

Algebra 1

Warm Up

Week 1 Block

Write an algebraic expression for each phrase.

- | | | | |
|------------------------------|----------------------|-------------------------------|----------------------|
| 1. 4 more than p | <input type="text"/> | 2. y minus 12 | <input type="text"/> |
| 3. 12 minus m | <input type="text"/> | 4. the product of c and 15 | <input type="text"/> |
| 5. the quotient of n and 8 | <input type="text"/> | 6. the quotient of 17 and k | <input type="text"/> |
| 7. 23 less than x | <input type="text"/> | 8. the sum of v and 3 | <input type="text"/> |

Write an expression for each phrase.

- | | | | |
|------------------------------------|----------------------|--------------------------------------|----------------------|
| 9. 2 more than twice a number | <input type="text"/> | 10. a number minus 11 | <input type="text"/> |
| 11. 9 minus a number | <input type="text"/> | 12. a number divided by 82 | <input type="text"/> |
| 13. the product of 5 and a number | <input type="text"/> | 14. the sum of 13 and twice a number | <input type="text"/> |
| 15. the quotient of a number and 6 | <input type="text"/> | 16. the quotient of 11 and a number | <input type="text"/> |

Define variables and write an equation to model the relationship in each table.

17.

Number of Workers	Number of radios built
1	13
2	26
3	39
4	52

18.

Number of Tapes	Cost
1	\$8.50
2	\$17.00
3	\$25.50
4	\$34.00

19.

Number of sales	Total Earnings
5	\$2.00
10	\$4.00
15	\$6.00
20	\$8.00

20.

Number of Hours	Total Pay
4	\$32
6	\$48
8	\$64
10	\$80

Define variables and write an equation to model the relationship in each table.

17.

Number of Workers	Number of radios built
1	13
2	26
3	39
4	52

let $n = \#$ workers
 $R = \#$ radios built
 $R = 13n$

18.

Number of Tapes	Cost
1	\$8.50
2	\$17.00
3	\$25.50
4	\$34.00

let $n = \#$ tapes
 $C = \text{cost in } \$$
 $C = 8.50n$

19.

Number of sales	Total Earnings
5	\$2.00
10	\$4.00
15	\$6.00
20	\$8.00

let $n = \#$ sales
 $E = \text{total earnings}$
 $E = 0.40n$

20.

Number of Hours	Total Pay
4	\$32
6	\$48
8	\$64
10	\$80

let $n = \#$ hours
 $P = \text{total pay in } \$$
 $P = 8n$

Following Orders or PEMDAS



In a mathematical expression like $16 + 5 \cdot 35$, it may not be clear if we should add the 16 and 5 first, then multiply by the 35, or multiply the 5 and 35 first, then add the 16. One way gives the answer of 191 and the other is 735.

$$\begin{aligned} 16 + 5 \cdot 35 \\ 21 \cdot 35 \\ 735 \end{aligned}$$

$$\begin{aligned} 16 + 5 \cdot 35 \\ 16 + 175 \\ 191 \end{aligned}$$

Which is correct? To avoid confusion, an official **order of operations** has been established.

Order of Operations

PEMDAS:

P -

E -

MD -

AS -

So, what is the correct answer to $16 + 5 \cdot 35$? Find the work at the top of the page that follows the correct order of operations, and circle that answer.

Here is another example: $8[36 - 3(2 + 5)] \div 8 + 3 = 8[36 - 3(7)] \div 8 + 3$

$$\begin{aligned} &= 8[36 - 21] \div 8 + 3 \\ &= 8[15] \div 8 + 3 \\ &= 120 \div 8 + 3 \\ &= 15 + 3 \\ &= 18 \end{aligned}$$

Now you try a few:

1. $25 \div 5 + 4 \cdot 10 =$

2. $9 \cdot 2 - 12 \div 6 =$

3. $24 - 18 \div 3 \div (6 - 4) =$

4. $27 \div (6 - 3) \div 2 =$

5. $5 \cdot 20 - 2 \cdot 40 + 27 \div 3 - 6 \div 2 =$

6. $4 - (9 - 5) + 20 \cdot (4 - 2) \cdot 6 =$

Scrambled answers: $\frac{9}{2}$, 16, 21, 26, 45, 240

What Should You Order?



