

College Prep Algebra



**KEEP
CALM
AND
GOOD LUCK
WITH MIDTERMS.**

Midterm Review

College Prep Algebra

Midterm Review – 36 Questions on the Midterm Exam

Section P.2 Integer & Rational Exponents

Write the exponential expression in simplest form.

1. $(x^3y^2)(xy^5)$ 2. $(-2ab^4)(3a^2b^5)$ 3. $(-4x^{-3}y)(7x^5y^{-2})$ 4. $(-6x^4y)(7x^{-3}y^{-5})$

5. $\frac{6a^4}{8a^8}$ 6. $\frac{5x^4y^{-3}}{10x^7}$ 7. $\frac{36a^{-2}b^3}{3ab^4}$ 8. $(-2m^3n^2)(-3mn^2)^2$

9. $(3a^3b^2)^3(-4a^4b^2)$ 10. $(x^{-2}y)^2(xy)^{-2}$ 11. $\left(\frac{3x^2y^3}{6x^4y^4}\right)^2$ 12. $\left(\frac{x^{-3}y^{-4}}{x^{-2}y}\right)^{-2}$

Section P.6 Complex Numbers

Write the complex number in standard form.

13. $\sqrt{-81}$ 14. $\sqrt{-98}$ 15. $\sqrt{16} + \sqrt{-81}$ 16. $6 - \sqrt{-1}$ 17. $8 - \sqrt{-18}$

Simplify and write the complex number in standard form.

18. $(5 + 2i) + (6 - 7i)$ 19. $(-2 - 4i) - (5 - 8i)$ 20. $(5i)(8i)$ 21. $8i - (2 - 8i)$

22. $(4 + 2i)(3 - 4i)$ 23. $(4 - 5i)(4 + 5i)$ 24. $\frac{6+3i}{i}$ 25. $\frac{3+2i}{3-2i}$

Evaluate.

26. i^{15} 27. i^{27} 28. i^{18} 29. i^{40}

Section 1.1 Linear and Absolute Value Equations

Solve each equation.

30. $2x + 10 = 40$

31. $5x + 2 = 2x - 10$

32. $2(x - 3) - 5 = 4(x - 5)$

33. $\frac{2}{3}x - 5 = \frac{1}{2}x - 3$

34. $6 - 2(4x + 1) = 3x - 2(2x + 5)$

35. $\frac{3}{4}x + \frac{1}{2} = \frac{2}{3}$

36. $\frac{40-3x}{5} = \frac{6x+7}{8}$

Solve each absolute value equation.

37. $|2x + 6| = 10$

38. $|2x + 5| = -8$

39. $2|x + 3| + 4 = 34$

40. $\left|\frac{x+3}{4}\right| = 6$

Section 1.3 Quadratic Equations

Solve the quadratic equation using any method.

41. $x^2 + 4x - 21 = 0$

42. $2x^2 - 11x = -12$

43. $x^2 + 6x + 13 = 0$

44. $(x - 4)^2 + 25 = 0$

Section 1.4 Other Types of Equations

Solve the rational equation. Be sure to check your solution(s).

45. $\frac{5}{x+4} - 2 = \frac{7x+18}{x+4}$

46. $2 + \frac{9}{x-3} = \frac{3x}{x-3}$

47. $\frac{x}{x+1} - \frac{x+2}{x-1} = \frac{x-12}{x+1}$

48. $\frac{4}{y+2} = \frac{7}{y-4}$

Solve the radical equation. Be sure to check your solution(s).

49. $\sqrt{10 - x} = 4$

50. $\sqrt{9x - 20} = x$

51. $\sqrt{-7x + 2} + x = 2$

52. $\sqrt{-9x - 9} + x = 1$

53. $\sqrt{3x - 5} - \sqrt{x + 2} = 1$

54. $\sqrt{2x - 9} + \sqrt{2x + 6} = 3$

Solve each equation containing a rational exponent on the variable.

55. $x^{\frac{3}{2}} = 27$

56. $x^{\frac{4}{3}} = 81$

57. $3x^{\frac{2}{3}} - 16 = 59$

58. $4x^{\frac{3}{4}} - 31 = 77$

Solve the equation that is in quadratic form.

59. $x^4 - 9x^2 + 14 = 0$

60. $x^4 - 10x^2 + 9 = 0$

61. $x^{\frac{1}{2}} - 3x^{\frac{1}{4}} + 2 = 0$

62. $x^4 + 8x^2 - 9 = 0$

Section 1.5 Inequalities

Solve each inequality. Write the solution set in interval notation and graph the solution set.

63. $3x - 5 > 16$

64. $x + 4 \leq 3x + 16$

65. $-4(3x - 5) < 2(x - 4)$

Solve the compound inequality. Write the solution set in interval notation and graph the solution set.

66. $4x + 1 > -2$ and $4x + 1 \leq 17$

67. $x + 2 < -1$ or $x + 3 \geq 2$

68. $0 \leq 2x + 6 \leq 54$

Solve each absolute value inequality. Use interval notation to express the solution set.

69. $|3x - 10| < 14$

70. $|2x - 5| \geq 1$

71. $|x - 7| \geq 0$

72. $|2x - 7| < 7$

Use the critical value method to solve each polynomial inequality. Use interval notation to write each solution set.

73. $x^2 + 7x > 0$

74. $x^2 + 5x + 6 < 0$

75. $x^3 - x^2 - 16x + 16 \leq 0$

76. $x^2 - 3x \geq 28$

Use the critical value method to solve each polynomial inequality. Use interval notation to write each solution set.

