DRILLS – ADVANCED MATH

1. Which of the following expressions is equivalent to $2(ab - 3) + 2$?

   A) $2ab$ - 1
   B) $2ab$ - 4
   C) $2ab$ - 5
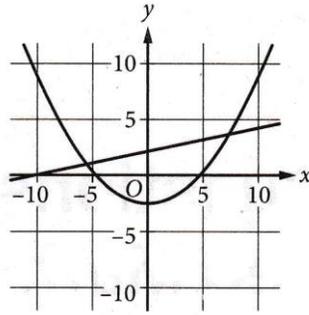   D) $2ab$ - 8

$$f(x) = (x + 0.25x)(50 - x)$$

2. The function f is defined as shown. What is the value of $f(20)$?

   A) 250
   B) 500
   C) 750
   D) 2,000

$$x^2 + 6x + 9 = 36$$

3. What is the positive solution to the given equation?

4. The function f is defined by $f(x) = \frac{22}{x+1}$. What is the value of $f(22)$?

5. A system of equations consists of a quadratic equation and a linear equation. The equations in this system are graphed in the *xy*-plane shown. How many solutions does this system have?

    A) 0
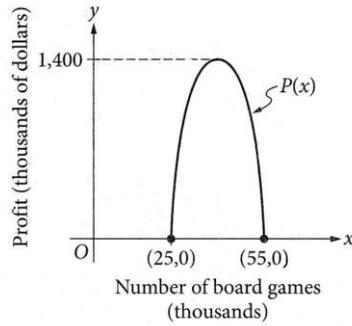   B) 1
    C) 2
    D) 3

$$S = 4\pi r^2$$

6. The formula shown gives the surface area, S, of a sphere in terms of the length of its radius, r. Which of the following gives the radius of the sphere in terms of its surface area?

    A) $r = \sqrt{\dfrac{S}{4\pi}}$

    B) $r = \sqrt{\dfrac{4\pi}{S}}$

    C) $r = \dfrac{\sqrt{S}}{4\pi}$

    D) $r = \dfrac{\sqrt{4\pi}}{S}$

$$\frac{4x}{2(x^2-1)} - \frac{3x}{3(x^2-1)}$$

7. Which of the following is equivalent to the given expression for $x \neq -1$ and $x \neq 1$??

    A) $\dfrac{1}{6(x-1)}$

    B) $\dfrac{1}{6(x^2-1)}$

    C) $\dfrac{1}{x-1}$

    D) $\dfrac{1}{x^2-1}$

Profit (thousands of dollars)

1,400

$P(x)$

(25,0)   (55,0)

Number of board games
(thousands)

8. A company produces board games and sells them online and in stores. The quadratic function P models the company's monthly profits $P(x)$, in thousands of dollars, when x board games, in thousands, are produced and sold. The graph of $y = P(x)$, where $25 \leq x \leq 55$, is shown in the xy-plane. How many board games must the company produce and sell in order to earn the maximum profit estimated by the model?

A) 20,000
B) 40,000
C) 60,000
D) 1,400,000

$$y - x = 30$$

$$y = x^2 - 28x$$

9. The graphs of the equations in the given system intersect at the point (x,y) in the xy-plane. What is a possible value of y?

10. In the equation $9x^2 + 108x + \frac{c}{4} = 0$, c is a constant. If the equation has exactly one solution, what is the value of c?

A) 0
B) 324
C) 1,296
D) 11,664

3

11. Kao measured the temperature of a cup of hot chocolate placed in a room with a constant temperature of 70 degrees Fahrenheit (°F). The temperature of the hot chocolate was 185°F at 6:00 p.m. when it started cooling. The temperature of the hot chocolate was 156°F at 6:05 p.m. and 135°F at 6:10 p.m. The hot chocolate's temperature continued to decrease. Of the following functions, which best models the temperature $T(m)$, in degrees Fahrenheit, of Kao's hot chocolate

A) $T(m) = 185(1.25)^m$
B) $T(m) = 185(0.85)^m$
C) $T(m) = (185 - 70)(0.75)^{\frac{m}{5}}$
D) $T(m) = 70 + 115(0.75)^{\frac{m}{5}}$

$$\sqrt{5(x - k)} = x - k$$

12. In the given equation, k is a positive constant. The greatest solution to the equation is 12. What is the value of k?

$$g(x) = (5 - 2x)(14 + 2x)$$

13. The function g is defined by the given equation. For what value of x does $g(x)$ reach its maximum?

14. A rectangular volleyball court has an area of 162 square meters. If the length of the court is twice the width, what is the width of the court, in meters?

A) 9
B) 18
C) 27
D) 54

4

$$x^2 = 6x + y$$
$$y = -6x + 36$$

15. A solution to the given system of equations is (x,y). Which of the following is a possible value of xy?

    A) 0
    B) 6
    C) 12
    D) 36

16. The function f is defined by $f(x) = ax^2 + bx + c$, where a, b, and c are constants and $1 < a < 4$. The graph of $y = f(x)$ in the xy-plane passes through points $(11,0)$ and $(-2,0)$. If a is an integer, what could be the value of $a + b$?

ANSWER KEY - ADVANCED MATH DRILL

SAT OFFICIAL GUIDE CHAPTER 24   PAGE 243 - 247

1. B
2. C
3. 3
4. $\frac{22}{23}$
5. C
6. A
7. D
8. B

9. 29 or 60
10. C
11. D
12. 7
13. $-\frac{9}{4}$
14. A
15. A
16. −16 or −24

Answer explanations can be found in the *Digital SAT Study Guide* on pages 243 to 247.