Find all real or imaginary solutions to each equation.

1. $\frac{2}{3}(x - 6) = \frac{x-7}{9}$ **2.** $x^2 + 4 = 0$

1.   _____   2.   _____

3. $\frac{5}{x+2} + 1 = \frac{4}{x+2}$ **4.** $3x^2 + 3 = 10x$

3.   _____   4.   _____

Solve each inequality in one variable. State the solution set using interval notation and graph it on the number line.

5. $4 - 3x \leq 10$ **6.** $3|2x + 1| > 3$

5.   _____   6.   _____

Sketch the graph of each equation in the *xy*-coordinate system.

7. $2x - 5y = 10$ **8.** $x^2 + y^2 = 4x$

Solve each problem.
9.   Find the slope of the line that goes through (2, 5) and (−1, 2).

9.   _____

10.   Find the slope-intercept form of the equation of the line that goes through $(3, -1)$ and is perpendicular to the line $y = 2x - 4$.

10.   _____

11.   Find the exact distance between $(-3, 4)$ and $(2, 1)$.

11.   _____

12.   How many liters of water must be added to 30 liters of a 20% alcohol solution to dilute it to a 15% solution?

12.   _____

13.   A rectangle has two sides of length 5 inches and a diagonal which is one inch longer than the length of the other two sides. Find the length of the diagonal.

13.   _____

14.   Solve $\frac{1}{x} + 2 = \frac{c}{2}$ for x.

14.   _____

15.   Find the value of the discriminant for $x^2 + 6x + 9 = 0$. How many real solutions are there for this equation?

15.   _____

Perform the indicated operations and write the answer in the form $a + bi$, where a and b are real.

16. $(3 + 2i)^2$ **17.** $i^3 - i^2$

16.   _____   17.   _____

Find all real or imaginary solutions to each equation.

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

2. $2x^2 + 8 = 0$

1. _____

2. _____

3. $2x^2 = 32$

4. $6x^2 - 6 = 5x$

3. _____

4. _____

Solve each inequality. State the solution set using interval notation and graph it.

5. $1 - 4x < 5$

6. $|5 - x| < 2$

5. _____

6. _____

Sketch the graph of each equation.

7. $3x - 4y = 12$

8. $x^2 + y^2 = 6y$

Solve each problem.

9. Find the slope of the line that goes through (3, 1) and (4, −2).

9. _____

10.   Find the slope-intercept form of the equation of the line that goes through $(4, -2)$ and is perpendicular to the line $y = \frac{1}{2}x - 4$.

10.   _____

11.   Find the exact distance between $(-2, 5)$ and $(4, 12)$.

11.   _____

12.   How much water must be added to 20 quarts of a 12% alcohol solution to dilute it to a 9% solution?

12.   _____

13.   A rectangle has a length which is one unit longer than its width. If each side of the rectangle is increased by one unit, then the area is increased by 10 square units. What were the original dimensions of the rectangle?

13.   _____

14.   Solve $x = \frac{1}{y} + 2$ for y.

14.   _____

15.   Find the value of the discriminant for $2x^2 + 6x + 9 = 0$. How many real solutions are there for this equation?

15.   _____

Perform the indicated operations and write the answers in the form $a + bi$, where a and b are real.

16. $i(\sqrt{-4} + 3)$ **17.** $i^5 - i^{60}$

16.   _____   17.   _____

Find all real or imaginary solutions to each equation.

1. $\frac{1}{2}(x+3) = \frac{2}{5}x + 1$

2. $|x+2| = 5$

1.   _____

2.   _____

3. $\frac{2(x+1)}{x-3} = \frac{x+5}{x-3}$

4. $6x^2 - 7x = 3$

3.   _____

4.   _____

Solve each inequality. State the solution set using interval notation and graph it.

5. $3 - \frac{2}{3}x \geq -1$

6. $|2x-1| - 2 > 3$

5.   _____

6.   _____

Sketch the graph of each equation.

7. $2x = 5 - y$

8. $(x+2)^2 + y^2 = 8y$

Solve each problem.
9.   Find the slope of the line that goes through $(-2, -1)$ and $(3, 1)$.

9.   _____

10.   Find the slope-intercept form of the equation of the line that goes through $(-5, 2)$ and is perpendicular to the line $y = -\frac{1}{3}x - \frac{2}{3}$.

