Name: Key

Final Review Chapters 4 – 6

Perform the indicated operation (4.1)

1. $\begin{bmatrix} 3 & 6 \\ -4 & -2 \end{bmatrix} + \begin{bmatrix} 1 & -4 \\ 0 & 6 \end{bmatrix}$

$\begin{bmatrix} 4 & 2 \\ -4 & 4 \end{bmatrix}$

2. $\begin{bmatrix} 2 & -3 \\ 3 & 4 \\ 4 & 5 \end{bmatrix} - \begin{bmatrix} 9 & -3 \\ -2 & 5 \\ 0 & 4 \end{bmatrix}$

$\begin{bmatrix} -7 & 0 \\ 5 & -1 \\ 4 & 1 \end{bmatrix}$

3. $2\begin{bmatrix} 4 & 0 \\ 1 & 3 \end{bmatrix} + 3\begin{bmatrix} -1 & -2 \\ 5 & 7 \end{bmatrix}$

$\begin{bmatrix} 5 & -6 \\ 17 & 27 \end{bmatrix}$

4. $\begin{bmatrix} 3 & 9 \end{bmatrix} \begin{bmatrix} 2 \\ 6 \\ -2 \end{bmatrix}$

$\begin{bmatrix} 2 \end{bmatrix}$

Let [A] = $\begin{bmatrix} 0 & 4 \\ -1 & -5 \end{bmatrix}$ [B] = $\begin{bmatrix} 2 & -6 \\ 3 & 1 \end{bmatrix}$ and [C] = $\begin{bmatrix} -1 & 3 \\ 0 & 2 \end{bmatrix}$

5. [A]([B] + [C])

$\begin{bmatrix} 12 & 12 \\ -16 & -12 \end{bmatrix}$

6. 2[A][B]

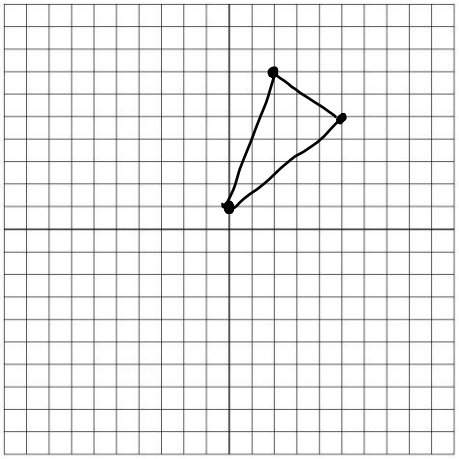
$\begin{bmatrix} 24 & 8 \\ -34 & 2 \end{bmatrix}$

Evaluate the determinant of the matrix (4.3)

7. $\begin{bmatrix} 4 & -3 \\ 7 & 2 \end{bmatrix}$ 29

8. $\begin{bmatrix} 6 & 3 & 1 \\ 1 & 0 & -1 \\ 13 & 9 & 12 \end{bmatrix}$ -12

Find the area of the triangle (4.3)

9.  Area = 11

Use Cramer's rule to solve the linear system (4.3)

10. $3x + y = 3$
$4x + 5y = -7$

$x = 2$
$y = -3$

11. $2x + z = 6$
$3x - 2y + 4z = 13$
$-y - 3z = -15$

$x = 1$

$y = 3$

$z = 4$

Find the inverse of the matrix (4.4)

12. $\begin{bmatrix} 4 & 3 \\ 7 & 6 \end{bmatrix}$ $\begin{bmatrix} 2 & -1 \\ -\frac{7}{3} & \frac{4}{3} \end{bmatrix}$

13. $\begin{bmatrix} 1 & 2 \\ 4 & -8 \end{bmatrix}$ $\begin{bmatrix} \frac{1}{2} & \frac{1}{8} \\ \frac{1}{4} & -\frac{1}{16} \end{bmatrix}$

Use an inverse matrix to solve the linear system (4.5)

14. $2x + 3y = 13$
$x - 5y = 0$

$x = 5$

$y = 1$

15. $-4x - 3y = -2$
$2x + y = 2$

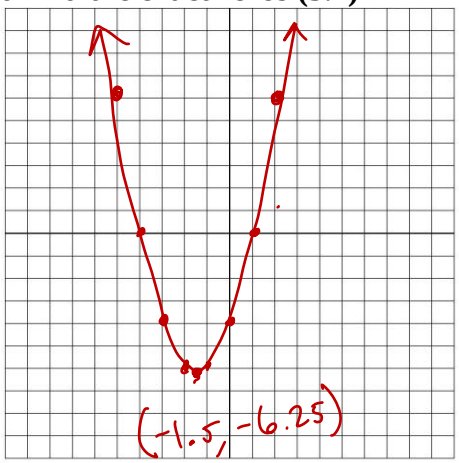
$x = 2$

$y = -2$

Graph the quadratic function. Label the vertex and find the exact zeros (5.1)