Time to review order of operations, with exponents included. Complete these problems without using a calculator!

Simplify. Show your work step by step. Check your answers at the bottom of the page!

1. $2 \cdot 5 + 3^2 - (9 + 4) =$

2. $(10 - 6) - 2^3 \div (4) \cdot 2 =$

3. $(10 + (5^2 \cdot 2)) \div 6 + 4 =$

4. $((9 - 7)^2 + \sqrt{25}) - 3 =$

5. $(2 \cdot (16) \div \sqrt{64} + (5^2 - 6)) =$

6. $4(3^3 - (9 - 5)^2 + 6 \div 2) =$

7. $8(6^2 - 3(2 + 5)) \div (6) - \sqrt{9} =$

8. $((\sqrt{49} + \sqrt{16} \cdot 2) + (4^2 - 3 \div 3 + 2)) =$

Scrambled answers: 0, 6, 6, 14, 17, 23, 32, 56

Evaluating Formulas



Evaluate each formula for the given information. First copy the formula, and then substitute the values provided for the variables and show the steps necessary to find the solution.

1. If $P = 2L + 2W$, where P = perimeter of a rectangle, L = length, and W = width,

find P when:

$$L = 16 \text{ ft}$$

$$W = 10 \text{ ft}$$

2. If $V = IR$, where V = voltage, I = amperage, and R = resistance,

find V , when:

$$I = 8 \text{ amps}$$

$$R = 3.5 \text{ ohms}$$

3. If $I = PRT$, where I = amount of interest, P = principal, R = interest rate, T = time in years,

find I when:

$$P = \$650$$

$$R = 4\%$$

$$T = 3 \text{ yrs}$$

4. If $V = \pi r^2 h$ where V = volume of a cylinder, r = radius, and h = height,

find V when:

$$\pi = 3.14$$

$$r = 4 \text{ cm}$$

$$h = 10 \text{ cm}$$

5. If $S = \frac{n}{2}(t_1 + t_n)$ where S = sum of the terms of a sequence, n = number of terms,

t_1 = first term, and t_n = last term,

find S when:

$$n = 15$$

$$t_1 = 7$$

$$t_n = 31$$

HW

It's all Greek to Me!



The Pythagorean Theorem was named after the Greek mathematician Pythagoras who was credited with its discovery. This theorem states a relationship between all three sides of a right triangle. All right triangles have two sides called **legs** (these form the right angle) and a longest side called the **hypotenuse** (across from the right angle).



The Pythagorean Theorem

For right triangles only,

(leg)² + (leg)² = (hypotenuse)²

For the triangle shown to the right,

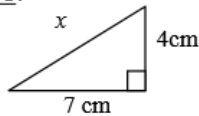
$a^2 + b^2 = c^2$

hypotenuse
(c)

leg
(a)

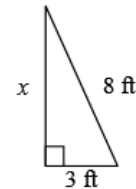
leg
(b)

The following examples show how you can determine the length of one missing side if you are given two side lengths.

Example 1:

$$\begin{aligned} \text{leg}^2 + \text{leg}^2 &= \text{hypotenuse}^2 \\ 7^2 + 4^2 &= x^2 \\ 49 + 16 &= x^2 \\ 65 &= x^2 \\ \sqrt{65} &= x \\ 8.1 &\approx x \end{aligned}$$

The hypotenuse is about 8.1 cm long.

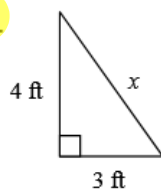
Example 2:

$$\begin{aligned} \text{leg}^2 + \text{leg}^2 &= \text{hypotenuse}^2 \\ 3^2 + x^2 &= 8^2 \\ 9 + x^2 &= 64 \\ x^2 &= 55 \\ x &= \sqrt{55} \\ x &\approx 7.4 \end{aligned}$$

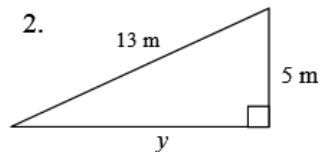
The missing leg is about 7.4 ft long.

