

Algebra 2 Review

Practice set · 81 questions

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Unit 1: Functions

1. If $f(x) = x^2 - 3x + 1$, what is $f(-2)$?

- A. -1
- B. 3
- C. 11
- D. -9

2. What is the domain of $f(x) = x^3 - 4x + 2$?

- A. $x \geq 0$
- B. $x \geq 2$
- C. All real numbers
- D. All real numbers except $x = 0$

3. Which interval represents $x < 8$?

- A. $(-\infty, 8]$
- B. $[8, \infty)$
- C. $(-\infty, 8)$
- D. $(8, \infty)$

4. A ball is thrown upward and its height in feet is $h(t) = -16t^2 + 48t$, where t is in seconds. After how many seconds does the ball return to the ground?

- A. 1.5 seconds
- B. 3 seconds
- C. 36 seconds
- D. 48 seconds

5. Which type of discontinuity does $f(x) = \frac{1}{x+2}$ have at $x = -2$?

- A. Point discontinuity
- B. Infinite discontinuity
- C. Jump discontinuity
- D. None — it is continuous.

6. The table shows several values of a function g . Is g even, odd, or neither?

x	$g(x)$
-2	-8
-1	-1
0	0
1	1
2	8

A. Even

B. Both even and odd

C. Neither

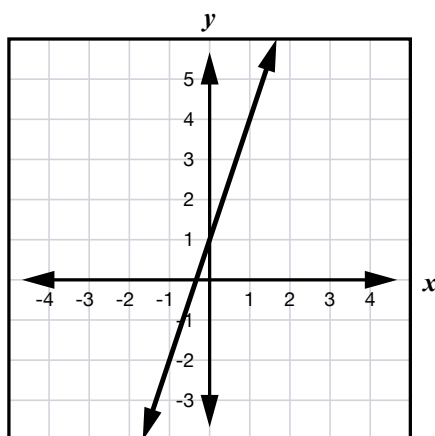
D. Odd

7. The table shows function f and the graph shows function g . Which function has the greater rate of change?

Function f

x	$f(x)$
0	-2
1	3
2	8

Function g



A. g

B. They have equal rates of change.

C. f

D. It cannot be determined.

8. What is the equation of the vertical line through $(3, -2)$?

A. $y = -2$

B. $x = -2$

C. $y = 3$

D. $x = 3$

9. Describe the graph compared with $f(x) = |x|$.

$$g(x) = |x| - 7$$

A. Right 7

B. Up 7

C. Down 7

D. Left 7

10. The table shows values of $f(x)$. If $g(x) = f(x - 1)$, what is $g(3)$?

x	$f(x)$
0	2
1	5
2	10
3	17
4	26

A. 10

B. 17

C. 26

D. 5

Unit 2: Linear Equations & Systems

11. Solve.

$$\frac{2}{3}x - 5 = 11$$

A. $x = 16.5$

B. $x = 24$

C. $x = \frac{32}{3}$

D. $x = 9$

12. How many solutions does $|x - 2| + 5 = 1$ have?

A. Two solutions

B. Infinitely many solutions

C. One solution

D. No solution

13. What is the slope of a line perpendicular to $y = 3x - 2$?

A. 3

B. -3

C. $\frac{1}{3}$

D. $-\frac{1}{3}$

14. A system of two linear equations has infinitely many solutions. What must be true of their graphs?

A. They are parallel and distinct.

B. They cross at exactly one point.

C. They are the same line.

D. One is horizontal and one is vertical.

15. A chemist mixes a 10% solution with a 40% solution to make 12 liters of a 30% solution. Which system models this?

A.
$$\begin{cases} x + y = 12 \\ 0.10x + 0.40y = 12 \end{cases}$$

B.
$$\begin{cases} x + y = 30 \\ 0.10x + 0.40y = 3.6 \end{cases}$$

C.
$$\begin{cases} x + y = 12 \\ 0.10x + 0.40y = 3.6 \end{cases}$$

D.
$$\begin{cases} 0.10x + 0.40y = 12 \\ x + y = 3.6 \end{cases}$$

16. Which system's solution is the set of all points that are both to the right of $x = 1$ and below $y = 3$?

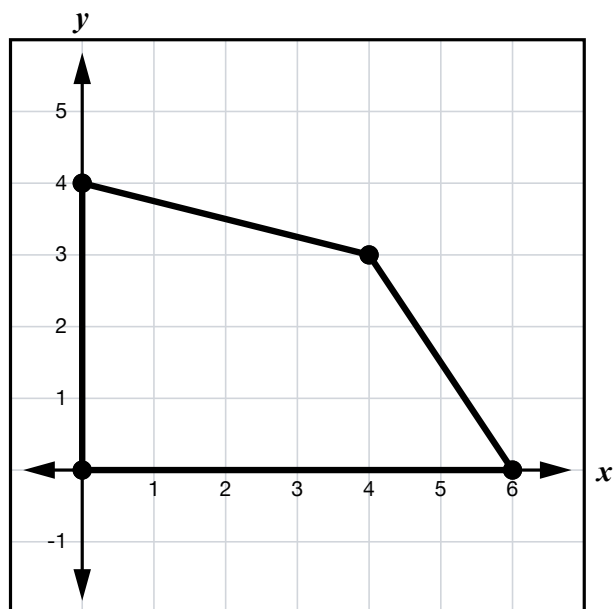
A. $\begin{cases} x \geq 1 \\ y \leq 3 \end{cases}$

B. $\begin{cases} x < 1 \\ y < 3 \end{cases}$

C. $\begin{cases} x > 1 \\ y > 3 \end{cases}$

D. $\begin{cases} x > 1 \\ y < 3 \end{cases}$

17. The graph shows a feasible region with vertices $(0, 0)$, $(6, 0)$, $(4, 3)$, and $(0, 4)$. What is the maximum value of $P = x + 2y$?



