

Using Variables

$$\begin{array}{r|l|l} 1 & 2 & 3 \\ \hline 55 & 110 & 165 \end{array}$$

1. A car travels 55 miles per hour. Write an expression for how far the car will have traveled:

- a. After 3 hours a. 165 MILES 3×55
- b. After 5 hours b. 275 MILES 5×55
- c. After h hours c. $55 \times h$

We drive 40 miles per hour on a road trip.

How many miles have we traveled in:

- 3 hours 120 miles 40×3
- 7 hours 280 miles 40×7
- h hours $40 \times h$

2. A plain pizza costs \$7.00. Each topping adds an extra cost of \$.50. How much does a pizza cost:

a. With one topping

a. $\$7.50$ $7.00 + .50$

b. With two toppings

b. $\$8.00$ $7.00 + 1.00$

c. With n toppings

c. $7.00 + .50 \times n$

Mark is 5 years older than Craig.

If c represents Craig's age,

write an expression that would represent Mark's age?

If Craig is 25 years old, how old is Mark?

$$\begin{aligned} S + C \\ C = 25 \\ S + 25 = \end{aligned} \quad \text{30 years old}$$

Jackson bought some pizzas for \$13 each. If p represents the number of pizzas he bought, what expression shows the total amount he spent?

$$13 \times p$$

If Jackson bought 7 pizzas, how much money did he spend?

$$\begin{aligned} 13 \times P \\ 7 = P \\ 13 \times 7 = \text{\$91} \end{aligned}$$

Sarah earns an allowance of \$7 per week. She also earns \$9 per hour baby-sitting. Write an expression that would represent the total amount of money she earns in one week.

$$7 + 9h$$

If Sarah babysits for 5 hours, how much money will she make?

$$7 + 9h$$

$$5 = h$$

$$7 + 9 \times 5 = \$52$$

At the school play, adult tickets cost \$7 and student tickets cost \$4. Write an expression to represent the total amount collected.

$$7A + 4S$$

Suppose 120 adult tickets and 84 student tickets were sold. How much money was collected?

$$\begin{array}{r}
 7 \cdot 120 + 4 \cdot 84 \\
 \cancel{7 \cdot 120} + 336 = 1176
 \end{array}$$

The formula for the perimeter of a rectangle is $P=2l + 2w$. The length of the rectangle is 4 units longer than the width. $4 + w = l$

$$8 + 4w$$

Write an algebraic expression that can be used to find the perimeter.

$$P = 2L + 2w$$

$$\begin{array}{r}
 P = 2(4+w) + 2w \\
 8 + 2w + 2w \\
 \hline
 8 + 4w
 \end{array}$$

What is the perimeter of the rectangle if the length is 12 in?

w

$$\begin{aligned}
 &8 + 4w \\
 &8 + 4(12) \\
 &8 + 48 \\
 &56 \text{ in}
 \end{aligned}$$

$$L + L + w + w$$

The formula for the perimeter of a rectangle is $P = 2l + 2w$. The width of the rectangle is 6 units shorter than the length. $w = L - 6$

Write an algebraic expression that can be used to find the perimeter.

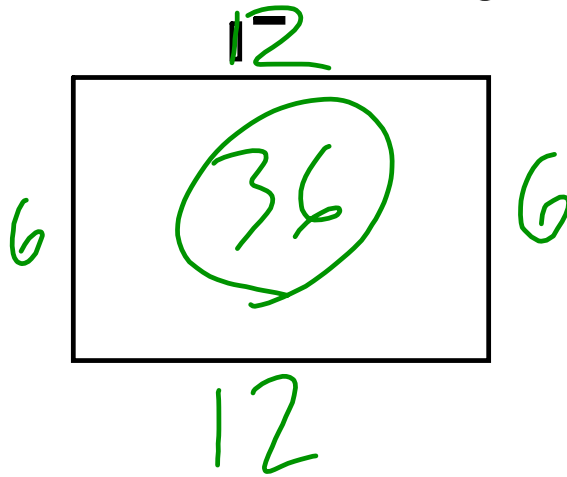
$$\begin{aligned}
 P &= 2L + 2w \\
 &2L + 2(L - 6) \\
 &2L + 2L - 12 \\
 &4L - 12
 \end{aligned}$$

