1. The distance a car travels can be found using the formula \( d = r \cdot t \), where \( d \) is distance, \( r \) is rate of speed, and \( t \) is time. How many miles does the car travel if it drives at an average rate of speed of 60 miles per hour for a period of \( \frac{3}{4} \) of an hour?

\[
\text{RATE (R)} = 60 \text{ MPH} \\
\text{TIME (T)} = \frac{3}{4} \text{ HOUR}
\]

\[
d = (60 \text{ MHR}) \left( \frac{3}{4} \text{ H} \right) \\
d = 45 \text{ MILES}
\]

2. The distance a car travels can be found using the formula \( d = r \cdot t \), where \( d \) is distance, \( r \) is rate of speed, and \( t \) is time. What is the average rate of speed, if the person drives a distance of 208 miles in 4 hours?

\[
d = 208 \text{ MILES} \\
t = 4 \text{ HOURS}
\]

\[
d = r \cdot t \\
208 = 4 \cdot r \\
\frac{208}{4} = r \\
52 \text{ MPH = R}
\]

3. A person borrows money from a friend and they decide to use a simple interest formula. \( I = P \cdot R \cdot T \) where \( I \) is the interest in dollars, \( P \) is the principle (original money loaned) in dollars, \( R \) is the interest rate, and \( T \) is the time in years. If the person borrowed $2600 for 5 years at a rate of 3\%, how much interest will they owe for the loan?

\[
\text{PRINCIPLE} = 2600 \text{ TIME} = 5 \text{ YEARS} \\
\text{RATE} = 3\% = .03
\]

\[
I = P \cdot R \cdot T \\
I = (2600)(.03)(5) \\
I = 390
\]

4. A person borrows money from a friend and they decide to use a simple interest formula. \( I = P \cdot R \cdot T \) where \( I \) is the interest in dollars, \( P \) is the principle (original money loaned) in dollars, \( R \) is the interest rate, and \( T \) is the time in years. If the person paid $768 in interest for a loan over 5 years at a rate of 4\%, how much money did they original borrow?

\[
I = 768 \text{ TIME} = 5 \text{ YEARS} \text{ RATE} = 4\% = .04
\]

\[
I = P \cdot R \cdot T \\
768 = P \cdot (.04)(5) \\
768 = \frac{2P}{.2} \\
\frac{768}{.2} = P \\
P = 3840
\]

5. A certain population of bacteria has an average growth rate of 0.04 bacteria per hour. The formula for the growth of the bacteria’s population is \( A = P_o(2.718)^{.04t} \), where \( P_o \) is the original population, \( t \) is time in hours, and \( A \) is the new population. If we begin with 50 bacteria \((P_o)\), about how many bacteria will there be after 20 hours?

\[
P_o = 50 \text{ t = 20} \\
A = P_o (2.718)^{.04(20)} \\
A = 50 \cdot (2.718)^{.04(20)} \\
50 \cdot (2.718)^{.04(20)} = 111.2678167 \\
A \approx 111 \text{ BACTERIA}
\]

6. A certain population of bacteria has an average growth rate of 0.06 bacteria per hour. The formula for the growth of the bacteria’s population is \( A = P_o(2.718)^{.06t} \), where \( P_o \) is the original population, \( t \) is time in hours, and \( A \) is the new population. If the current population of a culture was 3000 bacteria \((A)\) and it started growing 30 hours ago, what was the original size of the bacteria \((P_o)\)?

\[
A = 3000 \text{ t = 30} \\
A = P_o (2.718)^{.06(30)} \\
(2.718)^{.06(30)} \approx 6.049518514 \\
3000 = P_o \cdot (2.718)^{.06(30)} \\
3000 = \frac{6.049}{6.049} P_o \\
496 = P_o
\]
7. Find the dimensions of the rectangle if the perimeter is 20.

8. Find the each side of the triangle if the perimeter is 23.

9. One more than twice a number is 11. What is the number?

10. 4 times the difference of 4 and a number is 24. What is the number?

11. My son is 9 less than ½ my age. If I am 34 how old is my son?

12. Four less than a number tripled is the same number increased by ten. What is the number?

13. If the difference of twice a number and 8 is tripled the result is 18. What is the unknown number?

14. The quotient of a number and 2 is decreased by 3 and the result is 5. What is the number?
15. 5 subtracted from 4 times a number is 27. What is the number?

\[ 4x - 5 = 27 \]

\[ 4x = 32 \]

\[ x = 8 \]

16. 3 times a number plus 5 is the same number increased by 17. What is the number?

\[ 3x + 5 = x + 17 \]

\[ 2x = 12 \]

\[ x = 6 \]

17. 4 less than number is the same as twice the number reduced by 12. What is the number?

\[ x - 4 = 2x - 12 \]

\[ 8 = x \]

18. Four less than the product of a number and 8 is twice the sum of the number and 10. What is the number?

\[ (8x) - 4 = 2(x + 10) \]

\[ 8x - 4 = 2x + 20 \]

\[ 6x - 4 = 24 \]

\[ x = 4 \]

19. Five times the difference of twice a number and three is twenty-five. What is the number?

\[ 5(2x - 3) = 25 \]

\[ 10x - 15 = 25 \]

\[ 10x = 40 \]

\[ x = 4 \]

20. Three is subtracted from a number that is doubled this entire result is tripled which equals twenty-one. What is the number?

\[ (2x - 3) \cdot 3 = 21 \]

\[ 6x - 9 = 21 \]

\[ 6x = 30 \]

\[ x = 5 \]

21. The quotient of 3 less than twice a number and 5 is equal to the sum of 4 and the same number divided by 2. What is the number?

\[ \frac{2x - 3}{5} = 4 + \frac{x}{2} \]

\[ 4x - 6 = 20 + 5x \]

\[ -4x = 26 \]

\[ x = -6.5 \]

22. Two classrooms have a total of 45 people in them. The first class is a math class with 5 more students than the science class. How many are in each class?

