

5.2.1 SAT Practice Questions

1. Given $f(x) = x^2 + 2x + 5$, what is $f(5)$?
 - A. 40
 - B. 50
 - C. 30
 - D. 35

2. Given $f(x) = 2x^2 + 3x + 4$, what is $f(2)$?
 - A. 20
 - B. 18
 - B. 16
 - D. 22

3. Which of the following is a solution of $x^2 - 7x - 8 = 0$
 - A. 7
 - B. 1
 - C. -7
 - D. -1

4. Which of the following is a solution of $6x^2 + 7x - 20 = 0$
 - A. $\frac{4}{3}$
 - B. $\frac{5}{2}$
 - C. $\frac{3}{4}$
 - D. $\frac{2}{5}$

5. Solving the following Quadratic equations with Quadratic Formula:
 - 1) $2x^2 - 3x - 1 = 0$
 - 2) $3x^2 - 5x - 3 = 0$
 - 3) $x^2 - 3x + 1 = 0$

4) $x^2 - 10x + 5 = 0$

5) $x^2 - 5x + 2 = 0$

6. For what value of x is the function $f(x)$ below undefined?

$$f(x) = \frac{x + 4}{(x - 3)^2 - 6(x - 3) + 9}$$

7. What one of the possible values of x is the function $f(x)$ below undefined?

$$f(x) = \frac{x + 4}{(x - 3)^2 - 4(x - 3) - 5}$$

8. If the curve of $y = x^2 - 5x + k$ goes through the point $(2, 5)$, then what is the value of k ?9. If the curve of $y = x^2 - 2kx + k^2$ goes through the point $(-4, 9)$, then what is the value of k ?10. If $f(x) = 2x^2 + 3x + 6$ and $g(x) = x^2 - 2x - 4$, then what is the value of $f(g(x))$ when $x = 3$?11. If $f(x) = x^2 - 3x + 4$ and $g(x) = 3x^2 + x - 5$, then what is the value of $g(f(x))$ when $x = 4$?12. If $(ax + 3)(bx + 2) = 7x^2 + cx - 6$ and $a + b = -8$, then what is one of the two possible values of c ?13. If $(ax + 2)(bx - 4) = kx^2 + 12x - 8$ and $a + b = 3$, then what is one of the two possible values of k ?

5.2.2 Solutions

1. A $f(5) = 5^2 + 2 \times 5 + 5 = 25 + 10 + 5 = 40$.

2. B $f(2) = 2 \times 2^2 + 3 \times 2 + 4 = 8 + 6 + 4 = 18$.

3. D $x^2 - 7x - 8 = (x - 8)(x + 1) = 0$. Thus $x = 8$ or $x = -1$.

4. A $6x^2 + 7x - 20 = (2x + 5)(3x - 4) = 0$. Thus $x = -\frac{5}{2}$ or $x = \frac{4}{3}$.

5. For any Quadratic equation: $ax^2 + bx + c = 0$, using the Quadratic Formula: $x =$

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}, \text{ we can obtain:}$$

$$1) x = \frac{3 \pm \sqrt{9 - 8}}{4} = \frac{3 \pm \sqrt{17}}{4}$$

$$2) x = \frac{5 \pm \sqrt{61}}{6}$$

$$3) x = \frac{3 \pm \sqrt{5}}{2}$$

$$4) x = 5 \pm 2\sqrt{5}$$

$$5) x = \frac{5 \pm \sqrt{17}}{2}$$

6. 6. If the function is undefined, then $(x - 3)^2 - 6(x - 3) + 9 = (x - 3 - 3)^2 = (x - 6)^2 = 0$. Thus, if the function is undefined, then $x = 6$.

7. 2 or 8. If the function is undefined, then $(x - 3)^2 - 4(x - 3) - 5 = (x - 3 - 5)(x - 3 + 1) = (x - 8)(x - 2)$. Thus, if the function is undefined, then $x = 8$ or $x = 2$.

8. 11. Substituting $y = 5$ and $x = 2$ into the equation, we can have $5 = 2^2 - 5 \times 2 + k$.

Further, we can derive that $5 = 4 - 10 + k$. Therefore, $k = 11$.

9. -1 or -7. Substituting $y = 9$ and $x = -4$ into the equation, we can have $9 = (-4)^2$