A. 6

B. 8

C. 10

D. 12

18. Adding equations 1 and 2 eliminates z . What equation results?

$$\begin{cases} x + y + z = 5 \\ 3x + 2y - z = 4 \end{cases}$$

A. $2x - y = 9$

B. $4x + 3y = 1$

C. $4x + 3y = 9$

D. $4x + 3y + 2z = 9$

Unit 3: Quadratic Functions

19. What is the axis of symmetry of $f(x) = x^2 - 6x + 5$?

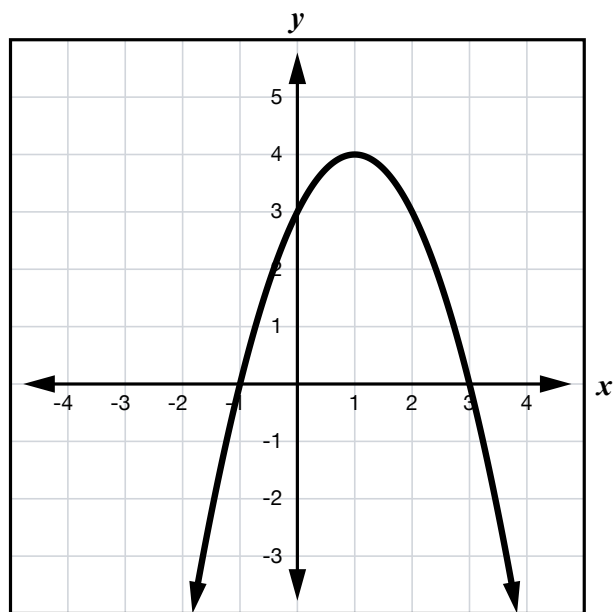
A. $x = -3$

B. $x = 3$

C. $x = 6$

D. $x = -6$

20. What are the real zeros of the function shown?



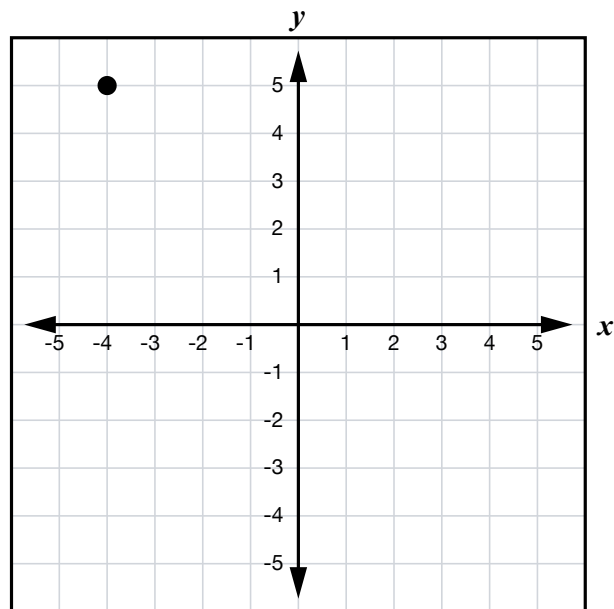
A. $x = -1$ and $x = 3$

B. $x = 1$ and $x = -3$

C. $x = 4$

D. $x = -1$

21. Which complex number plots at the point $(-4, 5)$ on the complex plane?



A. $-4 - 5i$

B. $5 - 4i$

C. $-4 + 5i$

D. $4 + 5i$

22. What is the sum of $(a + bi)$ and its conjugate $(a - bi)$?

A. $2bi$

B. 0

C. $2a$

D. $a^2 + b^2$

23. Multiply.

$$(3 - 2i)(3 + 2i)$$

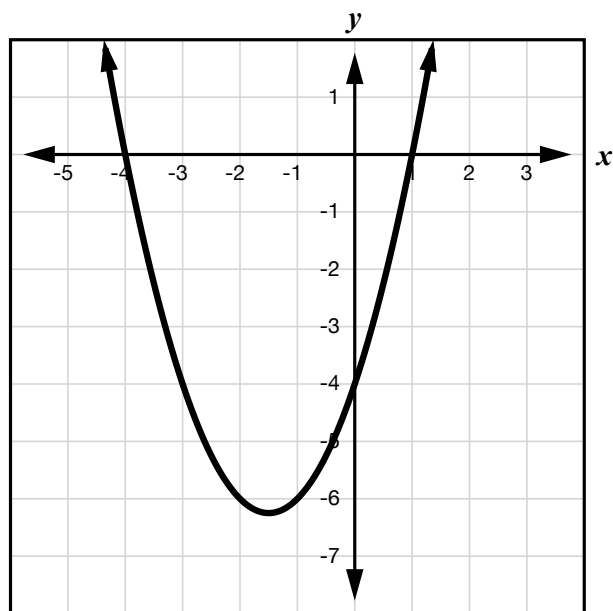
A. 13

B. $9 - 4i$

C. 5

D. $13 + 12i$

24. What are the solutions of the related equation, based on the graph shown?



A. $x = 4$ and $x = -1$

B. $x = -4$ and $x = 1$

C. $x = -4$ only

D. $x = -3$ and $x = 1$