77. $\frac{x+4}{x-1} < 0$

78. $\frac{x-4}{x+6} \leq 1$

79. $\frac{x^2-6x+9}{x-5} \leq 0$

80. $\frac{3x+1}{x-2} \geq 4$

Section 2.2 Introduction to Functions

Determine whether the equation defines y as a function of x .

81. $x^2 - 2y = 2$

82. $y = \sqrt[3]{x}$

83. $y^2 = 2x + 3$

84. $y = \frac{2}{x+6}$

Evaluate each function.

85. Given $f(x) = 2x^2 + 3$, find $f(4)$, $f(-6)$, and $f(0)$. 86. Given $f(x) = \frac{x}{x+4}$, find $f(-2)$, $f(3)$, and $f(10)$.

Determine the domain of each function.

87. $f(x) = \sqrt{6+x}$

88. $f(x) = x^2 + 3x + 15$

89. $f(x) = \frac{6}{x-10}$

90. $f(x) = \frac{1}{\sqrt{7-x}}$

Find the value(s) of a in the domain of f for which $f(a)$ equals the given number.

91. $f(x) = x^2 + 2x - 2, f(a) = 46$

92. $f(x) = 5x + 8, f(a) = 33$

Find the zero(s) of the function.

93. $f(x) = 6 + 2x$

94. $f(x) = 8 - 6x$

95. $f(x) = x^2 + 4x - 21$

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

Section 2.3 Linear Functions

Write the equation of the line in slope-intercept form for the given situation.

97. Through $(-3,2)$, slope 4

98. Through $(0,4)$, slope 0

99. Through $(-5,6)$ and $(-3,-4)$

Write the equation of a line in slope-intercept form for the given situation.

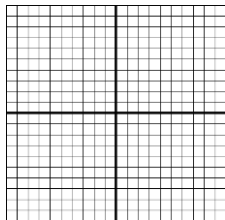
100. The graph is parallel to the graph of $y = -\frac{3}{4}x + 3$ and passes through the point whose coordinates are $(-4,2)$.

101. The graph is perpendicular to the graph of $3x + 4y = 12$ and passes through the point whose coordinates are $(-6,0)$.

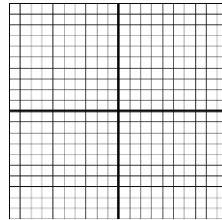
2.4 Quadratic Functions

Write the quadratic function in vertex form. Graph the quadratic and then state the axis of symmetry of the graph.

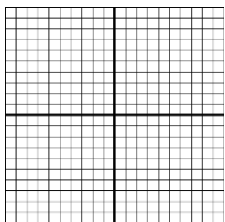
102. $f(x) = -x^2 + 6x + 1$



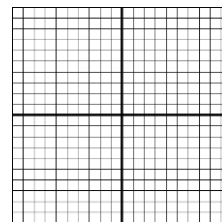
103. $f(x) = 2x^2 - 3x + 7$



104. $f(x) = x^2 - 6x$



105. $f(x) = -2x^2 - 4x + 5$



Find the minimum or maximum of the quadratic function. State whether the value is a minimum or maximum.

106. $f(x) = -x^2 + 6x + 2$

107. $h(x) = x^2 - 2x - 1$

108. $f(x) = -\frac{1}{2}x^2 + 6x + 17$

Section 2.5 Properties of Graphs

Determine whether the given function is an even function, odd function, or neither.

111. $f(x) = x^7 + x^3$

112. $f(x) = x^2 - 7$

113. $f(x) = x^2 + 4x - 13$

114. $f(x) = x^4 + x^2 + 5$

115. Let f be a function such that $f(-3) = -1$, $f(1) = -3$, $f(4) = 2$. Give the coordinates of three points on the graph of:

a. $y = f(x + 4)$

b. $y = f(x) - 6$

c. $y = f(x - 1) + 4$

d. $y = -f(x)$

e. $y = f(-x) + 2$

Section 2.6 Functions and Graphs

116. If $f(x) = \sqrt{x + 5}$ and $g(x) = 2x + 8$, find the domain for each situation.

- a. $(f + g)(x)$ b. $(f - g)(x)$ c. $(fg)(x)$ d. $\left(\frac{f}{g}\right)(x)$

117. If $f(x) = x + 7$ and $g(x) = \sqrt{6 - x}$, find the domain for each situation.

- a. $(f + g)(x)$ b. $(f - g)(x)$ c. $(fg)(x)$ d. $\left(\frac{f}{g}\right)(x)$

Evaluate the indicate function, where $f(x) = x^2 + 2$ and $g(x) = 2x + 12$.

118. $(f + g)(5)$ 119. $(f + g)\left(\frac{1}{2}\right)$ 120. $(f - g)(-3)$ 121. $(f - g)(-1)$

Evaluate the indicate function, where $f(x) = 2x^2 - 5x$ and $g(x) = x + 13$.

122. $(fg)(7)$ 123. $\left(\frac{f}{g}\right)(-4)$ 124. $\left(\frac{f}{g}\right)(11)$ 125. $(fg)(-3)$

126. If $f(x) = 3x + 5$ and $g(x) = x^2$, find $(f \circ g)(x)$ **and** $(g \circ f)(x)$.

127. If $f(x) = 2x - 7$ and $g(x) = x^2 + x - 10$, find $(f \circ g)(x)$ **and** $(g \circ f)(x)$.

Evaluate each composition function, where $f(x) = 2x - 3$, $g(x) = x^2 - 5x$, and $h(x) = 4 - 3x^2$.

128. $(g \circ f)(-5)$ 129. $(f \circ g)(14)$ 130. $(g \circ h)(-1)$ 131. $(f \circ f)(0)$ 132. $(g \circ f)(5c)$