

1

LINEAR & INEQUALITIES

EASY

Solve for x : $3x + 7 = 22$

2

LINEAR & INEQUALITIES

EASY

Which inequality represents all x greater than -3 ?

3

LINEAR & INEQUALITIES

EASY

What is the slope of the line through $(2, 5)$ and $(6, 13)$?

4

LINEAR & INEQUALITIES

EASY

Solve: $2(x - 3) = 4x - 10$

5

LINEAR & INEQUALITIES

EASY

The line $y = 3x - 4$ has y -intercept:

6

LINEAR & INEQUALITIES

MEDIUM

Solve the inequality: $4x - 3 > 13$

7

LINEAR & INEQUALITIES

MEDIUM

If $f(x) = 2x + 1$ and $g(x) = x - 3$, find $(f + g)(x)$.

8

LINEAR & INEQUALITIES

MEDIUM

Find the equation of a line parallel to $y = 2x + 1$ passing through $(0, -3)$.

9

LINEAR & INEQUALITIES

MEDIUM

Solve the system: $x + y = 7$ and $x - y = 3$.

10

LINEAR & INEQUALITIES

HARD

Solve: $|2x - 4| = 10$

UNIT 2 — QUADRATIC FUNCTIONS

11

QUADRATIC FUNCTIONS

EASY

What are the zeros of $y = x^2 - 5x + 6$?

12

QUADRATIC FUNCTIONS

EASY

The vertex of $y = x^2 - 4x + 7$ is at:

13

QUADRATIC FUNCTIONS

EASY

Use the quadratic formula to solve $x^2 - 2x - 3 = 0$.

14

QUADRATIC FUNCTIONS

EASY

For $y = -2x^2 + 8x - 5$, the parabola opens:

15

QUADRATIC FUNCTIONS

MEDIUM

What is the discriminant of $2x^2 - 3x + 5 = 0$?

16

QUADRATIC FUNCTIONS

MEDIUM

Complete the square: $x^2 + 6x + \underline{\hspace{1cm}} = (x + \underline{\hspace{1cm}})^2$

17

QUADRATIC FUNCTIONS

MEDIUM

A ball is thrown up: $h(t) = -16t^2 + 64t + 5$. What is the maximum height?

18

QUADRATIC FUNCTIONS

MEDIUM

Write $y = x^2 - 6x + 2$ in vertex form.

19

QUADRATIC FUNCTIONS

HARD

For what values of k does $x^2 + kx + 9 = 0$ have exactly one solution?

20

QUADRATIC FUNCTIONS

HARD

Find the quadratic with roots $x = 3$ and $x = -5$.

UNIT 3 — POLYNOMIALS

21

POLYNOMIALS

EASY

Simplify: $(2x^2 + 3x - 1) + (x^2 - 2x + 4)$

22

POLYNOMIALS

EASY

Factor completely: $x^2 - 16$

23

POLYNOMIALS

EASY

What is the degree of the polynomial $4x^3 - 2x + 7$?

24

POLYNOMIALS

EASY

Multiply: $(x + 3)(x - 2)$

25

POLYNOMIALS

MEDIUM

Factor: $2x^2 + 7x + 3$

26

POLYNOMIALS

MEDIUM

Use synthetic division: divide $x^3 - 2x^2 + x - 4$ by $(x - 2)$.

27

POLYNOMIALS

MEDIUM

By the Rational Root Theorem, which is a possible rational root of $2x^3 - 3x + 1$?

28

POLYNOMIALS

MEDIUM

Factor completely: $x^3 - 8$

29

POLYNOMIALS

HARD

If $(x - 3)$ is a factor of $x^3 - 5x^2 + 2x + 24$, what is one other factor?

30

POLYNOMIALS

HARD

How many sign changes are in $f(x) = x^4 - 3x^2 + 2x - 1$ (Descartes' Rule)?

UNIT 4 — RATIONAL EXPRESSIONS

31

RATIONAL EXPRESSIONS

EASY

Simplify: $(x^2 - 4)/(x + 2)$

32

RATIONAL EXPRESSIONS

EASY

What is the domain restriction for $f(x) = 1/(x - 5)$?

33

RATIONAL EXPRESSIONS

EASY

Add: $\frac{1}{x} + \frac{2}{x}$

34

RATIONAL EXPRESSIONS

MEDIUM

Add: $\frac{1}{(x+1)} + \frac{1}{(x-1)}$

35

RATIONAL EXPRESSIONS

MEDIUM

Solve: $\frac{3}{x} = \frac{12}{20}$

36

RATIONAL EXPRESSIONS

MEDIUM

Simplify the complex fraction: $\frac{1}{x} \div \frac{1}{x^2}$

37

RATIONAL EXPRESSIONS

MEDIUM

Find the vertical asymptote of $f(x) = \frac{2}{(x^2 - 9)}$.