25. The table shows values of $f(x) = x^2 - 49$. Use it to find the solutions of $x^2 - 49 = 0$.

x	$f(x)$
-8	15
-7	0
0	-49
7	0
8	15

A. $x = 0$

B. $x = -49$ or $x = 49$

C. $x = -7$ or $x = 7$

D. $x = 7$ only

26. Does the graph have a maximum or a minimum, and what is it?

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

- A. Minimum of 3
- B. Maximum of 2
- C. Maximum of 3
- D. Minimum of -1

27. Solve $x^2 - 2x - 4 = 0$ using the quadratic formula.

- A. $x = -1 \pm \sqrt{5}$
- B. $x = 1 \pm \sqrt{5}$
- C. $x = 2 \pm \sqrt{5}$
- D. $x = 1 \pm \sqrt{5}i$

28. The solutions of a quadratic equation are $3 + 4i$ and $3 - 4i$. What is their sum?

- A. $8i$
- B. $6 + 8i$
- C. 6
- D. 0

29. Solve.

$$x^2 - x - 6 < 0$$

- A. $-3 < x < 2$
- B. $x < -2$ or $x > 3$
- C. $-2 < x < 3$
- D. $x < -3$ or $x > 2$

30. Which statement best describes a solution of a system made of a line and a parabola?

- A. The vertex of the parabola
- B. The x -value where the parabola crosses the x -axis
- C. The y -intercept that the two graphs share
- D. An ordered pair (x, y) that lies on both graphs, where they intersect

