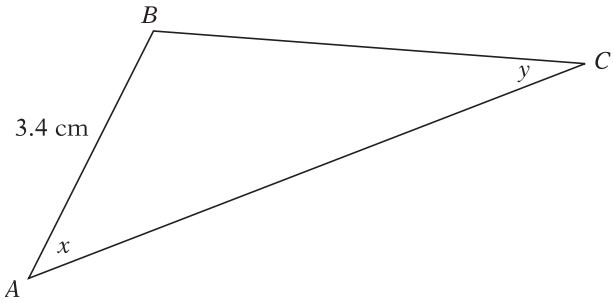

Figure 5

GO ON TO THE NEXT PAGE

40. The operation Φ is defined for all real numbers a and b by the equation: $a \Phi b = a^{-b} - 3b$

If $n \Phi -2 = 70$, which of the following could equal n?

(A) 7
(B) 9
(C) −8
(D) 8.7
(E) $\frac{1}{8}$

41. In Figure 6, the length of each edge of the cube is s. If A and B are midpoints of two edges, what is the perimeter of ABCD?

(A) $4s\sqrt{5}$
(B) $2s + s\sqrt{\frac{5}{2}}$
(C) $2s + s\sqrt{5}$
(D) $3s$
(E) $4s$

42. What is the length of the major axis of an ellipse whose equation is $12x^2 + 8y^2 = 48$?

(A) 2.45
(B) 4
(C) 4.90
(D) 6
(E) 12

43. What is the y-intercept of the line tangent to the circle $x^2 + y^2 = 1$ at the point $\left(\frac{3}{5}, \frac{4}{5}\right)$?

(A) 0.80
(B) 1
(C) 1.20
(D) 1.25
(E) 1.60

44. $\lim_{x \to 3} \frac{(3x^2 - 7x - 6)}{(x^2 - 9)} =$

(A) 0
(B) 1.6
(C) 1.8
(D) 2.4
(E) No limit exists

45. If a function is an odd function, then $f(-x) = -f(x)$ for all values of x in the domain. Which of the following is an odd function?

(A) $f(x) = \sin x$
(B) $f(x) = \cos x$
(C) $f(x) = x^2 - 10$
(D) $f(x) = 4^x$
(E) $f(x) = \log_2 x$

USE THIS SPACE AS SCRATCH PAPER

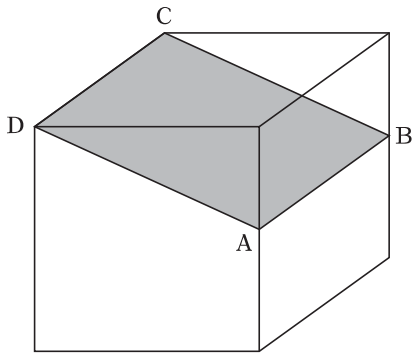

Figure 6

GO ON TO THE NEXT PAGE

46. If $12 \sin^2 x + \sin x - 1 = 0$ over the interval $180° \leq x \leq 360°$, then $x =$

(A) $14.5°$
(B) $-19.5°$
(C) $194.5°$ or $344.5°$
(D) $199.5°$
(E) $199.5°$ or $340.5°$

47. If $i^2 = -1$, then which of the following equals $(15 - 8i)^{\frac{1}{2}}$?

(A) $2 - 2i$
(B) $4 - i$
(C) $2 + 2i$
(D) $4 + i$
(E) $2 + 3i$

48. $\dfrac{\tan \theta + \cot \theta}{\tan \theta} =$

(A) 1
(B) $\csc^2 \theta$
(C) $\sin^2 \theta$
(D) $\cot \theta$
(E) $\sec^2 \theta$

49. What is the sum of the infinite series $1 - \dfrac{1}{5} + \dfrac{1}{25} - \dfrac{1}{125} + \cdots$?

(A) $\dfrac{5}{6}$
(B) $\dfrac{1}{5}$
(C) $\dfrac{6}{5}$
(D) $-\dfrac{5}{6}$
(E) $-\dfrac{6}{5}$

50. What is the middle term in the expansion of $\left(3x - \dfrac{1}{3}y\right)^8$?

(A) $0.86x^4y^4$
(B) $-70x^4y^4$
(C) $5{,}670x^4y^4$
(D) $70x^4y^4$
(E) $81x^4y^4$

USE THIS SPACE AS SCRATCH PAPER

S T O P

IF YOU FINISH BEFORE TIME IS CALLED, YOU MAY CHECK YOUR WORK ON THIS TEST ONLY.
DO NOT TURN TO ANY OTHER TEST IN THIS BOOK.

This page intentionally left blank