10.   _____

11.   Find the exact distance between $(4, \frac{1}{2})$ and $(-6, \frac{3}{2})$.

11.   _____

12.   How many liters of a 40% acid solution must be mixed with 10 liters of a 10% acid solution in order to end up with a 20% acid solution?

12.   _____

13.   A pair of jeans costs $23.54 after taxes. If the price tag on the jeans reads $22.00, what is the tax rate?

13.   _____

14.   Solve $3(b - a) + 5 = \frac{b + a}{2}$ for b.

14.   _____

15.   Find the value of the discriminant for $5x^2 + 9 = 0$. How many real solutions are there for this equation?

15.   _____

Perform the indicated operations and write the answer in the form $a + bi$, where a and b are real.

16. $\frac{1}{2 + 3i}$

17. $\sqrt{-3}\left(\sqrt{-27} + \sqrt{3}\right)$

16.   _____   17.   _____

Find all real and imaginary solutions to each equation.

1. $2 + 5x = 2x$

2. $|3x + 4| + 2 = 5$

1.   _____

2.   _____

3. $x^2 + 7x + 9 = 0$

4. $3(x^2 - 4) = 6$

3.   _____

4.   _____

Solve each inequality. State the solution set using interval notation and graph it.

5. $\frac{1}{4}x + \frac{2}{3} \geq \frac{1}{2}$

6. $3 - |x + 3| > 1$

5.   _____

6.   _____

Sketch the graph of each equation.

7. $2x = 4y - 6$

8. $x^2 + (y + 1)^2 = 4x$

Solve each problem.
9.   Find the slope of the line that goes through (2, 1) and $(-3, -1)$.

9.   _____

10.   Find the slope-intercept form of the equation of the line that goes through $(2, -3)$ and is perpendicular to the line $y = -\frac{5}{2}x - \frac{1}{4}$.

10.   _____

11.   Find the exact distance between $(3, -2)$ and $(-3, 5)$.

11.   _____

12.   Solve $\frac{y+5}{x-4} = \frac{3}{2}$ for x.

12.   _____

13.   Find the midpoint of the line segment with endpoints $(-2, 3)$ and $(5, -1)$.

13.   _____

14.   Find the x- and y-intercepts for the graph of $20x - 35y = 70$.

14.   _____

15.   A pair of jeans costs $35.26 after taxes. If the tax rate is 8.5%, what was the price of the jeans before taxes?

15.   _____

Perform the indicated operations and write the answer in the form $a + bi$, where a and b are real.

16. $\sqrt{-1}\left(\sqrt{-4} - 1\right)$ **17.** $\frac{3-i}{2+i}$

16.   _____   17.   _____

Multiple Choice: Choose the best answer for each of the following.

_____ **1.** Solve for x: $\frac{2}{3}x + \frac{1}{2} = \frac{1}{2}x + \frac{1}{3}$.

     a. -1 b. $\frac{5}{6}$ c. 5   d. $\frac{1}{5}$

_____ **2.** **Write the slope-intercept form of the equation of the line through $(-1, 2)$ that is perpendicular to the line $x + 3y = 4$.**

     a. $y = 3x + \frac{4}{3}$ b. $y = 3x + 5$ c. $y = -\frac{1}{3}x + \frac{5}{3}$ d. $y = -\frac{1}{3}x - \frac{7}{3}$

_____ **3.** Solve for y: $\frac{y-2}{x-3} = -2$.

     a. $-2x + 8$ b. 2   c. 8   d. $-2x - 1$

_____ **4.** **The cost of a television set after taxes is \$436. What is the cost of the TV before taxes if the tax rate is 9% ?**

     a. \$427   b. \$363.16   c. \$400   d. \$518.84

_____ **5.** **On a lonely stretch of highway in West Texas, Jacob sets his truck on cruise and travels to his work site, a trip which takes 5 hours. At the end of the week, on the trip home, he travels the same distance, but his cruise control is set at a speed which is 15 mph faster since he is very anxious to get home. Thus, he arrives in just 4 hours. What is his speed on the trip home?**

     a. 75 mph   b. 60 mph   c. 90 mph   d. 70 mph

_____ **6.** Solve for x: $2x^2 - 6 = 0$.

     a. $\pm\sqrt{3}$ b. 3   c. $\pm\frac{\sqrt{6}}{2}$ d. $\pm\frac{3}{2}$

_____ **7.** Solve for y: $6y^2 - 5y = 6$.

     a. $\frac{3}{2}, -\frac{2}{3}$ b. 1, 11   c. $\frac{5\pm\sqrt{169}}{12}$ d. $\frac{5\pm i\sqrt{119}}{12}$