31. Complete the statement: a parabola always opens toward its ____ and away from its ____.

- A. directrix; focus
- B. vertex; focus
- C. axis; vertex
- D. focus; directrix

Unit 4: Polynomial Functions

32. Which shows $9x - 4x^3 + 2x^5 - 6$ written in standard form?

A. $-4x^3 + 2x^5 + 9x - 6$

B. $-6 + 9x - 4x^3 + 2x^5$

C. $2x^5 - 4x^3 + 9x - 6$

D. $2x^5 + 4x^3 + 9x - 6$

33. Which function falls on the left and rises on the right?

A. $f(x) = 2x^3 - 5x + 1$

B. $f(x) = -3x^3 + x$

C. $f(x) = x^4 - 2x^2$

D. $f(x) = -x^6 + 4$

34. A polynomial function has degree 8. What is the greatest number of turning points its graph can have?

A. 8

B. 7

C. 6

D. 9

35. Which statement about adding two polynomials is always true?

A. The sum always has a higher degree than both polynomials.

B. The sum is never a polynomial.

C. The sum is always another polynomial.

D. The sum always has the same number of terms as each addend.

36. Multiply.

$$(3x - 2y)(x + 4y)$$

A. $3x^2 - 8y^2$

B. $3x^2 + 14xy - 8y^2$

C. $3x^2 + 10xy - 8y^2$

D. $3x^2 + 10xy + 8y^2$

37. What value of c makes $x^2 + 14x + c$ a perfect-square trinomial?

A. 7

B. 14

C. 196

D. 49

38. A rectangle has an area of $(12x^3 + 8x^2)$ square units and a width of $4x^2$ units. Which expression gives its length?

A. $3x^2 + 2x$

B. $3x + 8x^2$

C. $3x + 2$

D. $3x - 2$

39. A polynomial of degree 4 is divided by a binomial of degree 1 with no remainder. What is the degree of the quotient?

A. 2

B. 4

C. 3

D. 5

Unit 5: Polynomial Equations

40. The graph of $y = p(x)$ crosses the x -axis at $x = -4$ and $x = 1$, and crosses the y -axis at $y = 3$. What are the real solutions of $p(x) = 0$?

A. $x = -4$ and $x = 1$

B. $x = 4$ and $x = -1$

C. $x = 3$

D. $x = -4$, $x = 1$, and $x = 3$

41. What is the real solution of $27x^3 - 8 = 0$?

A. $x = \frac{2}{3}$ and $x = -\frac{2}{3}$

B. $x = \frac{2}{3}$

C. $x = -\frac{2}{3}$

D. $x = \frac{8}{27}$

42. Solve.

$$x^4 - 40x^2 + 144 = 0$$

A. $x = 2$ and $x = 6$

B. $x = 4$ and $x = 36$

C. $x = \pm 4$ and $x = \pm 36$

D. $x = \pm 2$ and $x = \pm 6$

43. A polynomial $p(x)$ satisfies $p(4) = 0$. What does this guarantee?

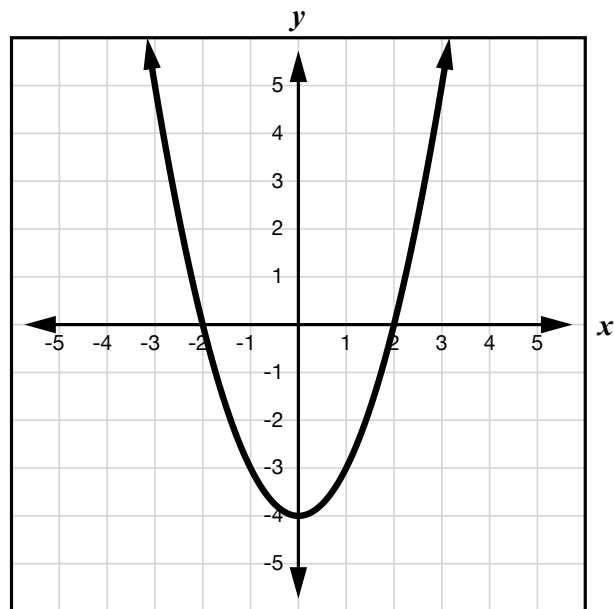
A. $x + 4$ is a factor of $p(x)$.

B. $p(x)$ has degree 4.

C. $x - 4$ is a factor of $p(x)$.

D. The leading coefficient of $p(x)$ is 4.

44. The graph of a degree-2 polynomial is shown. What is the multiplicity of each of its two zeros?



A. 2

B. 1

C. 4

D. 0

Unit 6: Radical Functions

45. For $f(x) = x^2 - 4x$ and $g(x) = 3x + 2$, find $(f - g)(x)$.

A. $x^2 - 7x - 2$

B. $x^2 - x + 2$

C. $x^2 - 7x + 2$

D. $x^2 + x - 2$

46. What is the inverse of $f(x) = 3x - 9$?

A. $f^{-1}(x) = \frac{x - 9}{3}$

B. $f^{-1}(x) = 3x + 9$

C. $f^{-1}(x) = \frac{x + 9}{3}$

D. $f^{-1}(x) = \frac{1}{3x - 9}$

47. Solve.

$$x^{\frac{2}{3}} = 9$$

A. 27

B. ± 27

C. 3

D. 729

48. The speed s , in feet per second, of a water wave in depth d feet is $s = \sqrt{32d}$. Find the speed where the depth is 8 feet.