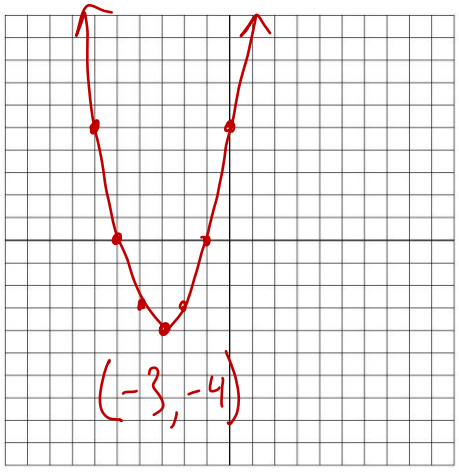
16. $y = x^2 + 3x - 4$

Vertex: $\left(-\frac{3}{2}, -\frac{25}{4}\right)$



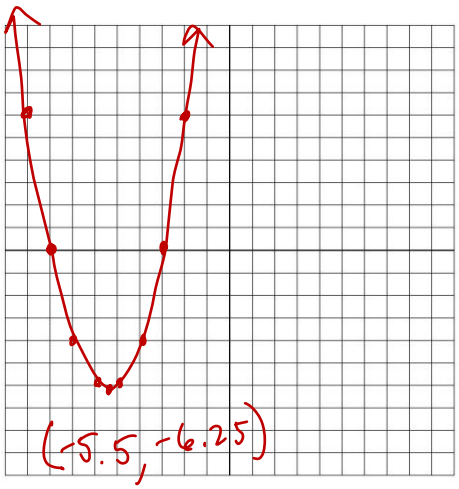
17. $y = (x + 3)^2 - 4$

Vertex: $(-3, -4)$



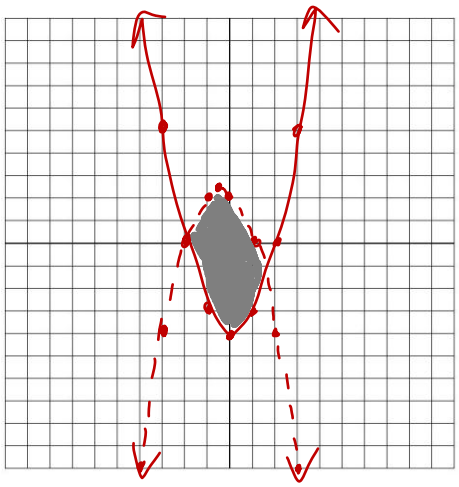
18. $y = (x + 8)(x + 3)$

Vertex: $\left(\frac{-11}{2}, \frac{-25}{4}\right)$



Graph the system of quadratic inequalities (5.7)

19. $y \geq x^2 - 4$
$y < -x^2 - x + 2$



Factor the trinomial (5.2)

20. $x^2 + 8x + 15$

$(x+5)(x+3)$

21. $m^2 - 9m + 20$

$(m-5)(m-4)$

22. $3x^2 + 11x - 4$

$(3x-1)(x+4)$

23. $6x^2 + 5x - 6$

$(2x+3)(3x-2)$

24. $n^2 - 49$

$(n+7)(n-7)$

25. $x^2 - 10x + 25$

$(x-5)^2$

Solve using factoring (5.2)

26. $x^2 + 10x + 21 = 0$

$(x+3)(x+7)=0$

$x=-3$ or $x=-7$

27. $2x^2 - 13x - 7 = 0$

$(2x+1)(x-7)=0$

$x=-\frac{1}{2}$ or $x=7$

28. $x^2 - 8x = -15$

$x^2-8x+15=0$

$(x-3)(x-5)=0$

$x=3$ or $x=5$

29. $8x^2 + 5x = 2x^2 + 4$

$6x^2+5x-4=0$

$(3x+4)(2x-1)=0$

$x=-\frac{4}{3}$ or $x=\frac{1}{2}$

Simplify the expression (5.3)

30. $\sqrt{32}$

$4\sqrt{2}$

31. $\sqrt{125}$

$5\sqrt{5}$

32. $3\sqrt{27}\cdot\sqrt{3}$

27

33. $\sqrt{15}\cdot\sqrt{3}$

$3\sqrt{5}$

34. $\sqrt{\frac{16}{25}}$

$\frac{4}{5}$

35. $\sqrt{\frac{81}{125}}$

$\frac{9\sqrt{5}}{25}$

Write the expression as a complex number in standard form (5.4)

36. $(2 + 2i) + (5 - i)$

$7+i$

37. $(8 - 5i) - (1 - 2i)$

$7-3i$

38. $-10i(4 + 7i)$

$70 - 40i$

39. $(-1 + 2i)(11 - i)$

$-9 + 23i$

Solve the equation (5.4)

