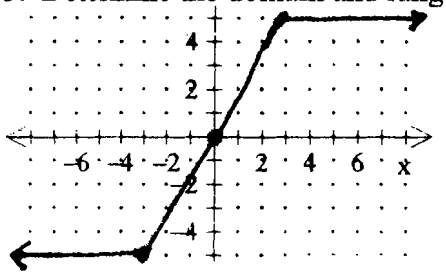
Algebra 2 Honors First Semester Review: Chapters 1-7

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* $\frac{1}{a}>\frac{1}{b}$.
10. For which operations is the set of positive integers closed?

Chapter 2

11. If $f(x)=6x^3+2x^2+5x$, find $f\left(\frac{-2}{a}\right)$. Express the answer as a single fraction.
12. Determine the domain of the relation $\{(x,y):|y|=4-x\}$.
13. Determine the domain and range of the relation graphed below. Is the relation a function?



14. Find k so that a line through $(k,|3k|)$ and $(k-1,k+2)$ will have a slope of 2.
15. Determine the slope, x-intercept, and y-intercept of the line $\frac{x-3}{2}+\frac{y+2}{3}=1$.
16. Write the equation for a line, in slope-intercept form, that passes through (5, -1) and is perpendicular to the line $4x-6y=9$.
17. Write the equation for a line, in standard form, that passes through $\left(\frac{1}{4},\frac{-1}{2}\right)$ and (-2, 1).

18. 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

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

20. Solve for x and y: $\frac{6}{x}+\frac{3}{y}=2$, $\frac{2}{x}-\frac{9}{y}=4$. (hint: let $a=\frac{1}{x}$ and $b=\frac{1}{y}$)

21. 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).

22. Tickets for the school play cost \$3 for students and \$5 for non-students. On opening night, 937 tickets were sold and \$3943 was collected. How many tickets were sold to students and non-students?

Chapter 4

23. Simplify: $3\left(\begin{bmatrix}1&0\\2&1\end{bmatrix}+\begin{bmatrix}4&2\\0&3\end{bmatrix}\right)-\begin{bmatrix}1&1\\-3&2\end{bmatrix}$

24. Simplify: $\begin{bmatrix}10&4&6\\5&6&8\\-2&7&-1\end{bmatrix}\begin{bmatrix}3&5\\0&-4\\-1&0\end{bmatrix}$

25. Evaluate the determinant: $\begin{vmatrix}12&15&3\\0&-24&1\\-30&-12&0\end{vmatrix}$

26. Solve the system $3x-2y=-12$, $5x+6y=19$ using Cramer's Rule.

27. Find the inverse of the matrix: $\begin{bmatrix}-3&6\\1&2\end{bmatrix}$.

28. Solve for matrix X: $\begin{bmatrix} 7 & 6 \\ 6 & 5 \end{bmatrix} X = \begin{bmatrix} 1 & 0 & -2 \\ 3 & 1 & 4 \end{bmatrix}$.

29. Write a matrix equation and use an inverse matrix to solve the system $\begin{aligned} 5x - 3y &= 21 \\ 2x + 7y &= -8 \end{aligned}$.

Chapter 5

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

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

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

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

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

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

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

37. Solve for x: $\left(1+2x^2\right)^2 + 6\left(1+2x^2\right) - 7 = 0$.

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

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

40. If $A = 4+3i$ and $B = -2+6i$, find (a) $A-B$ (b) AB (c) B^2 (d) $\frac{A}{B}$ (e) $|A|$

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

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

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

44. Use the discriminant to determine the number and type of solutions, without solving.
    (a) $7x^2 - 2\sqrt{14x} + 2 = 0$ (b) $3x^2 = 8x - 5$ (c) $5x^2 + 3x + 10 = 0$

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

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

Chapter 6

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

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

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

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

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

52. Simplify: $(3x-1)^3$.

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

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

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

56. Solve: $3x^3=24$.

57. Solve: $3x^5-30x^3=-48x$.

58. Solve: $15x^3+10x^2-105x-70=0$.

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

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

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

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

Chapter 7

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

64. Simplify to a single power of 5: $\left(5^{1/4}\cdot5^{2/3}\right)^2$.

65. Simplify: $\sqrt[4]{288n^9y^8}$.

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

67. Simplify: $\sqrt[3]{\dfrac{40}{9y}}$.

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

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

70. 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) $\dfrac{f(x)}{g(x)}$ (c) $f(g(x))$

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

72. Use the definition of inverse function to verify that $f(x)=\dfrac{1}{3}x^4+2$ and $g(x)=\sqrt[4]{3x-6}$, $x\geq 2$, are inverses of each other.

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

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

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. Draw a box-and-whisker plot of the data.