A. 4 feet per second

B. 16 feet per second

C. 8 feet per second

D. 256 feet per second

49. Simplify.

$$3\sqrt{5} + 2\sqrt{5}$$

A. $6\sqrt{5}$

B. $5\sqrt{10}$

C. $5\sqrt{5}$

D. 25

50. Solve the equation.

$$(-8x)^{1/3} + 2 = 6$$

A. $x = 8$

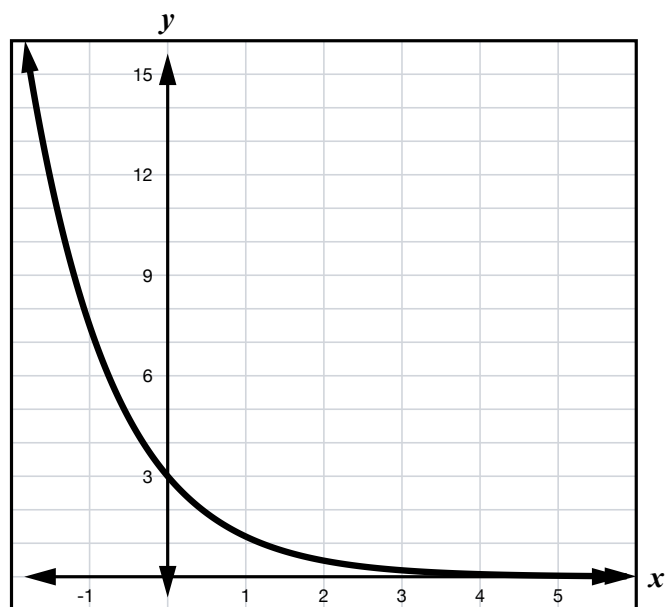
B. $x = -8$

C. $x = -2$

D. $x = 2$

Unit 7: Exponential Functions

51. Describe the graph of $f(x) = 3 \cdot \left(\frac{2}{5}\right)^x$ and give its y -intercept.



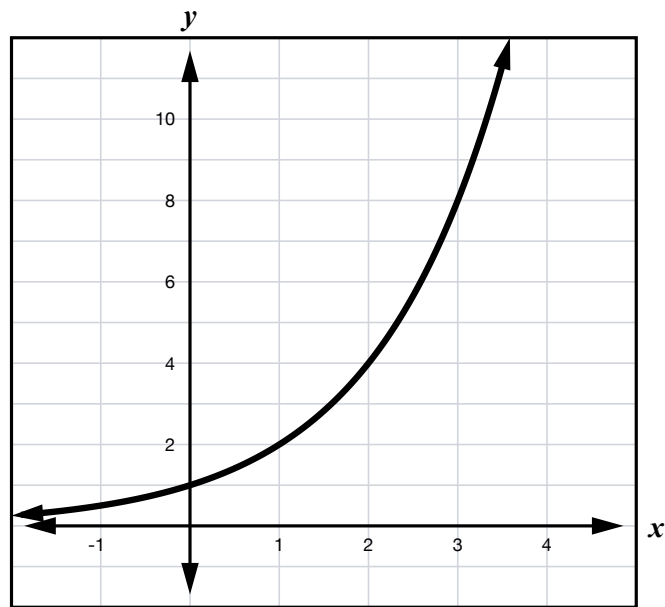
A. Decay, y -intercept 3

B. Growth, y -intercept 3

C. Decay, y -intercept $\frac{2}{5}$

D. Growth, y -intercept $\frac{2}{5}$

52. Use the graph to solve $2^x = 4$.



A. $x = 4$

B. $x = 2$

C. $x = 8$

D. $x = 16$

53. Evaluate e^2 to the nearest hundredth.

A. 5.44

B. 4.00

C. 7.39

D. 2.72

54. A sequence starts at 100 and has common ratio $\frac{1}{2}$. What is a_5 ?

A. $\frac{25}{2}$

B. $\frac{25}{4}$

C. 50

D. $\frac{100}{5}$

55. Find the sum of the first 50 odd numbers, $1 + 3 + 5 + \cdots + 99$

A. 4950

B. 2500

C. 1275

D. 99

56. Which sum does the sigma notation $\sum_{k=1}^4 3 \cdot 2^{k-1}$ represent?

A. $3 + 6 + 12$

B. $2 + 4 + 8 + 16$

C. $3 \cdot 2^4$

D. $3 + 6 + 12 + 24$

57. The table shows a data set. Which model best fits the data?

x	y
0	6
1	12
2	24
3	48

A. $y = 6 \cdot 2^x$

B. $y = 2 \cdot 6^x$

C. $y = 6 + 6x$

D. $y = 6 \cdot 4^x$

Unit 8: Logarithms

58. Evaluate.

$$\log_4 64$$

A. 16

B. 256

C. 4

D. 3

59. Condense $2 \log_b x + \log_b y$ into a single logarithm.

A. $\log_b(2xy)$

B. $\log_b(x^2 + y)$

C. $\log_b(x^2 y)$

D. $2 \log_b(xy)$

60. Evaluate.

$$\log 10^7$$

A. 7

B. 10^7

C. $\frac{1}{7}$

D. 70

61. Which candidate solution of $\log(x - 5) = 2$ must be rejected?

A. $x = 105$

B. $x = 5$

C. Neither — $x = 105$ is valid.

D. $x = -95$

Unit 9: Rational Functions

62. Multiply.

$$\frac{10x^3}{3y} \cdot \frac{9y^2}{5x}$$

A. $6x^3y^2$

B. $6xy^2$

C. $6x^2y^2$

D. $6x^2y$

63. Write as a single fraction: $5 - \frac{2}{x+1}$

A. $\frac{5x+3}{x+1}$

B. $\frac{5x+7}{x+1}$

C. $\frac{3}{x+1}$

D. $\frac{5x-2}{x+1}$

64. The reciprocal parent function $f(x) = \frac{1}{x}$ has two branches. In which quadrants do they lie?

A. Quadrants I and III

B. Quadrants II and IV

C. Quadrants I and II

D. Quadrants III and IV

