Directions: Please show all of your work for each problem. If applicable, you may find Microsoft Word’s equation editor helpful in creating mathematical expressions in Word. There is a tutorial on using this equation editor in Module 1 Lecture Notes. You also have the option of hand writing your work and scanning it.

1. Solve the system by addition.
   \[ x + 4y = 2 \]
   \[ 3x - 2y = -22 \]

2. Solve the system by addition.
   \[ x + y = 8 \]
   \[ x - y = 8 \]

3. Solve the system by addition.
   \[ 5x - 3y = 13 \]
   \[ 4x - 3y = 11 \]

4. The sum of two numbers is 33. Their difference is 7. What are the two numbers?

5. Sally bought three chocolate bars and a pack of gum and paid $1.75. Jake bought two chocolate bars and four packs of gum and paid $2.00. Find the cost of a chocolate bar and the cost of a pack of gum.

6. Adult tickets for a play cost $16 and child tickets cost $6. If there were 25 people at a performance and the theater collected $260 from ticket sales, how many adults and how many children attended the play?

7. Solve the system by substitution.
   \[ x + 3y = -4 \]
   \[ 2x + 2y = -8 \]

8. The difference of two numbers is 36. The larger is 6 less than 4 times the smaller. What are the two numbers?

9. The base of a ladder is 6 feet away from the wall. The top of the ladder is 7 feet from the floor. Find the length of the ladder to the nearest thousandth.

10. A company produces doll houses and sets of doll furniture. The doll houses take 3 hours of labor to produce, and the furniture sets take 8 hours. The labor available is limited to 400 hours per week, and the total production capacity is 100 items per week. Existing orders require that at least 20 doll houses and 10 sets of furniture be produced per week. Write a system of inequalities representing this situation, where \( x \) is the number of doll houses and \( y \) is the number of furniture sets.

11. Evaluate \( \sqrt{16} \), if possible.
12. Evaluate $\sqrt[3]{8}$, if possible.

13. State whether $\sqrt{64}$ is rational or irrational.

14. State whether $\sqrt{25}$ is rational or irrational.

15. The area of a square is 83 cm$^2$. Find the length of a side to the nearest hundredth.

16. The time in seconds that it takes for an object to fall from rest is given by $t = \frac{1}{4}\sqrt{s}$, in which $s$ is the distance fallen (in feet). Find the time required for an object to fall from the ground from a building that is 800 feet high. Round your answer to the nearest hundredth of a second.

17. Simplify. $\sqrt{72}$

18. Simplify. Assume $x$ represents a positive real number. $\sqrt{80x^4}$

19. Simplify. $\frac{1}{\sqrt{3}}$

20. Decide whether the following is written in simplest form. $\sqrt{28mn}$

21. Simplify by combining like terms. $\sqrt{63} - \sqrt{7}$

22. Simplify by combining like terms. $9\sqrt{5} - \sqrt{80}$

23. Find the perimeter of the triangle shown in the figure. Write your answer in reduced radical form.

24. Perform the indicated multiplication. Then simplify. $\sqrt{7} \left(6\sqrt{3} - 6\sqrt{7}\right)$

25. Perform the indicated multiplication. Then simplify the radical expression. $\left(3\sqrt{11}\right)^2$
26. Perform the indicated multiplication. Then simplify the radical expression. \((\sqrt{t} - 3)^2\)

27. Perform the indicated division. Rationalize the denominator, if necessary. Then, simplify. \(\frac{21 + \sqrt{18}}{3}\)

28. Solve. \(\sqrt{4x + 4} - 8 = 0\)