Use the Pythagorean Theorem to find the length of the missing side in each of the following triangles. Show all of your steps and round your answers to the nearest tenth.

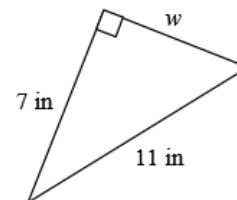
1.



2.



3.



HW: 1-2.A, 1-2.B, 1-2.C, 10.1A

Arrange these sentences in order

Eat breakfast

Go to school

Get out of bed

Get dressed

Shower


What is the correct answer to this problem

$$2 + 3 \times 18 / 6 - 2 =$$

5

13

9



The diagram shows the equation $2 + 3 \times 18 / 6 - 2 =$ on the left. Three arrows branch out from the equals sign to the numbers 5, 13, and 9. To the right of each number is a red 'F' inside a white circle, indicating that each of these numbers is an incorrect answer.

Now to find out why only one answer is correct.

WHY IS THE **ORDER OF OPERATIONS** IMPORTANT?

Move this box down to show discussion.

Sometimes we use the first letters in the saying
"Please Excuse My Dear Aunt Sally"
to remember the
Order of Operations:

Write the math word that each letter stands for.

Touch the ✓ to reveal the correct answers.

P

PARENTHESES

E

EXPONENTS

M

MULTIPLICATION

D

DIVISION

A

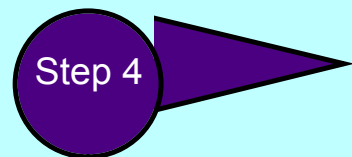
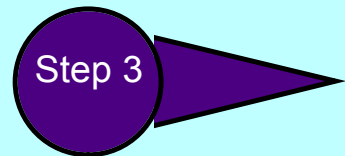
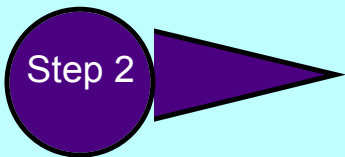
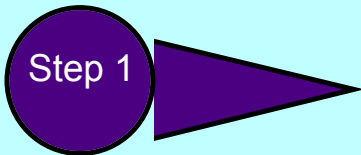
ADDITION

S

SUBTRACTION

Let's Review the Order of Operations...

Pull tab to reveal the Order of Operations:



Evaluate the given expression. Show your steps and answer in the gray box.

$$2(5-4)^2+3$$

When finished, drag the expression to the black box to see the answer.

Remember that multiplication/division and addition/subtraction go in order from left to right. If division comes first, do it first. If subtraction comes first, do it first.

Examples:

$$6/3*4 : \text{ Slide to the right to show the steps.}$$

$$9-5+4 \text{ Slide to the right to show the steps.}$$

Try these!

$$10/2*3 \text{ Slide to the right to show the steps}$$

$$8-4+2 \text{ Slide to the right to show the steps}$$

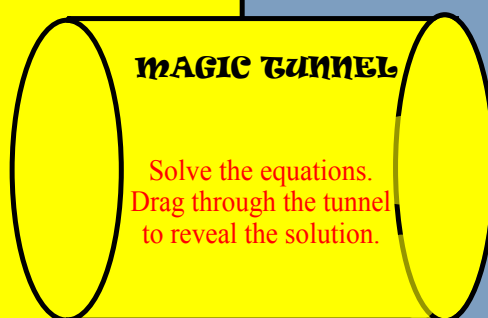
$$3 * (4 + 7) =$$

$$6 + 9 * 5 =$$

$$1 + 2 * 3^2 =$$

$$(-8 + 43) / 5 =$$

$$115 - 10^2 + 3 * 5 =$$



$$(18 - 11) * 3 + 7 =$$

$$15 + 10 * 4 =$$

$$10 - 4 / 2 * 3 =$$

$$14 - 7 + 5 + 1 =$$

$$9.5 * 2 / .5 + 45 / 5 =$$