65. A student writes $y = 12x$ for a relationship where y varies inversely with x and $y = 1.5$ when $x = 8$. What is the error?

A. The equation should be $y = \frac{x}{12}$.

B. The constant should be 9.5.

C. Inverse variation divides — the equation should be $y = \frac{12}{x}$.

D. There is no error.

66. Solve.

$$\frac{3}{2x} + \frac{1}{2} = \frac{5}{x}$$

A. $x = \frac{7}{2}$

B. $x = 7$

C. $x = 13$

D. $x = 10$

Unit 10: Statistics

67. A quality inspector tests every 25th light bulb that comes off an assembly line. Which sampling method is being used?

- A. Convenience
- B. Simple random
- C. Systematic
- D. Stratified

68. Researchers test whether a new playlist improves focus. One group listens to the playlist while working and one group works in silence. Which is the control group?

- A. The group that listens to the playlist
- B. Neither group
- C. Both groups together
- D. The group that works in silence

69. A researcher measures the mean weight of a random sample of 60 fish from a lake and gets 2.4 pounds. A student calls 2.4 a parameter. What is the correct term and why?

Group	Size	Mean weight
Sample fish	60	2.4 lb
All fish in lake	Unknown	Not measured

- A. A parameter, because it describes the whole lake
- B. A statistic, because it describes a sample
- C. A parameter, because it is a mean
- D. A statistic, because the sample is small

70. What percent of a normal distribution lies above the mean?

- A. 68%
- B. 34%
- C. 50%
- D. 100%

71. A poll uses a random sample of 625 people. Using $ME = \frac{1}{\sqrt{n}}$, what is the margin of error?

- A. 4%
- B. 25%
- C. 2.5%
- D. 6.25%

72. A contest pays \$10 with probability 0.7 and charges \$20 with probability 0.3. What is the expected result for one entry?

A. -\$10

B. -\$6

C. \$1

D. \$7

Unit 11: Trigonometry

73. Convert 150° to radians.

A. $\frac{5\pi}{6}$
C. $\frac{5\pi}{12}$

B. $\frac{6\pi}{5}$
D. $\frac{3\pi}{4}$

74. Find the reference angle for $\frac{5\pi}{6}$.

A. $\frac{\pi}{6}$
C. $\frac{5\pi}{6}$

B. $\frac{\pi}{3}$
D. $\frac{\pi}{4}$

75. Evaluate.

$$\cos 0^\circ$$

A. 0
C. 1

B. -1
D. $\frac{1}{2}$

76. How does the graph of $y = 4 \sin \theta$ compare with the graph of $y = \sin \theta$?

- A. It completes four cycles in 360° .
C. Its period is four times as long.

