Algebra 2/Trig Honors First Semester Review **Ch. 1-3, 5, 10, 6, 7**

Chapter 1

1. Solve for x: $\frac{1}{3}(x-6)=\frac{-2}{5}x+\frac{14}{5}$

2. Solve for a: $S=\frac{n}{2}[2a+(n-1)d]$

3. Solve for x: $-4<2(3-x)$ *or* $8(x-5)\geq 8$

4. Solve for x: $|2x-6|=50$

5. Solve for x and graph the solution:
$-4<\frac{3x+2}{-4}<\frac{-1}{2}$

6. Solve for x and graph the solution:
$12-2|2-3x|>8$

7. Solve for x and graph the solution:
$2+|2x-1|\geq 14-3|2x-1|$

8. Solve for x and graph the solution:
$1\leq|2x-1|\leq 9$

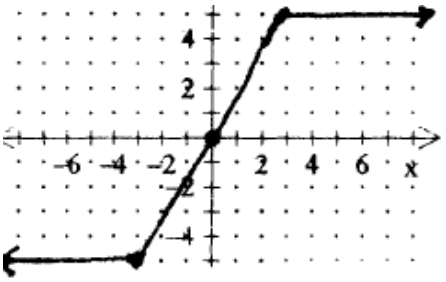
9. Always, sometimes, or never true?
If $a>b$, $a\neq 0$, and $b\neq 0$, then $\frac{1}{a}>\frac{1}{b}$.

Chapter 2

10. If $f(x)=6x^3+2x^2+5x$, find $f\left(\frac{-2}{a}\right)$.
Express the answer as a single simplified fraction.

11. Determine the domain of the relation
$\{(x,y):|y|=4-x\}$.

12. Determine the domain and range of the relation graphed below. Is the relation a function?



13. Find k so that a line through $(k,|3k|)$ and $(k-1,k+2)$ will have a slope of 2.

14. Determine the slope, x-intercept, and y-intercept of the line $\frac{x-3}{2}+\frac{y+2}{3}=1$.

15. Write the equation for a line, in slope-intercept form, that passes through (5, -1) and is perpendicular to the line $4x-6y=9$.

16. Write the equation for a line, in standard form, that passes through $\left(\frac{1}{4},\frac{-1}{2}\right)$ and (-2, 1).

17. Given: $f(x)=\begin{cases}-x^2+3x, & \text{if } x<2\\ -4x-5, & \text{if } x\geq 2\end{cases}$.
Find $f(-10)$.

Chapter 3

18. Solve for x and y: $\frac{5x}{4}+y=\frac{11}{2}$
$x+\frac{y}{3}=3$

19. Solve for x and y: $\frac{6}{x}+\frac{3}{y}=2$
$\frac{2}{x}-\frac{9}{y}=4$

20. Find a, b, and c so that the graph of $y=ax^2+bx+c$ contains the points (2, 1), (-3, 31), and (4, 17).

21. Tickets to a school play cost \$5 for students and \$7 for non-students. On opening night, 800 tickets were sold and \$4650 was collected. How many tickets were sold to students and non-students?

Chapter 5

22. Factor completely: $5x^3 - 405x$

23. Factor completely:
$16x^3y - 88x^2y^2 + 121xy^3$

24. Factor completely: $3x^{4n} + 3x^{2n} - 6$

25. Factor completely: $x^2 + 14x + 49 - 400y^2$

26. Solve for x: $30x^3 - 38x^2 = 20x$

27. Solve for x: $3(5x-2)^2 + 5 = 194$

28. Solve for x: $-x^2 - 41 = 2x^2 - 5$

29. Solve for x: $(1+2x^2)^2 + 6(1+2x^2) - 7 = 0$

30. Simplify: $\sqrt{6} \cdot \sqrt{18}$

31. Simplify: $\sqrt{\frac{7}{40}}$

32. If $A = 4 + 3i$ and $B = -2 + 6i$, find

(a) $A - B$ (b) AB (c) B^2 (d) $\frac{A}{B}$ (e) $|A|$

33. Find the zeros of $y = -4x^2 - 24x$.

34. Solve by completing the square:
$5x^2 + 6x - 15 = 0$.

35. Solve using quadratic formula:
$\sqrt{3}\,x^2 + 2x - 2\sqrt{3} = 0$.

36. Use the discriminant to determine the number and type of solutions, without solving.

(a) $7x^2 - 2\sqrt{14}\,x + 2 = 0$ (b) $3x^2 = 8x - 5$

(c) $5x^2 + 3x + 10 = 0$

37. Rewrite the equation of the parabola $y = -2x^2 + 12x - 23$ in vertex form. Find the vertex and the maximum or minimum value.

