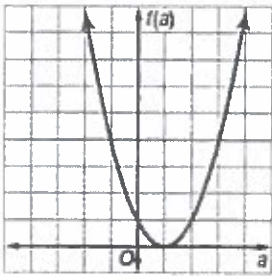


Quadratic and Radical Functions - Exam Review #8

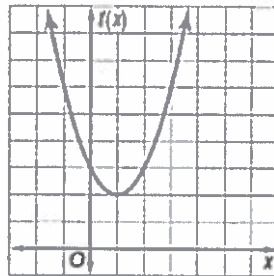
Match each graph to the number of solutions it has. Then, list the solutions in the blanks provided.

B 1.



A. No Solutions

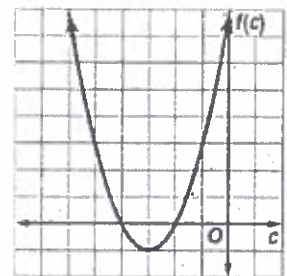
A 2.



B. 1 Solution

x = 1

C 3.



C. 2 Solutions

x = -2, -4

Name the transformations which are indicated by the given equations.

4. $y = x^2 + 3$

shift up 3

5. $y = 4x^2$

stretch by factor of 4

6. $y = (x - 5)^2$

shift right 5

7. $y = \frac{1}{6}x^2$

shrink by factor of 6

8. $y = (x + 7)^2$

shift left 7

9. $y = -x^2 - 8$

- reflection
- down 8

Use the quadratic formula to solve the given equations. $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

10. $x^2 + 2x - 3 = 0$

$$x = \frac{-2 \pm \sqrt{2^2 - 4(1)(-3)}}{2(1)} = \frac{-2 \pm \sqrt{4 + 12}}{2}$$

$$= \frac{-2 \pm 4}{2} \begin{cases} \frac{-6}{2} = -3 \\ \frac{2}{2} = 1 \end{cases} \quad \boxed{x = 1, -3}$$

11. $x^2 - x - 20 = 0$

$$x = \frac{+1 \pm \sqrt{(-1)^2 - 4(1)(-20)}}{2(1)} = \frac{1 \pm \sqrt{1 + 80}}{2}$$

$$= \frac{1 \pm 9}{2} \begin{cases} \frac{10}{2} = 10 \\ \frac{-8}{2} = -4 \end{cases} \quad \boxed{x = 10, -4}$$

12. $x^2 - 5x - 36 = 0$

$$x = \frac{+5 \pm \sqrt{(-5)^2 - 4(1)(-36)}}{2(1)} = \frac{5 \pm \sqrt{25 + 144}}{2}$$

$$= \frac{5 \pm 13}{2} \begin{cases} \frac{18}{2} = 9 \\ \frac{-8}{2} = -4 \end{cases} \quad \boxed{x = 9, -4}$$

13. $x^2 + 11x + 30 = 0$

$$x = \frac{11 \pm \sqrt{11^2 - 4(1)(30)}}{2(1)} = \frac{11 \pm \sqrt{121 - 120}}{2}$$

$$= \frac{11 \pm 1}{2} \begin{cases} \frac{12}{2} = 6 \\ \frac{10}{2} = 5 \end{cases} \quad \boxed{x = 6, 5}$$

Solve each equation using the zero product property.

14. $x(x-8) = 0$

$x = 0$
 ~~$x = 8$~~
 $x - 8 = 0$
 $x = 8$

15. $b(b+12) = 0$

$b = 0$
 $b + 12 = 0$
 $b = -12$

16. $(m-3)(m+5) = 0$

$m - 3 = 0$
 $m = 3$
 $m + 5 = 0$
 $m = -5$

17. $(a-9)(2a+1) = 0$

$a - 9 = 0$
 $a = 9$
 $2a + 1 = 0$
 $2a = -1$
 $a = -\frac{1}{2}$

Simplify the radical expressions. (Time for factor trees!)

18. $\sqrt{300}$

Factor tree for 300: 300 → 10 × 30 → 2 × 5 × 3 × 5 → 2 × 5 × 5 × 2 × 3. Simplified: $2 \cdot 5 \sqrt{3}$ or $10\sqrt{3}$

19. $\sqrt{126}$

Factor tree for 126: 126 → 2 × 63 → 2 × 3 × 21 → 2 × 3 × 3 × 7. Simplified: $3\sqrt{2 \cdot 7}$ or $3\sqrt{14}$

20. $\sqrt{x^3 y^5}$

Factor tree for $x^3 y^5$: $x \cdot x \cdot x \cdot y \cdot y \cdot y \cdot y \cdot y$. Simplified: $x y^2 \sqrt{x y}$

21. $\sqrt{8b^2}$

Factor tree for $8b^2$: $8 \cdot b \cdot b$. Simplified: $2b\sqrt{2}$

22. $\sqrt{36k^2 m^4}$

Factor tree for $36k^2 m^4$: $36 \cdot k \cdot k \cdot m \cdot m \cdot m \cdot m$. Simplified: $3 \cdot 2 \cdot k \cdot m \cdot m = 6km^2$. *no leftovers!

Simplify each expression.

23. $12\sqrt{r} - 9\sqrt{r}$

$3\sqrt{r}$

24. $\sqrt{28} + \sqrt{63}$

Factor trees for 28 and 63. Simplified: $2\sqrt{7} + 3\sqrt{7} = 5\sqrt{7}$

25. $4\sqrt{3} + 2\sqrt{12} \rightarrow 4\sqrt{3} + 2 \cdot 2\sqrt{3}$

Factor tree for 12. Simplified: $4\sqrt{3} + 4\sqrt{3} = 8\sqrt{3}$

26. $\sqrt{6}(4\sqrt{3} - \sqrt{10})$

Distribute: $\sqrt{6} \cdot 4\sqrt{3} - \sqrt{6} \cdot \sqrt{10}$. Factor trees for 18 and 60. Simplified: $4\sqrt{18} - \sqrt{60}$
 $4 \cdot 3\sqrt{2} - 2\sqrt{15}$
 $12\sqrt{2} - 2\sqrt{15}$