What is the perimeter of the rectangle if the
~~width is 3 in?~~

$$L = 12$$

$$4L - 12$$

$$4(12) - 12$$



Variables, Expressions, and Formulas Name _____

- The formula that is used to convert Fahrenheit (F) to Celsius (C) is $5 \cdot (F - 32) \div 9$. Convert 77°F to degrees in Celsius.
- Find the total area of a rectangle tile using the formula lw with the length is 6m and a width is 8m .
- Ms. Li want to make a rectangular garden. The length of the garden is 8ft and width of the garden is 7ft . Use the formula $2l + 2w$ to find the perimeter of the garden.
- Charles is 3 years older than Paul. If y represents Paul's age, what expression represents Charles's age? If Paul is 25 years old, how old is Charles?
- Maya bought some pizzas for \$14 each. If p represents the number of pizzas she bought, what expression shows the total amount she spent? If she bought 5 pizzas how much money did she spend.
- Mohamed bought several bottles of juice for \$3 each. He paid for all of them with a \$20 bill. If j represents the number of bottles Mohamed bought, what expression represents the change he would receive? If Mohamed bought 4 bottles of juice, how much change would he receive?
- A giant bamboo plant grew 18 inches per year. When Mrs. Sanchez started measuring the plant it was 5 inches tall. If y represents the number of years she measured the plant, what expression represents its height?
- Mary earns an allowance of \$5 per week. She also earns \$6 per hour baby-sitting. Write an expression that would represent the total amount of money she earns in one week. If Mary babysits for 6 hours, how much money will she make?
- One Middle School sold tickets for a school play. The price of an adult ticket was \$5, and the price of a student ticket was \$3. Write an expression that represents the total amount of money collected. Suppose 150 adult tickets and 100 student tickets were sold. How much money was collected?

Variables, Expressions, and Formulas Name _____

- Mary earns an allowance of \$5 per week. She also earns \$6 per hour baby-sitting. Write an expression that would represent the total amount of money she earns in one week. If Mary babysits for 6 hours, how much money will she make?
EXP SOL $5 + 6h$ $5 + 6 \cdot 6 = \$41$
- The Food Lion grocery store advertises a special on 2-liter bottles of soft drinks. The first bottle purchased is \$1.50 and each bottle after that is \$1.10. Write an expression that can be used to find the total cost. Find the total cost if you purchase 5 bottles.
- One Middle School sold tickets for a school play. The price of an adult ticket was \$5, and the price of a student ticket was \$3. Write an expression that represents the total amount of money collected. Suppose 150 adult tickets and 100 student tickets were sold. How much money was collected?
- Ms. Li's car needs to be repaired. The cost of the repair is going to be \$90 per hour for labor and an additional \$220 for parts. Write an expression that would represent the cost of getting the car repaired if a mechanic works on it for h hours. Find the total cost if the mechanic works on the car for 4 hours.
- The formula that is used to convert Fahrenheit (F) to Celsius (C) is $5 \cdot (F - 32) \div 9$. Convert 77°F to degrees in Celsius.
- In order to encourage recycling, city of Tayuan is offering 20 cents for every kilogram of newspapers collected, five cents per plastic bottle. Write an expression for the total amount earned from recycling. If Chen brings in ten kilograms of newspapers, 32 plastic bottles, how much will he receive?
- Borders book store is advertising a sale. The price of hardback books is \$8.50 and the price of paperback books is \$4.50. Write an algebraic expression that can be used to find the total amount of money spent at the bookstore. Suppose Tom buys 6 hardback books and 4 paperback books. Find the total amount he spent at the book sale.
- Find the total area of a rectangle tile using the formula lw with the length is 6m and a width is 8m .
- Find the volume of a cubical packing box using the formula s^3 if the side length is 2ft .
- Ms. Li want to make a rectangular garden. The length of the garden is 8ft and width of the garden is 7ft . Use the formula $2l + 2w$ to find the perimeter of the garden.
 $2l + 2w$
 $2(8) + 2(7)$
 $16 + 14 = 30\text{ft}$

Practice

Write an algebraic expression for each verbal expression. Let $x =$ the number.

1. 5 more than a number	2. 10 decreased by a number
_____	_____
3. the quotient of 12 and a number	4. 8 times a number
_____	_____
5. subtract 9 from a number	6. multiply a number by 7
_____	_____
7. divide a number by 20	8. the sum of 15 and a number
_____	_____

Decreased means to subtract.

Write a verbal expression for each algebraic expression.

9. $12s$	10. $y - 3$
_____	_____

REMEMBER The coefficient is a factor of the product.

11. $6 + k$	12. $p \div 5$
_____	_____
13. $8 - m$	14. $32 \div x$
_____	_____

Write an algebraic expression for each verbal expression. Let $n =$ the number.