38

RATIONAL EXPRESSIONS

MEDIUM

Multiply: $\frac{(x^2-1)}{(x+2)} \cdot \frac{(x+2)}{(x-1)}$

39

RATIONAL EXPRESSIONS

HARD

Solve: $\frac{2}{(x-3)} = \frac{4}{(x+1)}$

40

RATIONAL EXPRESSIONS

HARD

What is the horizontal asymptote of $f(x) = \frac{(3x^2 + 1)}{(x^2 - 4)}$?

41

RADICALS & COMPLEX NUMBERS

EASY

Simplify: $\sqrt{50}$

42

RADICALS & COMPLEX NUMBERS

EASY

What is i^2 , where $i = \sqrt{-1}$?

43

RADICALS & COMPLEX NUMBERS

EASY

Simplify: $\sqrt[3]{27}$

44

RADICALS & COMPLEX NUMBERS

EASY

Simplify: $\sqrt{12} + \sqrt{3}$

45

RADICALS & COMPLEX NUMBERS

MEDIUM

Rationalize the denominator: $1/\sqrt{5}$

46

RADICALS & COMPLEX NUMBERS

MEDIUM

Solve: $\sqrt{2x + 1} = 3$

47

RADICALS & COMPLEX NUMBERS

MEDIUM

Multiply: $(3 + 2i)(1 - i)$

48

RADICALS & COMPLEX NUMBERS

MEDIUM

What is the conjugate of $(4 - 3i)$?

49

RADICALS & COMPLEX NUMBERS

HARD

Write in $a + bi$ form: $(2 + i) / (1 - i)$

50

RADICALS & COMPLEX NUMBERS

HARD

Solve: $x^2 + 4 = 0$ over the complex numbers.

UNIT 6 — EXPONENTIAL & LOGARITHMS

51

EXPONENTIAL & LOGARITHMS

EASY

Evaluate: $\log_{10}(1000)$

52

EXPONENTIAL & LOGARITHMS

EASY

Simplify: $\log_2(8)$

53

EXPONENTIAL & LOGARITHMS

EASY

Which graph represents exponential growth?

54

EXPONENTIAL & LOGARITHMS

EASY

Evaluate: $\ln(e^4)$

55

EXPONENTIAL & LOGARITHMS

MEDIUM

Solve: $3^x = 81$

56

EXPONENTIAL & LOGARITHMS

MEDIUM

Expand: $\log(x^2y/z)$ using log properties.

57

EXPONENTIAL & LOGARITHMS

MEDIUM

Solve: $\log_3(x) = 4$

58

EXPONENTIAL & LOGARITHMS

MEDIUM

What is the inverse of $f(x) = 2^x$?

59

EXPONENTIAL & LOGARITHMS

MEDIUM

The half-life of a substance is 10 years. After 30 years, what fraction remains?

60

EXPONENTIAL & LOGARITHMS

HARD

Solve: $\log_2(x) + \log_2(x-2) = 3$

61

EXPONENTIAL & LOGARITHMS

HARD

Solve: $4^x = 2^{(x+2)}$

62

EXPONENTIAL & LOGARITHMS

HARD

A population grows as $P = 500e^{(0.04t)}$. When does $P = 1000$?

UNIT 7 — SEQUENCES & SERIES

63

SEQUENCES & SERIES

EASY

Find the 10th term of arithmetic sequence: 3, 7, 11, 15, ...

64

SEQUENCES & SERIES

EASY

Find the 5th term of geometric sequence: 2, 6, 18, 54, ...

65

SEQUENCES & SERIES

EASY

What is the common ratio in: 100, 20, 4, 0.8, ...?

66

SEQUENCES & SERIES

MEDIUM

Sum of first 20 terms of arithmetic sequence with $a_1 = 5$, $d = 3$.

67

SEQUENCES & SERIES

MEDIUM

Find the sum of infinite geometric series: $8 + 4 + 2 + 1 + \dots$

68

SEQUENCES & SERIES

MEDIUM

Find the 8th term of the arithmetic sequence: $a_1 = 10$, $d = -3$.

69

SEQUENCES & SERIES

MEDIUM

Write using sigma notation: $2 + 4 + 6 + 8 + \dots + 20$

70

SEQUENCES & SERIES

HARD

A geometric series has $a_1 = 3$, $r = 2$. Find S_6 (sum of 6 terms).

