Solve and check each equation below.

1. \[ 5x + 9 - 7x + 6 = x + 18 \]

2. \[ -2(y - 4) - (3y - 2) = -2 - (6y - 2) \]

3. \[ 1 - 2(6 - z) = 3z + 2 \]
Solve and check each equation. Begin your work by rewriting each equation without fractions or decimals.

4. \[ \frac{2x}{3} = \frac{x}{6} + 1 \]

5. \[ \frac{x}{2} - \frac{1}{10} = \frac{x}{5} + \frac{1}{2} \]

6. \[ 0.1(x - 3) = 1.1 - 0.25x \]

7. \[ 0.02(x - 2) = 0.06 - 0.01(x + 1) \]

In California, speeding fines are determined by the formula:

\[ F = 12(x - 65) + 80 \]

Where \( F \) is the cost, in dollars, of the fine if a person is caught driving \( x \) miles per hour. Use the formula to answer the following questions.

8. If a fine comes to $200, how fast was that person driving?

9. If a person was fined for driving 85 mph, how much was the fine?
Use the given information to write an equation. Let \( x \) represent the number described. Then solve the equation and find the number.

10. When 30 is subtracted from seven-eighths of a number, the result is equal to one-half of the number. What is the number?

11. When two-fifths of a number is added to one-fourth of the number, the sum is 13. What is the number?

Solve each formula for the specified variable. Recognize any of the formulas? What does it describe?

12. \( E = mc^2 \) for \( m \)

13. \( V = \frac{4}{3} \pi r^3 \) for \( \pi \)

14. \( \frac{A}{\pi r^2} = 1 \) for \( A \)
Solve each word problem. Be sure to indicate what x represents. Use the four step strategy as a guide to help you solve. Don't forget to include appropriate units in your answer!

15. The average yearly salary of an American whose final degree is a doctorate is $48 thousand less than twice that of an American whose final degree is a bachelor’s. Combined, two people with each of these educational attainments earn $135 thousand. Find the average yearly salary of Americans with each of these final degrees.

16. A car rental agency charges $180 per week plus $0.25 per mile to rent a car. How many miles can you travel in one week for $240?

17. A rectangular field is five times as long as it is wide. If the perimeter of the field is 288 yards, what are the field's dimensions?

18. One angle of a triangle is twice as a large as another. The measure of the third angle is 20 degrees greater than that of the smallest angle. Find the measure of each angle.
19. A triangular swimming pool has a base of 60 feet and an area of 1200 square feet. What is the height of the swimming pool?

20. Find the circumference and area of a circle if the diameter of a circle is 20 inches. Don’t forget your units in your answer!

Use both the addition and multiplication properties of inequality to solve each inequality, graph the solution set on a number line, and write the solution set in interval notation.

21. \[ 7 - 2(x - 4) < 5(1 - 2x) \]

22. \[ 2y + \frac{1}{3} \geq \frac{3}{2} \]