_____ **8.** Solve for x: $x^2 = 4x$.

     a. 4   b. $\pm 2\sqrt{x}$ c. ± 2 d. 0, 4

_____ **9.**   **Solve the inequality: $2x - 3 > 5$ and $5x + 2 \leq 32$.**

a. $(4, 6]$ b. $(4, \infty) \cup (-\infty, 6]$ c. $(-\infty, 6]$ d. $(-\infty, \infty)$

_____ **10.**   **To receive a C in a math course, an average between 70 and 80, inclusive, is required. Leah has scores of 76, 82, and 87 on her first three math tests. After the fourth test, she states that she now has a C average. What is the range of scores possible for her fourth test in order for that statement to be true?**

a. $[0, 70]$ b. $[70, 80]$ c. $[35, 75]$ d. $[60, 70]$

_____ **11.**   **Find the slope of the line passing through the points $(-3, -4)$ and $(6, -9)$.**

a. $-\frac{9}{5}$ b. $-\frac{5}{9}$ c. $-\frac{3}{13}$ d. $-\frac{13}{3}$

_____ **12.**   **Find the midpoint of the line segment with endpoints $(-3, -4)$ and $(6, -9)$.**

a. $(-4.5, 2.5)$ b. $-\frac{5}{9}$ c. $(1.5, -6.5)$ d. $(0, -6)$

_____ **13.**   **Solve the inequality: $5 - 3x > 14$.**

a. $(-\infty, -3) \cup (\frac{19}{3}, \infty)$ b. $(-3, \infty)$ c. $(-\infty, -\frac{11}{3})$ d. $(-\infty, -3)$

_____ **14.**   **Solve for x: $|x - 1| = 3$.**

a. $\{4\}$ b. $\{-4\}$ c. $\{-4, 4\}$ d. $\{-2, 4\}$

_____ **15.**   **Find all solutions: $x^2 + 2x - 3 = 0$.**

a. $\{-1, 3\}$ b. $\{-3, 1\}$ c. $\{0, -1 \pm \sqrt{2}\}$ d. $\{-1 \pm \sqrt{2}\}$

_____ **16.**   **Perform the indicated operations and simplify: $\left(\sqrt{-3} + 4\right)\left(\sqrt{-3} - 1\right)$.**

a. $-7 + 3i\sqrt{3}$ b. $5 + 3i\sqrt{3}$ c. $-1 + 3\sqrt{-3}$ d. $-1 + 5i\sqrt{3}$

_____ **17.**   **Perform the indicated operation and simplify: $\frac{1 + 3i}{1 - 2i}$.**

a. $1 - \frac{3}{2}i$ b. $-1 + i$ c. $7 + i$ d. $\frac{7}{5} + \frac{1}{5}i$

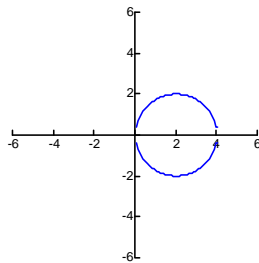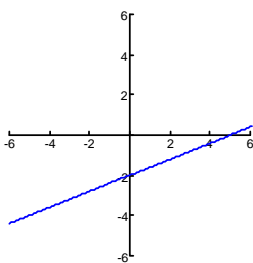**Multiple Choice: Choose the best answer for each of the following.**

_____ **1.**   **Solve for x:** $\frac{2}{5}x + \frac{1}{3} = \frac{1}{2}x + \frac{1}{3}$.

     a. -1 b. $-\frac{20}{3}$ c. 0 d. $\frac{20}{3}$

_____ **2.**   **Write the slope-intercept form of the equation of the line that goes through $(-2, 3)$ and is perpendicular to the line $x + 3y = 4$.**

     a. $y = 3x - 3$ b. $y = 3x + \frac{4}{3}$ c. $y = 3x + 9$ d. $y = -\frac{1}{3}x + \frac{7}{3}$