15. the product of 4 and the sum of 6 and a number _____
16. 5 more than the quotient of a number and 2 _____
17. the sum of 14 and the product of 8 and a number _____

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Variables, Expressions, and Formulas Name _____

- The formula that is used to convert Fahrenheit (F) to Celsius (C) is $5 \cdot (F - 32) \div 9$. Convert 77°F to degrees in Celsius.
 $5 \cdot (F - 32) \div 9 = 5 \cdot (77 - 32) \div 9 = 5 \cdot (45) \div 9 = 225 \div 9 = 25$
- Find the total area of a rectangle tile using the formula $l \cdot w$ with the length is 6m and a w is 8m.
 $l \cdot w = 6 \cdot 8 = 48 m^2$
- Ms. Li want to make a rectangular garden. The length of the garden is 8ft and width of the garden is 7ft. Use the formula $2l + 2w$ to find the perimeter of the garden.
 $2l + 2w = 2(8) + 2(7) = 16 + 14 = 30 FT$
- Charles is 3 years older than Paul. If y represents Paul's age, what expression represents Charles's age? If Paul is 25 years old, how old is Charles?
 $C = 3 + P$ $C = 3 + 25 = 28 \text{ YEARS OLD}$
- Maya bought some pizzas for \$14 each. If p represents the number of pizzas she bought, what expression shows the total amount she spent? If she bought 5 pizzas how much money did she spend?
 $14 \cdot p$ $14 \cdot 5 = \$70$
- Mohamed bought several bottles of juice for \$3 each. He paid for all of them with a \$20 bill. If j represents the number of bottles Mohamed bought, what expression represents the change he would receive? If Mohamed bought 4 bottles of juice, how much change would he receive?
 $20 - 3j$ $20 - 3(4) = 20 - 12 = \$8$
- A giant bamboo plant grew 18 inches per year. When Mrs. Sanchez started measuring the plant it was 5 inches tall. If y represents the number of years she measured the plant, what expression represents its height?
 $18y + 5$
- Mary earns an allowance of \$5 per week. She also earns \$6 per hour baby-sitting. Write an expression that would represent the total amount of money she earns in one week. If Mary babysits for 6 hours, how much money will she make?
 $6x + 5$ $6(6) + 5 = 36 + 5 = \$41$
- One Middle School sold tickets for a school play. The price of an adult ticket was \$5, and the price of a student ticket was \$3. Write an expression that represents the total amount of money collected. Suppose 150 adult tickets and 100 student tickets were sold. How much money was collected?
 $5A + 3S$ $5(150) + 3(100) = 750 + 300 = \1500

Variables, Expressions, and Formulas Name _____

- Mary earns an allowance of \$5 per week. She also earns \$6 per hour baby-sitting. Write an expression that would represent the total amount of money she earns in one week. If Mary babysits for 6 hours, how much money will she make?
 $6h + 5$ $6(6) + 5 = 36 + 5 = \$41$
- The Food Lion grocery store advertises a special on 2-liter bottles of soft drinks. The first bottle purchased is \$1.10 and each bottle after that is \$1.10. Write an expression that can be used to find the total cost. Find the total cost if you purchase 9 bottles.
 $1.10B + 1.50$ $1.10(9) + 1.50 = 9.90 + 1.50 = \5.90
- One Middle School sold tickets for a school play. The price of an adult ticket was \$5, and the price of a student ticket was \$3. Write an expression that represents the total amount of money collected. Suppose 150 adult tickets and 100 student tickets were sold. How much money was collected?
 $5a + 3s$ $5(150) + 3(100) = 750 + 300 = \1500
- Ms. Li's car needs to be repaired. The cost of the repair is going to be \$90 per hour for labor and an additional \$220 for parts. Write an expression that would represent the cost of getting the car repaired if a mechanic works on it for h hours. Find the total cost if the mechanic works on the car for 4 hours.
 $90h + 220$ $90(4) + 220 = 360 + 220 = \580
- The formula that is used to convert Fahrenheit (F) to Celsius (C) is $5 \cdot (F - 32) \div 9$. Convert 77°F to degrees in Celsius.
 $5 \cdot (F - 32) \div 9 = 5 \cdot (77 - 32) \div 9 = 5(45) \div 9 = 225 \div 9 = 25$
- In order to encourage recycling, city of Tayuan is offering 20 cents for every kilogram of newspapers collected, five cents per plastic bottle. Write an expression for the total amount earned from recycling. If Chen brings in ten kilograms of newspapers, 32 plastic bottles, how much will he receive?
 $20n + 5b$ $20(10) + 5(32) = 200 + 160 = \360
- Borders book store is advertising a sale. The price of hardback books is \$8.50 and the price of paperback books is \$4.50. Write an algebraic expression that can be used to find the total amount of money spent at the bookstore. Suppose Tom buys 6 hardback books and 4 paperback books. Find the total amount he spent at the book sale.
 $8.50H + 4.50P$ $8.50(6) + 4.50(4) = 51 + 18 = \69
- Find the total area of a rectangle tile using the formula $l \cdot w$ with the length is 6m and a w is 8m.
 $l \cdot w = 6 \cdot 8 = 48 m^2$
- Find the volume of a cubical packing box using the formula s^3 if the side length is 2ft.
 $s^3 = 2^3 = 8 FT^3$
- Ms. Li want to make a rectangular garden. The length of the garden is 8ft and width of the garden is 7ft. Use the formula $2l + 2w$ to find the perimeter of the garden.
 $2(8) + 2(7) = 16 + 14 = 30 FT$