71

SEQUENCES & SERIES

HARD

A sequence is defined by $a_1 = 2$, $a_n = a_{n-1} + n$. What is a_4 ?

72

SEQUENCES & SERIES

HARD

For what value of r does the infinite geometric series with $a_1 = 5$ have sum = 20?

73

CONIC SECTIONS

EASY

What shape is described by $x^2 + y^2 = 25$?

74

CONIC SECTIONS

EASY

The center and radius of $(x-2)^2 + (y+3)^2 = 16$?

75

CONIC SECTIONS

EASY

The vertex of parabola $x^2 = 8y$ is at:

76

CONIC SECTIONS

MEDIUM

Identify: $x^2/9 + y^2/4 = 1$

77

CONIC SECTIONS

MEDIUM

For ellipse $x^2/25 + y^2/9 = 1$, the foci are at:

78

CONIC SECTIONS

MEDIUM

Identify: $x^2/4 - y^2/9 = 1$

79

CONIC SECTIONS

MEDIUM

Write the equation of a circle centered at $(3, -1)$ with radius 5.

80

CONIC SECTIONS

HARD

Convert to standard form: $x^2 + y^2 + 6x - 4y - 12 = 0$

81

CONIC SECTIONS

HARD

The asymptotes of $x^2/4 - y^2/9 = 1$ are:

82

CONIC SECTIONS

HARD

A parabola has vertex (2, 1) and focus (2, 3). Its equation is:

UNIT 9 — TRIGONOMETRY

83

TRIGONOMETRY

EASY

What is $\sin(30^\circ)$?

84

TRIGONOMETRY

EASY

What is $\cos(60^\circ)$?

85

TRIGONOMETRY

EASY

Convert 180° to radians.

86

TRIGONOMETRY

MEDIUM

What is $\tan(45^\circ)$?

87

TRIGONOMETRY

MEDIUM

What is the period of $y = \sin(2x)$?

88

TRIGONOMETRY

MEDIUM

Which quadrant has $\sin \theta > 0$ and $\cos \theta < 0$?

89

TRIGONOMETRY

MEDIUM

Find $\sin \theta$ if $\cos \theta = 3/5$ and θ is in Quadrant I.

90

TRIGONOMETRY

HARD

Which identity is the Pythagorean identity?

91

TRIGONOMETRY

HARD

Solve for x in $[0, 2\pi)$: $2\sin(x) - 1 = 0$

92

TRIGONOMETRY

HARD

The amplitude of $y = -3\sin(x)$ is:

UNIT 10 — STATISTICS & PROBABILITY

93

STATISTICS & PROBABILITY

EASY

A bag has 4 red and 6 blue marbles. $P(\text{red}) = ?$

94

STATISTICS & PROBABILITY

EASY

What is the mean of: 2, 4, 6, 8, 10?

95

STATISTICS & PROBABILITY

MEDIUM

How many ways can 5 students be arranged in a line?

96

STATISTICS & PROBABILITY

MEDIUM

How many ways can 3 students be chosen from 7 for a committee?

97

STATISTICS & PROBABILITY

MEDIUM

Two fair coins are flipped. $P(\text{both heads}) = ?$

98

STATISTICS & PROBABILITY

MEDIUM

Find the standard deviation concept: it measures...

99

STATISTICS & PROBABILITY

HARD

A die is rolled twice. $P(\text{sum} = 7) = ?$

100

STATISTICS & PROBABILITY

HARD

The median of 3, 7, 9, 12, 15, 20 is:

Answer Key

1. B	2. B	3. B	4. B	5. A
6. B	7. B	8. B	9. A	10. A
11. A	12. A	13. A	14. B	15. A
16. A	17. A	18. A	19. A	20. A
21. A	22. A	23. C	24. A	25. A
26. A	27. A	28. A	29. A	30. C
31. A	32. A	33. A	34. A	35. A
36. A	37. A	38. A	39. A	40. A
41. A	42. A	43. A	44. A	45. A
46. A	47. A	48. A	49. B	50. A
51. B	52. B	53. A	54. B	55. A
56. A	57. C	58. A	59. B	60. A
61. A	62. A	63. A	64. A	65. A
66. A	67. A	68. A	69. A	70. A
71. A	72. A	73. A	74. A	75. A
76. A	77. A	78. A	79. A	80. A
81. A	82. A	83. A	84. A	85. A
86. A	87. A	88. A	89. A	90. A
91. A	92. A	93. A	94. A	95. A
96. A	97. A	98. A	99. A	100. A