_____ **3.**   **Solve for y:** $\frac{y-3}{x-2} = -2$.

     a. $\frac{2}{3}x + \frac{7}{3}$ b. 3 c. $-2x + 7$ d. $-2x - 1$

_____ **4.**   **The cost of a television set after taxes is \$324. What is the cost of the TV before taxes if the tax rate is 8% ?**

     a. \$349.92   b. \$300.00   c. \$298.08   d. \$264.00

_____ **5.**   **The Walker family will all be attending a wedding out-of-town. Bettye and Harold Walker leave a day early and arrive in the town where the wedding will take place in 3.5 hours. Mary and Janie Walker leave the morning of the wedding, drive an average of 10 miles per hour faster than their siblings did the day before, and arrive in 3 hours. How far away was the town from the Walker residence?**

     a. 165 miles   b. 180 miles   c. 60 miles   d. 210 miles

_____ **6.**   **Solve for x:** $2x^2 - 10 = 0$.

     a. $\pm\sqrt{5}$ b. 5 c. $\pm\frac{\sqrt{10}}{2}$ d. $\pm\frac{\sqrt{5}}{2}$

_____ **7.**   **Solve for y:** $6y^2 + y = 12$.

     a. $12, \frac{11}{6}$ b. $\frac{-1 \pm \sqrt{289}}{12}$ c. $\frac{-1 \pm \sqrt{287}}{12}$ d. $-\frac{3}{2}, \frac{4}{3}$

_____ **8.**   **Solve for x:** $x^2 = 9x$.

     a. $0, 9$ b. $\pm 3\sqrt{x}$ c. ± 3 d. 9

_____ **9.**   **Solve the inequality:** $3 - 2x > 5$ **and** $5x + 2 \geq -28$.

a. $(-1, \infty)$ b. $[-6, -1)$ c. $(-1, 6]$ d.$(-\infty, -1) \cup (-6, \infty)$

_____ **10.**   **To receive a B in a math course, an average between 80 and 89, inclusive, is required. Leah has scores of 76, 82, and 98 on her first three math tests. After the fourth test, she states that she now has a B average. What is the range of scores possible for her fourth test in order for that statement to be true?**

a. $[80, 89]$ b. $[64, 100]$ c. $[13.5, 23]$ d. $[75, 95]$

_____ **11.**   **Find the slope of the line passing through the points** $(1, 1)$ **and** $\left(\frac{2}{5}, 0\right)$.

a. $\frac{1}{3}$ b. $-\frac{3}{5}$ c. $\frac{5}{3}$ d. $-\frac{5}{3}$

_____ **12.**   **Find the slope of the line which is parallel to the line** $x = \frac{4}{5}y + \frac{1}{4}$.

a. $\frac{4}{5}$ b. $\frac{5}{4}$ c. $-\frac{5}{4}$ d. $-\frac{5}{16}$

_____ **13.**   **Solve the inequality:** $5 < 1 - 3x \leq 10$.

a. $\left(\frac{4}{3}, 3\right]$ b. $\left[-\frac{11}{3}, -\frac{4}{3}\right)$ c. $\left[-3, -\frac{4}{3}\right)$ d.$\left(-\infty, -\frac{4}{3}\right) \cup \left[-3, \infty\right)$

_____ **14.**   **Solve for** x: $|3x - 6| = 9$.

a. $\{-1\}$ b. $\{5\}$ c. $\{1, 5\}$ d. $\{-1, 5\}$

_____ **15.**   **Find all solutions:** $x^2 - 2x - 3 = 0$.

a. $\{-1, 3\}$ b. $\{-3, 1\}$ c. $\{0, -1 \pm \sqrt{2}\}$ d. $\{-1 \pm \sqrt{2}\}$

_____ **16.**   **Perform the indicated operation and simplify:** $\frac{2-i}{3+4i}$.

a. $\frac{2}{3} - \frac{1}{4}i$ b. $\frac{2}{5} - \frac{11}{5}i$ c. $2 - i$ d. $\frac{2}{25} - \frac{11}{25}i$

_____ **17.**   **Perform the indicated operation and simplify:** $i\left(3i^2 + 4i\right)$.

a. $3 + 4i$ b. $-3 - 4i$ c. $-4 - 3i$ d. $-4 + 3i$

CHAPTER 1.