40. $x^2 = 144$

$x = 12$ or -12

41. $2x^2 = 400$

$x = 10\sqrt{2}$ or $-10\sqrt{2}$

42. $-4(x + 2)^2 = -20$

$x = -2 + \sqrt{5}$ or $-2 - \sqrt{5}$

43. $\frac{1}{3}(x - 4)^2 = 3$

$x = 7$ or 1

44. $\frac{x^2}{9} - 1 = 5$

$x = 3\sqrt{6}$ or $-3\sqrt{6}$

45. $x^2 = -16$

$x = 4i$ or $-4i$

46. $(x - 3)^2 = -49$

$x = 3 + 7i$ or $3 - 7i$

47. $-\frac{1}{4}(x + 1)^2 = 5$

$x = -1 + 2\sqrt{5}\,i$ or $-1 - 2\sqrt{5}\,i$

Solve the equation by completing the square (5.5)

48. $x^2 - 6x = 7$

$x = -1$ or 7

49. $4x^2 + 40x + 280 = 0$

$x = -5 + 3\sqrt{5}\,i$ or $-5 - 3\sqrt{5}\,i$

Use the quadratic formula to solve the equation (5.6)

50. $4x^2 + x = 3$

$x = \frac{3}{4}$ or -1

51. $x^2 - 4x + 5 = 0$

$x = 2 + i$ or $2 - i$

Simplify the expression (6.1)

52. $(6x^3y^4)^{-2}$

$\frac{1}{36x^6y^8}$

53. $\frac{2x^{-3}y^{-5}}{4x^{-6}y^3}$

$\frac{x^3}{2y^8}$

54. $\frac{x^{10}}{3y^4} \cdot \frac{9x^2y^2}{x^4y^3}$

$\frac{3x^8}{y^5}$

55. $\frac{15xy^4}{8x^3y^0} \cdot \frac{16x^5y^2}{5y^4}$

$6x^3y^2$

Find the sum or difference (6.3)

56. $(2x^2 + 6x + 3) + (3x^2 + 4x + 4)$

$5x^2+10x+7$

57. $(5x^3 – 2x^2 + 7) – (8x^2 – 11)$

$5x^3-10x^2+18$

Find the product of the polynomials (6.3)

58. $(x + 7)(x – 5)$

$x^2+2x-35$

59. $(x^2 – 3x + 2)(x^2 + 4)$

$x^4-3x^3+6x^2-12x+8$

60. $(x + 1)(x + 3)(2x – 1)$

$2x^3 + 7x^2 + 2x - 3$

61. $(x + 3)^3$

$x^3 + 9x^2 + 27x + 27$

Divide using long division (6.5)

62. $(x^3 – 2x^2 – 8x + 5) \div (x – 1)$

$x^2 - x - 9 - \frac{4}{x-1}$

63. $(5x^2 – 6) \div (x – 2)$

$5x + 10 + \frac{14}{x-2}$

Divide using synthetic division (6.5)

64. $(3x^4 – 17x^3 + 13x^2 – 24x + 16) \div (x – 2)$

$3x^3 - 11x^2 - 9x - 42 - \frac{68}{x-2}$

65. $(4x^4 + 2x^2 – x + 5) \div (x + 2)$

$4x^3 - 8x^2 + 18x - 37 + \frac{79}{x+2}$

Factor the polynomial function. Then find all the zeros of the function (6.7)

66. $f(x) = x^3 – 2x^2 – 11x + 12$

$f(x) = (x+3)(x-1)(x-4)$

Zeros: $-3, 1, 4$

67. $f(x) = x^3 - x^2 + 4x - 4$

$f(x) = 2i)(x-(x-1)(x+2i)$

zeros: $1, \ 2i, -2i,$

68. $f(x) = x^4 + 2x^3 - 12x^2 - 40x - 32$

$f(x) = (x-4)(x+2)^3$

zeros: $4, -2, -2, -2$

Write a polynomial function of least degree that has real coefficients, the given zeros and a leading coefficient of 1 (6.7)

69. 4, 6, -7

$f(x) = x^3 - 3x^2 - 46x + 168$

70. $4i, -4i, i$

$f(x) = x^4 + 17x^2 + 16$

71. Tasty Bakery sells three kinds of muffins: chocolate chip muffins at 35 cents each, oatmeal muffins at 40 cents each and cranberry muffins at 45 cents each. Charles buys a total of 23 muffins and spends $9.60. He buys three times as many cranberry muffins as chocolate chip muffins. How many of each type of muffin did he buy?

Write a system of equations that represents this problem.

Solve the system of equations.

Chocolate Chip Muffins: 4
Oatmeal Muffins: 7
Cranberry Muffins: 12