



Name: _____

Date: _____

Score: / 30

Learning Objectives

- Solve quadratic equations by factoring and the quadratic formula
- Find the vertex and axis of symmetry of a parabola
- Evaluate and interpret exponential functions
- Solve exponential equations using logarithms

Simplify each expression completely. Show all steps and circle your final answer.

Exponential functions

1. Evaluate: 2^2 .

$$2^2$$

Answer: _____

2. Evaluate: 4^5 .

$$4^5$$

Answer: _____

3. Evaluate: 4^3 .

$$4^3$$

Answer: _____

4. Evaluate: 3^3 .

$$3^3$$

Answer: _____

5. Evaluate: 3^5 .

$$3^5$$

Answer: _____

6. Evaluate: 2^4 .

$$2^4$$

Answer: _____

7. Evaluate: 4^4 .

$$4^4$$

Answer: _____

8. Evaluate: 5^5 .

$$5^5$$

Answer: _____

9. Evaluate: 2^4 .

$$2^4$$

Answer: _____

10. Evaluate: 2^2 .

$$2^2$$

Answer: _____

Solving quadratics

11. Solve by factoring: $1x^2 + 2x + -15 = 0$.

$$x^2 + 2x - 15 = 0$$

Answer: _____

12. Solve by factoring: $1x^2 + 1x + -20 = 0$.

$$x^2 + 1x - 20 = 0$$

Answer: _____

13. Solve by factoring: $2x^2 + 4x + -30 = 0$.

$$2x^2 + 4x - 30 = 0$$

Answer: _____

14. Solve by factoring: $2x^2 + 4x + -6 = 0$.

$$2x^2 + 4x - 6 = 0$$

Answer: _____

15. Solve by factoring: $1x^2 + 3x + -10 = 0$.

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

Answer: _____

16. Solve by factoring: $1x^2 + -1x + -2 = 0$.

$$x^2 - 1x - 2 = 0$$

Answer: _____

17. Solve by factoring: $1x^2 + 0x + -4 = 0$.

$$x^2x - 4 = 0$$

Answer: _____

18. Solve by factoring: $2x^2 + 2x + -4 = 0$.

$$2x^2 + 2x - 4 = 0$$

Answer: _____

19. Solve by factoring: $2x^2 + 8x + -10 = 0$.

$$2x^2 + 8x - 10 = 0$$

Answer: _____

20. Solve by factoring: $2x^2 + 4x + -30 = 0$.

$$2x^2 + 4x - 30 = 0$$

Answer: _____

Vertex of a parabola

21. Find the vertex of $f(x) = -3x^2 + 24x + -43$.

$$f(x) = -3x^2 + 24x - 43$$

Answer: _____

22. Find the vertex of $f(x) = -1x^2 + 4x + -2$.

$$f(x) = -1x^2 + 4x - 2$$

Answer: _____

23. Find the vertex of $f(x) = -2x^2 + 4x + 2$.

$$f(x) = -2x^2 + 4x + 2$$

Answer: _____

24. Find the vertex of $f(x) = 2x^2 + -16x + 37$.

$$f(x) = 2x^2 - 16x + 37$$

Answer: _____

25. Find the vertex of $f(x) = 2x^2 + -16x + 30$.

$$f(x) = 2x^2 - 16x + 30$$

Answer: _____

26. Find the vertex of $f(x) = 1x^2 + -6x + 3$.

$$f(x) = 1x^2 - 6x + 3$$

Answer: _____

27. Find the vertex of $f(x) = 1x^2 + 2x + 2$.

$$f(x) = 1x^2 + 2x + 2$$

Answer: _____

28. Find the vertex of $f(x) = -2x^2 + 0x + 2$.

$$f(x) = -2x^2 + 0x + 2$$

Answer: _____

29. Find the vertex of $f(x) = -3x^2 + 24x + -53$.

$$f(x) = -3x^2 + 24x - 53$$

Answer: _____

30. Find the vertex of $f(x) = -3x^2 + -24x + -50$.

$$f(x) = -3x^2 - 24x - 50$$

Answer: _____



INTALG: Quadratic and Exponential Function

ANSWER KEY & SOLUTIONS

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Topics: Vertex of a parabola, Solving quadratics, Exponential functions. All answers verified by independent computation.

Solutions

Exponential functions

1. Evaluate: 2^2 .

$$2^2$$

$$\rightarrow 2^2 = 4.$$

Answer: $2^2 = 4$

2. Evaluate: 4^5 .

$$4^5$$

$$\rightarrow 4^5 = 1024.$$

Answer: $4^5 = 1024$

3. Evaluate: 4^3 .

$$4^3$$

$$\rightarrow 4^3 = 64.$$

Answer: $4^3 = 64$

4. Evaluate: 3^3 .

$$3^3$$

$$\rightarrow 3^3 = 27.$$

Answer: $3^3 = 27$

5. Evaluate: 3^5 .

$$3^5$$

$$\rightarrow 3^5 = 243.$$

Answer: $3^5 = 243$

6. Evaluate: 2^4 .

$$2^4$$

$$\rightarrow 2^4 = 16.$$

Answer: $2^4 = 16$

7. Evaluate: 4^4 .

$$4^4$$

$$\rightarrow 4^4 = 256.$$

Answer: $4^4 = 256$

8. Evaluate: 5^5 .

$$5^5$$

$$\rightarrow 5^5 = 3125.$$

Answer: $5^5 = 3125$

9. Evaluate: 2^4 .

$$2^4$$

$$\rightarrow 2^4 = 16.$$

Answer: $2^4 = 16$

10. Evaluate: 2^2 .

$$2^2$$

$$\rightarrow 2^2 = 4.$$

Answer: $2^2 = 4$

Solving quadratics

11. Solve by factoring: $1x^2 + 2x + -15 = 0$.

$$x^2 + 2x - 15 = 0$$

→ Factor: set each factor equal to zero.

