GT& PAP

Pre-Calculus

Summer Assignment 2018-2019

PRE-CAL SUMMER ASSIGNMENT.

Pre-Calculus Prerequisite Skills Review: Due the first 2 days of school at the beginning of class. There will be 10 points deducted per block late. (This is part of your first test grade – make sure you do it well. Do your work on a separate sheet of paper and make sure you **SHOW ALL WORK** to receive credit. Work must be neat and easy to read!!! You must do any graphs on graph paper.

Why are we doing this?

- These are the skills needed for a successful year in Pre Cal.
- It will help you know what to work on.
- In the past, these topics have caused trouble for students after the long, fun, and exciting summer.
- These problems help address area where we see some of the most common mistakes in algebra.

In exercises 1 – 4, (a) plot the points, (b) find the distance between the points, and (c) find the midpoint of the line segment joining the points.

1. (-3, 8), (1, 5)
2. (-2, 6), (4, -3)
3. (5.6, 0) (0, 8.2)
4. (0, -12), (-3.6, 0)

In exercises 5, the polygon is shifted to a new position in the plane. Find the coordinates of the vertices of the polygon in its new position.

5. Original coordinates of the vertices: (4, 8), (6, 8), (4, 3), (6, 3)
   Shifted: three units downward, two units to the left

In exercises 6 – 9, find the x- and y-intercepts of the graph of the equation.

6. $y = 2x + 7$
7. $y = |x + 1| - 3$
8. $y = (x - 3)^2 - 4$
9. $y = x\sqrt{4 - x^2}$

In exercises 10 – 13, find the slope and y-intercept (if possible) of the equation of the line. Sketch the line.

10. $y = 6$
11. $x = -3$
12. $y = 3x + 13$
13. $y = -10x + 9$

In exercises 14 – 17, find the slope of the line passing through the pair of points.

14. (3, -4), (-7, 1)

15. (-1,8), (6, 5)

16. (-4.5, 6), (2.1, 3)

17. (2, -3), (8, 2)

In exercises 18 – 21, find the slope-intercept form of the equation of the line that passes through the given point and has the indicated slope. Sketch the line.

	Point	*Slope*
18.	(0, -5)	$m = \frac{3}{2}$
19.	(-2, 6)	$m = 0$
20.	(10, -3)	$m = -\frac{1}{2}$
21.	(-8, 5)	m is undefined

In exercises 22 – 25, find the slope-intercept form of the equation of the line passing through the points.

22. (0, 0), (0, 10)

23. (2, 5), (-2, -1)

24. (-1, 4), (2, 0)

25. (11, -2), (6, -1)

In exercises 26-29, write the equation of the line described. State your answer in the form specified.

26. passes through the point (-2,3) and is perpendicular to the line $3x + 4y = -7$; point-slope form

27. slope is undefined and passes through the point (4, -5); slope-intercept form

28. x-intercept is 5 and y-intercept is 3; standard form

29. Two values of a linear function $f(x)$ are $f(4) = 2$ and $f(-5) = -1$. Find the equation of $f(x)$.

In exercises 30 and 31, evaluate the function at each specified value of the independent variable and simplify.

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

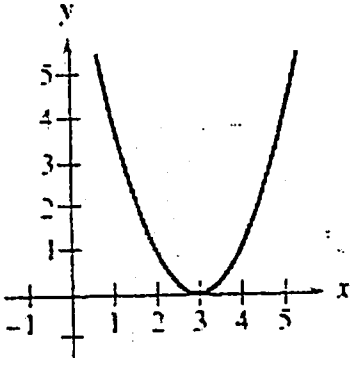
(a) $f(2)$ (b) $f(-4)$ (c) $f(t^2)$ (d) $f(t+1)$

31. $h(x) = \begin{cases} 2x+1, & x \le -1 \\ x^2+2, & x > -1 \end{cases}$

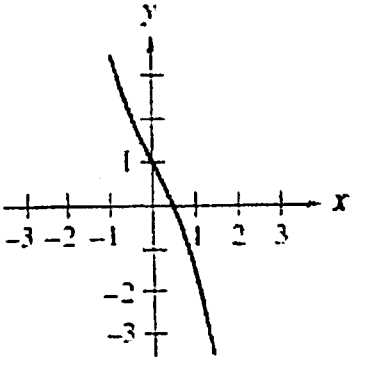
(a) $h(-2)$ (b) $h(-1)$ (c) $h(0)$ (d) $h(2)$

In exercises 32 – 35, use the Vertical Line Test to determine whether y is a function of x.

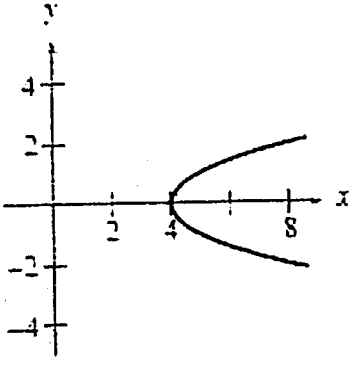
$y = (x-3)^2$



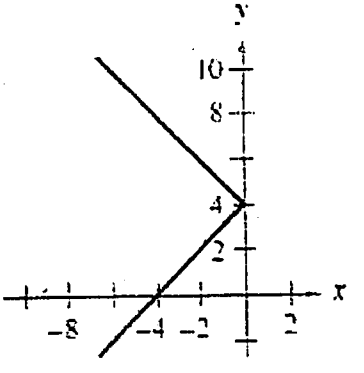
$y = -\frac{3}{5}x^3 - 2x + 1$



$x - 4 = y^2$



$x = -|4 - y|$



In exercises 36 - 45, solve the function algebraically.