38. Solve for x and graph the solution:
$3x^2 + 16x < 35$.

Chapter 10

39. Find the distance between the points (-4, 2) and (3, 10). Find the midpoint of the segment connecting those points.

40. Write the equation of a circle with center (-8, 0) and radius 5.

41. Write the equation of an ellipse with center at (0, 0), vertex (4, 0), and co-vertex (0, 2).

42. Write the equation of a parabola in vertex form:
a) with directrix $y = 5$ and focus (-4, -1)
b) with focus (3, 2) and vertex (-2, 2)

43. Write the equation of an ellipse with foci (9, -2) and (-3, -2) and major axis length 18.

44. Write the equation of a hyperbola with vertices (5, 4) and (5, -4) and foci (5, 6) and (5 , -6).

45. Find the eccentricity of each of the following:

a) $y = x^2$ b) $4x^2 + 4y^2 = 36$

c) $\frac{x^2}{36} - \frac{y^2}{64} = 1$ d) $\frac{x^2}{49} + \frac{y^2}{40} = 1$

46. Identify the conic, rewrite in standard form, and find the center.

a) $9x^2 + 25y^2 + 36x - 150y + 36 = 0$

b) $x^2 + y^2 - 12x + 4y + 31 = 0$

47. Solve each system:

a) $\begin{aligned} 5x^2 + 3y^2 &= 17 \\ -x + y &= -1 \end{aligned}$ b) $\begin{aligned} 3x^2 + 2y^2 &= 17 \\ 4x^2 + 3y^2 &= 24 \end{aligned}$

Chapter 6

48. Simplify: $\left(\frac{2x^{-1}}{y^4}\right)^3 \left(4xy^{-3}\right)^{-2}$

49. Simplify, if $n > 1$: $\frac{\left(x^{n-1}\right)\left(y^{n}\right)^3}{\left(x^{n+1}\right)^2\left(y^{n+1}\right)}$

50. Simplify: $2x^n\left(3x^{n+2}-8x^{3n-2}\right)$

51. Simplify:
$\left(6x^3+3x^2-5x-1\right)-3\left(7x^3+3x-6\right)$

52. Simplify: $2x\left(9x^n+5\right)\left(9x^n-5\right)$

53. Simplify: $\left(3x-1\right)^3$

54. Factor completely: $125x^6-27y^3$

55. Factor completely: $512x^{16}-2$

56. Factor by completing the square: $4x^4+81$

57. Solve for x over the complex numbers:
$3x^3=24$

58. Solve for x over the real numbers:
$3x^5-30x^3=-48x$

59. Solve for x over the real numbers:
$15x^3+10x^2-105x-70=0$

60. Use polynomial long division to find the quotient:
$\left(4x^5-8x^3+4x^2+3x-5\right)\div\left(2x^2-1\right)$

61. Use synthetic division to find the quotient:
$\left(4x^4+5x^3-2x-5\right)\div\left(x+2\right)$

62. Write a polynomial function, $f(x)$, if $\frac{-1}{2}$, $\sqrt{3}$, and $2i$ are zeros of the function.

63. If $\frac{-1}{2}$ and -2 are zeros of $f(x)=8x^4+36x^3+64x^2+56x+16$, find the other zeros.

Chapter 7

64. Simplify: $-\left(\frac{27}{8}\right)^{-4/3}$

65. Simplify to a single power of 5:
$\left(5^{1/4}\cdot 5^{2/3}\right)^2$

66. Simplify: $\sqrt[4]{288n^9y^8}$. Assume all variables are positive.

67. Simplify: $\frac{\sqrt[6]{32}\cdot\sqrt[4]{8}}{\sqrt[3]{16}}$

68. Simplify: $\sqrt[3]{\frac{40}{9y}}$

69. Simplify to a single power of x: $\frac{x^{1/3}\cdot x^{1/4}}{x^{-2/5}}$

70. Simplify: $\sqrt{5a^2-20a+20}$. Assume that the radical is defined.

71. If $f(x)=6x^2-24$ and $g(x)=x-2$, perform the indicated operations and state the domain.

a) $f(x)-g(x)$ b) $\frac{f(x)}{g(x)}$ c) $f(g(x))$

72. Find the inverse of the function
$f(x)=8x^3-27$.

73. Solve for x: $2\left(x-4\right)^4+7=97$

74. Solve for x: $3\left(2x-1\right)^{2/3}=75$

75. Solve for x: $\sqrt[3]{3x^2-8}+5=9$.

76. Solve for x: $\sqrt{7-x}+\sqrt{x-6}=1$

77. Find the (a) mean (b) median (c) mode (d) range and (e) standard deviation for the data set 52, 56, 57, 58, 58, 73, 55, 58, 57, 58. Round answers to the nearest tenth.