- B. Its maximum is 4 instead of 1.
D. It is shifted up 4 units.

77. How is $y = \sin(\theta - 75^\circ)$ shifted compared with $y = \sin \theta$?

- A. left 75°
C. down 75°

- B. right 75°
D. up 75°

Unit 12: Trig Identities & Equations

78. If $\sin \theta = \frac{3}{5}$ and $90^\circ < \theta < 180^\circ$, what is $\cos \theta$?

A. $-\frac{3}{4}$

B. $\frac{4}{5}$

C. $-\frac{4}{5}$

D. $\frac{3}{4}$

79. $\sin A = \frac{8}{17}$ and $\cos B = \frac{3}{5}$, with A and B both between 0° and 90° . Find $\cos(A + B)$.

A. $\frac{84}{85}$

B. $-\frac{13}{85}$

C. $\frac{77}{85}$

D. $\frac{13}{85}$

80. If $\cos \theta = \frac{8}{17}$ and $0^\circ < \theta < 90^\circ$, what is $\sin 2\theta$?

A. $\frac{240}{289}$

B. $\frac{120}{289}$

C. $-\frac{240}{289}$

D. $\frac{289}{240}$

81. Solve $2 \cos^2 \theta + \sin \theta - 1 = 0$ for $0^\circ \leq \theta < 360^\circ$.

A. $\theta = 90^\circ, 210^\circ, 330^\circ$

B. $\theta = 210^\circ$ and $\theta = 330^\circ$

C. $\theta = 30^\circ, 90^\circ, 150^\circ$

D. $\theta = 90^\circ$ only

Answer Key

Unit 1: Functions

- | | | | | | |
|------|------|------|-------|------|------|
| 1. C | 2. C | 3. C | 4. B | 5. B | 6. D |
| 7. C | 8. D | 9. C | 10. A | | |

Unit 2: Linear Equations & Systems

- | | | | | | |
|-------|-------|-------|-------|-------|-------|
| 11. B | 12. D | 13. D | 14. C | 15. C | 16. D |
| 17. C | 18. C | | | | |

Unit 3: Quadratic Functions

- | | | | | | |
|-------|-------|-------|-------|-------|-------|
| 19. B | 20. A | 21. C | 22. C | 23. A | 24. B |
| 25. C | 26. C | 27. B | 28. C | 29. C | 30. D |
| 31. D | | | | | |

Unit 4: Polynomial Functions

- | | | | | | |
|-------|-------|-------|-------|-------|-------|
| 32. C | 33. A | 34. B | 35. C | 36. C | 37. D |
| 38. C | 39. C | | | | |

Unit 5: Polynomial Equations

- | | | | | | |
|-------|-------|-------|-------|-------|--|
| 40. A | 41. B | 42. D | 43. C | 44. B | |
|-------|-------|-------|-------|-------|--|

Unit 6: Radical Functions

- | | | | | | |
|-------|-------|-------|-------|-------|-------|
| 45. A | 46. C | 47. B | 48. B | 49. C | 50. B |
|-------|-------|-------|-------|-------|-------|

Unit 7: Exponential Functions

- | | | | | | |
|-------|-------|-------|-------|-------|-------|
| 51. A | 52. B | 53. C | 54. B | 55. B | 56. D |
| 57. A | | | | | |

Unit 8: Logarithms

- | | | | | | |
|-------|-------|-------|-------|--|--|
| 58. D | 59. C | 60. A | 61. C | | |
|-------|-------|-------|-------|--|--|

Unit 9: Rational Functions

- | | | | | | |
|-------|-------|-------|-------|-------|--|
| 62. D | 63. A | 64. A | 65. C | 66. B | |
|-------|-------|-------|-------|-------|--|

Unit 10: Statistics

67. **C** 68. **D** 69. **B** 70. **C** 71. **A** 72. **C**

Unit 11: Trigonometry

73. **A** 74. **A** 75. **C** 76. **B** 77. **B**

Unit 12: Trig Identities & Equations

78. **C** 79. **D** 80. **A** 81. **A**