36. $f(x) = 3x^2 - 16x + 21$

37. $f(x) = 5x^2 + 4x - 1$

38. $\frac{3}{2}(x+5) - \frac{1}{4}(z+24) = 0$

39. $(x-3)^2 + 9 = 2523.\ x^{\frac{4}{3}} = 81$

40. $\log_5 x = 2$

41. $5^{2x} = \frac{1}{125}$

42. $x^3 - 2x^2 - 5x + 6 = 0$

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

44. $\sqrt{x} + 1 = 41$

45. $|2x - 1| = 5$

In exercises 46 – 49, completely factor the difference of two squares.

46. $x^2 - 81$

47. $32y^2 - 18$

48. $16x^2 - \frac{1}{9}$

49. $(x-1)^2 - 4$

In exercises 50 – 55, factor the perfect square trinomial.

50. $x^2 - 4x + 4$

51. $4t^2 + 4t + 1$

52. $25y^2 - 10y + 1$

53. $9u^2 + 24uv + 16v^2$

54. $x^2 - \frac{4}{3}x + \frac{4}{9}$

55. $(x+2)^2 + 10(x+2) + 25$

In exercises 56 – 59, factor the sum or difference of cubes.

56. $x^3 - 27$

57. $z^3 + 125$

58. $27x^3 + 8$

59. $64x^3 - y^3$

In exercises 60 - 65, factor the trinomial.

60. $x^2 + x - 2$

61. $s^2 - 5s + 6$

62. $20 - y - y^2$

63. $3x^2 - 5x + 2$

64. $5x^2 + 26x + 5$

65. $-9z^2 + 3z + 2$

In exercises 66 - 69, factor by grouping.

66. $2x^3 - x^2 - 6x + 3$

67. $6 + 2x - 3x^3 - x^4$

68. $6x^3 - 2x + 3x^2 - 1$

69. $8x^5 - 6x^2 + 12x^3 - 9$

In exercises 70 - 73, factor the trinomial by grouping.

70. $3x^2 + 10x + 8$

71. $6x^2 + x - 2$

72. $15x^2 - 11x + 2$

73. $6x^2 - x - 15$

Helpful factoring hints!

Factoring Special Polynomial Forms

Factored Form	*Example*
Difference of Two Squares	
$u^2 - v^2 = (u + v)(u - v)$	$9x^2 - 4 = (3x)^2 - 2^2 = (3x + 2)(3x - 2)$
Perfect Square Trinomial	
$u^2 + 2uv + v^2 = (u + v)^2$	$x^2 + 6x + 9 = x^2 + 2(x)(3) + 3^2 = (x + 3)^2$
$u^2 - 2uv + v^2 = (u - v)^2$	$x^2 - 6x + 9 = x^2 - 2(x)(3) + 3^2 = (x - 3)^2$
Sum or Difference of Two Cubes	
$u^3 + v^3 = (u + v)(u^2 - uv + v^2)$	$x^3 + 8 = x^3 + 2^3 = (x + 2)(x^2 - 2x + 4)$
$u^3 - v^3 = (u - v)(u^2 + uv + v^2)$	$27x^3 - 1 = (3x)^3 - 1^3 = (3x - 1)(9x^2 + 3x + 1)$

Guidelines for Factoring Polynomials

1. Factor out any common factors using the Distributive Property.
2. Factor according to one of the special polynomial forms.
3. Factor as $ax^2 + bx + c = (mx + r)(nx + s)$.
4. Factor by grouping.

For 74 – 81, use $f(x) = x^3 + 1$, $g(x) = x^2 - 2$, $h(x) = x + 3$

74. $h(2 + a)$

75. $h(f(x))$

76. $g(x) + h(x)$

77. $f(g(2))$

78. $f(x + h) - f(x)$

78. $h^{-1}(x)$

80. $f(x) \cdot g(x)$

81. $g(h(x))$

State the domain of each function.

82. $f(x) = \dfrac{1}{x^2 - 4}$

83. $f(x) = \dfrac{x - 4}{\sqrt{x + 3}}$

84. $f(x) = \sqrt{x - 6}$

85. $f(x) = \log(x - 3)$

Applications of Systems of Equations

86. A 20 m ladder and a 15m ladder were leaned against a building. The bottom of the longer ladder was 7 m farther from the building that the bottom of the shorter ladder, but both ladders reached the same distance up the building. Find the distance.

87. Four squares, each with sides 4 cm long, are cut from the corners of a rectangular piece of cardboard having area 560 sq cm. The flaps are then bent up to form an open-topped box having volume 960 cu cm. Find the dimensions of the original piece of cardboard.