→ $x = -5$ or $x = 3$.

Answer: $x = -5$ or $x = 3$

12. Solve by factoring: $1x^2 + 1x + -20 = 0$.

$$x^2 + 1x - 20 = 0$$

→ Factor: set each factor equal to zero.

→ $x = -5$ or $x = 4$.

Answer: $x = -5$ or $x = 4$

13. Solve by factoring: $2x^2 + 4x + -30 = 0$.

$$2x^2 + 4x - 30 = 0$$

→ Factor: set each factor equal to zero.

→ $x = -5$ or $x = 3$.

Answer: $x = -5$ or $x = 3$

14. Solve by factoring: $2x^2 + 4x + -6 = 0$.

$$2x^2 + 4x - 6 = 0$$

→ Factor: set each factor equal to zero.

→ $x = -3$ or $x = 1$.

Answer: $x = -3$ or $x = 1$

15. Solve by factoring: $1x^2 + 3x + -10 = 0$.

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

→ Factor: set each factor equal to zero.

→ $x = -5$ or $x = 2$.

Answer: $x = -5$ or $x = 2$

16. Solve by factoring: $1x^2 + -1x + -2 = 0$.

$$x^2 - 1x - 2 = 0$$

→ Factor: set each factor equal to zero.

→ $x = -1$ or $x = 2$.

Answer: $x = -1$ or $x = 2$

17. Solve by factoring: $1x^2 + 0x + -4 = 0$.

$$x^2 - 4 = 0$$

→ Factor: set each factor equal to zero.

→ $x = -2$ or $x = 2$.

Answer: $x = -2$ or $x = 2$

18. Solve by factoring: $2x^2 + 2x + -4 = 0$.

$$2x^2 + 2x - 4 = 0$$

→ Factor: set each factor equal to zero.

→ $x = -2$ or $x = 1$.

Answer: $x = -2$ or $x = 1$

19. Solve by factoring: $2x^2 + 8x + -10 = 0$.

$$2x^2 + 8x - 10 = 0$$

→ Factor: set each factor equal to zero.

→ $x = -5$ or $x = 1$.

Answer: $x = -5$ or $x = 1$

20. Solve by factoring: $2x^2 + 4x + -30 = 0$.

$$2x^2 + 4x - 30 = 0$$

→ Factor: set each factor equal to zero.

→ $x = -5$ or $x = 3$.

Answer: $x = -5$ or $x = 3$

Vertex of a parabola

21. Find the vertex of $f(x) = -3x^2 + 24x + -43$.

$$f(x) = -3x^2 + 24x - 43$$

→ Write in vertex form: $-3(x - 4)^2 + 5$.

→ Vertex = (4, 5).

Answer: Vertex = (4, 5)

22. Find the vertex of $f(x) = -1x^2 + 4x + -2$.

$$f(x) = -1x^2 + 4x - 2$$

→ Write in vertex form: $-1(x - 2)^2 + 2$.

→ Vertex = (2, 2).

Answer: Vertex = (2, 2)

23. Find the vertex of $f(x) = -2x^2 + 4x + 2$.

$$f(x) = -2x^2 + 4x + 2$$

→ Write in vertex form: $-2(x - 1)^2 + 4$.

→ Vertex = (1, 4).

Answer: Vertex = (1, 4)

24. Find the vertex of $f(x) = 2x^2 + -16x + 37$.

$$f(x) = 2x^2 - 16x + 37$$

→ Write in vertex form: $2(x - 4)^2 + 5$.

→ Vertex = (4, 5).

Answer: Vertex = (4, 5)

25. Find the vertex of $f(x) = 2x^2 + -16x + 30$.

$$f(x) = 2x^2 - 16x + 30$$

→ Write in vertex form: $2(x - 4)^2 + -2$.

→ Vertex = (4, -2).

Answer: Vertex = (4, -2)

26. Find the vertex of $f(x) = 1x^2 + -6x + 3$.

$$f(x) = 1x^2 - 6x + 3$$

→ Write in vertex form: $1(x - 3)^2 + -6$.

→ Vertex = (3, -6).

Answer: Vertex = (3, -6)

27. Find the vertex of $f(x) = 1x^2 + 2x + 2$.

$$f(x) = 1x^2 + 2x + 2$$

→ Write in vertex form: $1(x - -1)^2 + 1$.

→ Vertex = $(-1, 1)$.

Answer: Vertex = $(-1, 1)$

28. Find the vertex of $f(x) = -2x^2 + 0x + 2$.

$$f(x) = -2x^2 + 0x + 2$$

→ Write in vertex form: $-2(x - 0)^2 + 2$.

→ Vertex = $(0, 2)$.

Answer: Vertex = $(0, 2)$

29. Find the vertex of $f(x) = -3x^2 + 24x + -53$.

$$f(x) = -3x^2 + 24x - 53$$

→ Write in vertex form: $-3(x - 4)^2 + -5$.

→ Vertex = $(4, -5)$.

Answer: Vertex = $(4, -5)$

30. Find the vertex of $f(x) = -3x^2 + -24x + -50$.

$$f(x) = -3x^2 - 24x - 50$$

→ Write in vertex form: $-3(x - -4)^2 + -2$.

→ Vertex = $(-4, -2)$.

Answer: Vertex = $(-4, -2)$