Math Class: \( x \rightarrow 25 \)

Science Class: \( x - 5 \rightarrow 20 \)

\[ (x) + (x - 5) = 45 \]

\[ 2x - 5 = 45 \]

\[ 2x = 50 \]

\[ x = 25 \]

23. Two numbers total 44. The first number is 1 less than twice the second. What are the two numbers?

First Number: \( 2x - 1 \rightarrow 29 \)

Second Number: \( x \rightarrow 15 \)

\[ (2x - 1) + (x) = 44 \]

\[ 3x - 1 = 44 \]

\[ 3x = 45 \]

\[ x = 15 \]

24. A husband and wife have a combined income of $74,000 a year. The wife makes $10,000 less than twice as much as her husband makes. How much do they each earn?

Wife: \( 2x - 10,000 \rightarrow 46,000 \)

Husband: \( x \rightarrow 28,000 \)

\[ (2x - 10,000) + (x) = 74,000 \]

\[ 3x - 10,000 = 74,000 \]

\[ 3x = 84,000 \]

\[ x = 28,000 \]
25. The difference of two numbers is 20. The larger of the two numbers is 2 more than twice the smaller. What are the two numbers?

\[
\begin{align*}
\text{LARGER NUMBER} & = 2x + 2 \quad \rightarrow \quad 38 \\
\text{SMALLER NUMBER} & = x \quad \rightarrow \quad 18 \\
(2x + 2) - x & = 20 \\
2x + 2 - x & = 20 \\
x + 2 & = 20 \\
-x & = -2 \\
x & = 18
\end{align*}
\]

26. Mark is 3 less than 4 times as old as Tim. Together their ages total 42. How old is each person?

\[
\begin{align*}
\text{MARK} & = 4x - 3 \quad \rightarrow \quad 38 \\
\text{TIM} & = x \quad \rightarrow \quad 9 \\
(4x - 3) + x & = 42 \\
4x - 3 + x & = 42 \\
5x - 3 & = 42 \\
5x & = 45 \\
x & = 9
\end{align*}
\]

27. An angle’s is equal to 30 less than twice its supplement. What is the angle?

\[
\begin{align*}
\text{ANGLE} & = x \quad \rightarrow \quad 110 \\
\text{SUPPLEMENT} & = 180 - x \quad \rightarrow \quad 70 \\
\text{ANGLE} & = (180 - x) - 30 \\
x & = 2(180 - x) - 30 \\
x & = 360 - 2x - 30 \\
x & = 330 - 2x \\
2x & = 330 \\
x & = \frac{330}{2} \\
x & = 110
\end{align*}
\]

28. An angle is equal to 24 more than twice its complement. What is the angle?

\[
\begin{align*}
\text{ANGLE} & = x \quad \rightarrow \quad 68 \\
\text{COMPLEMENT} & = 90 - x \quad \rightarrow \quad 22 \\
x & = 2(90 - x) + 24 \\
x & = 180 - 2x + 24 \\
x & = 204 - 2x \\
2x & = 204 \\
x & = \frac{204}{2} \\
x & = 68
\end{align*}
\]

29. Jessica is 4 years older than Jeff. Keisha is twice as old as Jeff. The total of all three of their ages is 60. How old is each person?

\[
\begin{align*}
\text{JESSICA} & = x + 4 \quad \rightarrow \quad 18 \\
\text{JEFF} & = x \quad \rightarrow \quad 14 \\
\text{KEISHA} & = 2x \quad \rightarrow \quad 28 \\
(x + 4) + x + (2x) & = 60 \\
4x + 4 & = 60 \\
4x & = 56 \\
x & = \frac{56}{4} \\
x & = 14
\end{align*}
\]

30. Consider the 3 interior angles of a triangle. The second angle is 30 less than twice the first. The third is 10 more than twice the first. What are the three angle measures?

\[
\begin{align*}
\text{ANGLE} & = x \quad \rightarrow \quad 40 \\
\text{ANGLE} & = (2x - 30) \quad \rightarrow \quad 60 \\
\text{ANGLE} & = (2x + 10) \quad \rightarrow \quad 70 \\
(x) + (2x - 30) + (2x + 10) & = 180 \\
x & = 4x - 20 \\
x & = 200 \\
x & = \frac{200}{5} \\
x & = 40
\end{align*}
\]

31. The check for a restaurant comes and due to a coupon it was reduced by 5 dollars. Four friends split the tab evenly after the coupon. Each friend paid $6.50. How much was the original check?

\[
\begin{align*}
\text{ORIGINAL CHECK} & = x \\
\frac{x - 5}{4} & = 6.50 \\
x - 5 & = 26 \\
x & = 31
\end{align*}
\]

32. A person purchased 4 tires. The person had a coupon for 10% off. In the end each tire ended up costing $44.00 a piece. How much was the original total bill before the coupon?

\[
\begin{align*}
\text{TOTAL COST} & = x \\
\frac{x - 0.10x}{4} & = 44 \\
0.90x & = 176 \\
\frac{0.90x}{0.9} & = \frac{176}{0.9} \\
x & = 195.56
\end{align*}
\]