Form A:
1. $\left\{\frac{29}{5}\right\}$ **2.** $\{\pm 2\}$ **3.** $\{-3\}$ **4.** $\left\{\frac{1}{3}, 3\right\}$

5. $[-2, \infty)$ **6.** $(-\infty, -1) \cup (0, \infty)$

7.   **8.**   **9.** 1   **10.** $y = -\frac{1}{2}x + \frac{1}{2}$

11. $\sqrt{34}$ **12.** 10 liters   **13.** 13 inches   **14.** $x = \frac{2}{c-4}$

15. disc $= 0$, 1 real solution   **16.** $5 + 12i$ **17.** $1 - i$

Form B:
1. $\left\{-\frac{4}{5}\right\}$ **2.** $\left\{\pm \frac{\sqrt{10}}{2}\right\}$ **3.** $\{\pm 4\}$ **4.** $\left\{-\frac{2}{3}, \frac{3}{2}\right\}$

5. $(-1, \infty)$ **6.** $(3, 7)$

7.   **8.**   **9.** -3 **10.** $y = -2x + 6$ **11.** $\sqrt{85}$
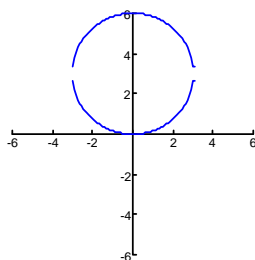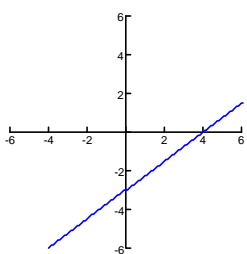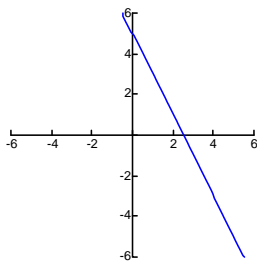

12. $6\frac{2}{3}$ quarts   **13.** 4 units by 5 units   **14.** $y = \frac{1}{x-2}$
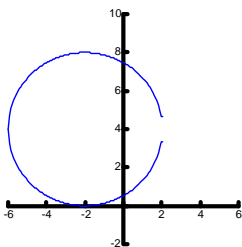
15. disc $= -36$, 0 real solutions   **16.** $5i$ **17.** $-1 + i$

Form C:
1. $\{-5\}$ **2.** $\{-7, 3\}$ **3.** no solution   **4.** $\left\{-\frac{1}{3}, \frac{3}{2}\right\}$

5. $(-\infty, 6]$ **6.** $(-\infty, -2) \cup (3, \infty)$

7.   **8.**   **9.** $\frac{2}{5}$

10. $y = 3x + 17$ **11.** $\sqrt{101}$ **12.** 5 liters   **13.** 7%   **14.** $b = \frac{7}{5}a - 2$

15. disc $= -180$, 0 real solutions   **16.** $\frac{2}{13} - \frac{3}{13}i$ **17.** $9 + 3i$

Form D:
1. $\left\{ -\frac{2}{3} \right\}$ **2.** $\left\{ -\frac{7}{3}, -\frac{1}{3} \right\}$ **3.** $\left\{ -\frac{8}{5}, \frac{3}{2} \right\}$ **4.** $\left\{ \pm\sqrt{6} \right\}$ **5.** $\left[-\frac{2}{3}, \infty \right)$ **6.** $(-5, -1)$
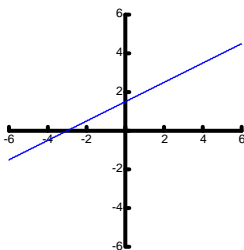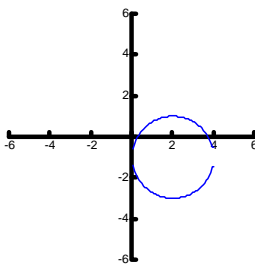
7.   **8.**   **9.** $\frac{2}{5}$ **10.** $y = \frac{2}{5}x - \frac{19}{5}$ **11.** $\sqrt{85}$

12. $x = \frac{2y + 22}{3}$ **13.** $\frac{-7 \pm \sqrt{13}}{2}$ **14.** $(0, -2), (3.5, 0)$

15. $32.50   **16.** $2 - i$ **17.** $1 - i$

Form E:
1. a   **2.** b   **3.** a   **4.** c   **5.** a   **6.** a   **7.** a   **8.** d
9. a   **10.** c   **11.** b   **12.** c   **13.** d   **14.** d   **15.** b   **16.** a   **17.** b

Form F:
1. c   **2.** c   **3.** c   **4.** b   **5.** d   **6.** a   **7.** d   **8.** a
9. b   **10.** b   **11.** c   **12.** b   **13.** c   **14.** d   **15.** a   **16.** b   **17.** a