Answers: 1. $\dfrac{72}{11}$ 2. $\dfrac{S}{n}-\dfrac{(n-1)d}{2}$ 3. $x<5$ or $x\geq 6$ 4. $-22, 28$ 5. $\dfrac{14}{3}>x>0$

6. $\dfrac{4}{3}>x>0$ 7. $x\leq -1$ *or* $x\geq 2$ 8. $-4\leq x\leq 0$ *or* $1\leq x\leq 5$

9. sometimes 10. addition, multiplication 11. $\dfrac{-48+8a-10a^2}{a^3}$ 12. all real numbers ≤ 4

13. D: all real numbers; R: $-5\leq y\leq 5$; yes 14. 2 or -1 15. slope $=\dfrac{-3}{2}$, $\left(\dfrac{11}{3},0\right)$, $\left(0,\dfrac{11}{2}\right)$

16. $y=\frac{-3}{2}x+\frac{13}{2}$ 17. $2x+3y=-1$ 18. -130 19. $(2,3)$ 20. $(2,-3)$

21. $a=2,\ b=-4,\ c=1$ 22. 371 students, 566 non-students 23. $\begin{bmatrix}14 & 5\\ 9 & 10\end{bmatrix}$

24. $\begin{bmatrix}24 & 34\\ 7 & 1\\ -5 & -38\end{bmatrix}$ 25. -2466 26. $\left(\frac{-17}{14},\frac{117}{28}\right)$ 27. $\begin{bmatrix}\frac{-1}{6} & \frac{1}{2}\\ \frac{1}{12} & \frac{1}{4}\end{bmatrix}$ 28. $\begin{bmatrix}13 & 6 & 34\\ -15 & -7 & -40\end{bmatrix}$

29. $(3,-2)$ 30. $5x(x+9)(x-9)$ 31. $xy(4x-11y)^2$ 32. $3\left(x^{2n}+2\right)\left(x^n+1\right)\left(x^n-1\right)$

33. $(x+7+20y)(x+7-20y)$ 34. $0,\frac{-2}{5},\frac{5}{3}$ 35. $\frac{2\pm3\sqrt{7}}{5}$ 36. $\pm2i\sqrt{3}$

37. $\pm2i, 0$ 38. $6\sqrt{3}$ 39. $\frac{\sqrt{70}}{20}$ 40. (a) $6-3i$ (b) $-26+18i$ (c) $-32-24i$

(d) $\frac{1}{4}-\frac{3}{4}i$ (e) 5 41. 0, -6 42. $\frac{-3\pm2\sqrt{21}}{5}$ 43. $\frac{-\sqrt{3}\pm\sqrt{21}}{3}$

44. (a) 1 real double root (b) 2 real rational roots (c) 2 conjugate imaginary roots

45. $y=-2(x-3)^2-5$; vertex (3, -5); maximum value = -5 46. $-7<x<\frac{5}{3}$

47. $\frac{1}{2x^5y^6}$ 48. $\frac{y^{2n-1}}{x^{n+3}}$ 49. $6x^{2n+2}-16x^{4n-2}$ 50. $-15x^3+3x^2-14x+17$

51. $162x^{2n+1}-50x$ 52. $27x^3-27x^2+9x-1$ 53. $\left(5x^2-3y\right)\left(25x^4+15x^2y+9y^2\right)$

54. $2\left(16x^8+1\right)\left(4x^4+1\right)\left(2x^2+1\right)\left(2x^2-1\right)$ 55. $\left(2x^2+6x+9\right)\left(2x^2-6x+9\right)$ 56. $-2,-1\pm i\sqrt{3}$

57. $0,\pm2\sqrt{2},\pm\sqrt{2}$ 58. $\frac{-2}{3},\pm\sqrt{7}$ 59. $2x^3-3x+2-\frac{3}{2x^2-1}$

60. $4x^3-3x^2+6x-14+\frac{23}{x+2}$ 61. $f(x)=2x^5+x^4+2x^3+x^2-24x-12$ 62. $-1\pm i$

63. $\frac{-16}{81}$ 64. $5^{11/6}$ 65. $2n^2y^2\sqrt[4]{18n}$ 66. $\sqrt[4]{2}$ 67. $\frac{2\sqrt[3]{15y^2}}{3y}$ 68. $x^{59/60}$

69. $(a-2)\sqrt{5}$ 70. (a) $6x^2-x-22$, all real numbers (b) $6x+12,\ x\neq2$ (c) $6x^2-24x$, all real numbers 71. $f^{-1}(x)=\frac{\sqrt[3]{x+27}}{2}$ 72. show that $f\left(g(x)\right)=x$ and $g\left(f(x)\right)=x$

73. $4\pm\sqrt[4]{45}$ 74. 63 75. $\pm2\sqrt{6}$ 76. 7, 6 77. (a) 58.2 (b) 57.5 (c) 58 (d) 21 (e) 5.2