GT/Pre-AP Pre-Calculus - Summer Assignment

A. Write the equation of line with the given information:

1. Point-Slope Form: through the point (2, -1) with slope $-\dfrac{2}{3}$.

2. General Form: through the points f(-5) = 4 and f(2) = -5

3. General Form: line through (2, -3) and parallel to $2x + 5y = 3$ in general form.

4. Slope-Intercept Form: through the points $f(2) = -3$, $f(8) = 2$.

5. Slope-Intercept Form: through $f(10) = -3$ and has $m = -\dfrac{1}{2}$

6. General Form: through (2, -3) and perpendicular to $3x - 4y = 7$

B. Division

7. Find the quotient and the remainder by using long division:

a) $\dfrac{x^3 - 4x^2 + 2x + 5}{x - 2}$

b) $\dfrac{2x^3 + 7x^2 - 4x + 7}{x^2 + 2x - 1}$

8. Find the quotient and the remainder by using synthetic division:

a) $(x^3 - x^2 + 5) \div (x + 2)$

b) $(x^5 + 8x^4 + 17x^3 + 12x^2 + 12x + 13) \div (x + 5)$

C. Factoring

9. $15x^3 + 9x^2$

10. $7m^2 + 6m - 1$

11. $3k^2 - 10k + 7$

12. $14u^2 + 35u^4$

13. $3x^2 + 9x + 4x + 12$

14. $5x^2 - 14x + 8$

15. $6 + 2x - 3x^3 - x^4$

16. $2x^2 - 3x - 5$

17. $8x^5 - 6x^2 + 12x^3 - 9$

18. $15x^2 - 11x + 2$

19. $3x^2 - 5x + 2$

20. $2x^3 - x^2 - 6x + 3$

21. $32y^2 - 18$

D. Equations and Inequalities

Solve the following equations.

22. $\dfrac{x-2}{3} + \dfrac{x+5}{2} = \dfrac{1}{3}$

23. $2(5 - 2y) - 3(1 - y) = y + 1$

24. $\dfrac{5}{2}x + \dfrac{2}{3}x = 1$

25. $6|5p + 4| - 16 = 20$

26. $\dfrac{9}{x+5} - \dfrac{7}{x-5} = \dfrac{14}{(x-5)(x+5)}$

Solve the following inequalities and write answers in interval notation.

27. $12 \le 5x - 3 \le 32$

28. $-5z + 4 > -3z + 11$

29. $\dfrac{3x-5}{4} \le -1$

30. $|x + 2| + 9 < 13$

E. Quadratic Methods

Solve by factoring

31. $9x = 10x^2$

32. $8x^2 + 2x = 1$

33. $x(x - 5) = 36$

34. $(x - 6)(x - 8) = 24$

35. $\dfrac{x-4}{x} = \dfrac{15}{x+4}$

Solve using the square root method. Make sure to simplify radicals, no decimals.

36. $3x^2 + 2 = 0$

37. $(x + 5)^2 + 12 = 0$

38. $5(4x - 3)^2 = 30$

39. $\dfrac{(y+4)^2}{2} = 18$

Solve by completing the square. Make sure to simplify radicals, no decimals.

40. $x^2 + 8x = -10$

41. $x^2 - 5x + \dfrac{41}{4} = 0$

42. $2x^2 + 16x + 39 = 0$

Solve using the Quadratic Formula. Make sure to simplify radicals, no decimals.

43. $3x^2 = 2 - 9x$

44. $5x^2 - 2x = -4$

45. $12x^2 = x + 6$

F. Add, Subtract, Multiply and Divide Fractions

46. $\dfrac{6}{x} + 5$

47. $\dfrac{x}{x+5} + \dfrac{7x}{x^2-25}$

48. $\dfrac{5x}{x-5} - \dfrac{x+5}{x+2}$

49. $\dfrac{\frac{x}{5}}{\frac{3}{}}$

50. $\dfrac{2x^2 + 5x - 3}{6x^2 - 5x + 1}$

51. $\dfrac{1 - \frac{1}{3}}{\frac{1}{2} - \frac{1}{6}}$

G. Complex Numbers

Write the expression in the standard form $a + bi$

52. $(-2 + 3i) - (-5 - 7i)$

53. $5i(4 + 5i)$

54. $(5 + 6i)(-4 + 7i)$

55. $\dfrac{6}{5-i}$

H. Simplifying Radicals

56. $\sqrt{48x^2 y^8}$

57. $3\sqrt{24} + 8\sqrt{54}$

58. $2\sqrt{-8} - 5\sqrt{27} + 5\sqrt{-18} + 7\sqrt{12}$

59. $\dfrac{8}{6 + \sqrt{7}}$

60. $\dfrac{\sqrt{2}}{\sqrt{7}}$

I. Composite Functions

For 61 – 67, use $f(x) = x^3 + 1$, $g(x) = x^2 - 2$, $h(x) = x + 3$

61. $h(2 + a)$

62. $h(f(x))$

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

64. $f(g(2))$

65. $h(h(x))$

66. $f(x) \bullet g(x)$

67. $g(h(x))$

J. Domain

State the domain of each function in interval notation. (Hint: find the restrictions first)

68. $f(x) = \sqrt{3x + 2}$

69. $f(x) = \dfrac{x}{\sqrt{x-4}}$

70. $g(x) = \sqrt{-2x + 5}$
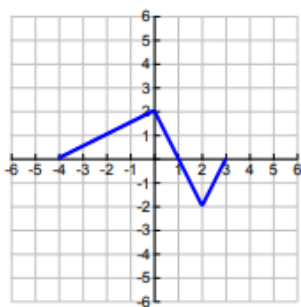
71. $f(x) = \dfrac{3x-6}{x^2-25}$

72. $f(x) = x^2 + 3x - 4$
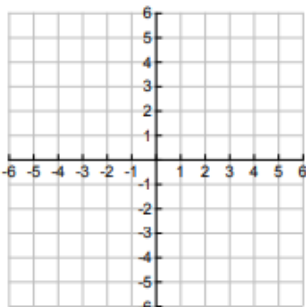
73. $f(x) = \dfrac{1}{x^2 - 4}$

K. Transformations

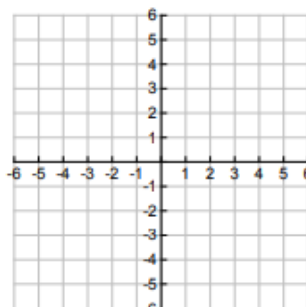Use the graph of $y = f(x)$ to sketch the following transformations.

$y = f(x)$

74. $y = 2f(x)$

75. $y = f(x - 1)$

76. $y - 2f(x - 2) + 1$