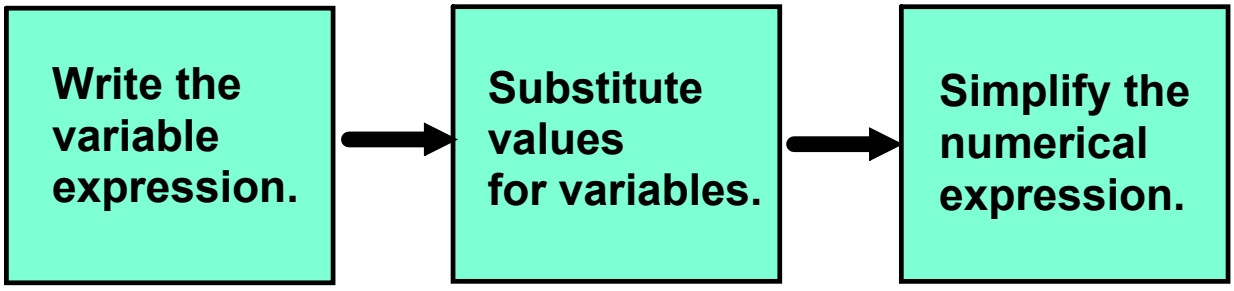
1.1 VARIABLES & EXPRESSIONS

variable- a letter that is used to represent one or more numbers

algebraic expression- a collection of numbers, variables, and operations (ie: multiplication, division, addition, or subtraction)

evaluating the expression- replacing each variable in an expression by a number



EXAMPLES

1. Evaluate the expression when y = 2.

a) $8y$

$8 \cdot 2$

8×2

$8(2)$

$\boxed{16}$

b) $\frac{10}{y}$

$\frac{10}{2}$

$\boxed{5}$

c) $y + 3$

$2 + 3$

$\boxed{5}$

d) $14 - y$

$14 - 2$

$\boxed{12}$

2. Evaluate the expression when k = 3.

a) $k + 8$

$3 + 8$

$\boxed{11}$

b) $4k$

$4 \cdot 3$

$\boxed{12}$

c) $18 - k$

$18 - 3$

$\boxed{15}$

d) $\frac{12}{k}$

$\frac{12}{3}$

$\boxed{4}$

ADDITION

- sum
- increased by
- plus
- more than
- added to
- the total of

EXAMPLES: Write the phrase as a variable expression. Let x represent the number.

3. fifteen more than a number

$15 + x$

4. the sum of a number and eight

$x + 8$

SUBTRACTION

- difference
- decreased by
- minus
- less than change order
- subtracted to/from
- less = minus

5. a number decreased by three

$x - 3$

6. twenty-seven less than a number

$x - 27$

7. the difference of nine and a number

$9 - x$

8. a number less one

$x - 1$

MULTIPLICATION

- product
- multiplied by
- times
- of

9. the product of eighty-five and a number

$85x$

10. one-half of a number

$\frac{1}{2}x$

11. twenty times a number

$20x$

AVOID → $\div$ & $\overline{)}$

DIVISION (fraction!)

- quotient
- divided by
- the ratio of

12. the quotient of eleven and a number

$\frac{11}{x}$

13. a number divided by three

$\frac{x}{3}$

BE CAREFUL WHEN THERE IS MORE THAN ONE OPERATION!

14. Translate the phrase "the quotient when the quantity 10 plus a number is divided by 2" into an expression.

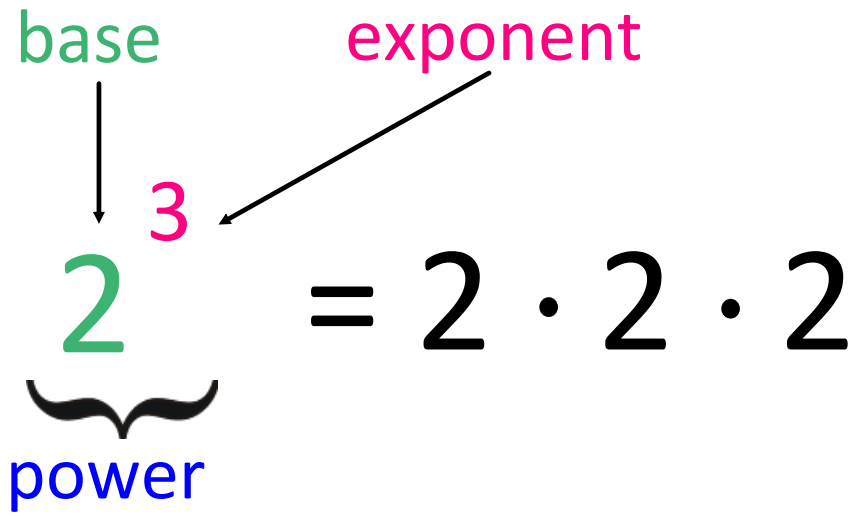
$$\frac{10+x}{2}$$

15. Translate the phrase "8 times the quantity 4 plus a number" into an expression.

$$8(4+x)$$

16. Translate the phrase "the quotient of the square of a number and 5" into an expression.

$$\frac{x^2}{5}$$



Exponential Form	Words	Meaning
4^2	four to the second power or four squared	$4 \cdot 4$
8^3	eight to the third power or eight cubed	$8 \cdot 8 \cdot 8$
x^5	*x* to the fifth power	$x \cdot x \cdot x \cdot x \cdot x$

EXAMPLES: Write the power in words and as a product.

17. 8^2 eight squared $8 \cdot 8$

18. y^6 y to the sixth power $y \cdot y \cdot y \cdot y \cdot y \cdot y$

Evaluate the power.

19. Evaluate x^3 when $x = 5$.

$5 \cdot 5 \cdot 5 =$ 125

20. Evaluate h^6 when $h = 2$.

$2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 =$ 64

21. Evaluate $\left(\frac{1}{4}\right)^2$.

$\frac{1}{4} \cdot \frac{1}{4} = \frac{1}{16}$

22. Evaluate $\left(\frac{2}{3}\right)^3$.

$\frac{2}{3} \cdot \frac{2}{3} \cdot \frac{2}{3} = \frac{8}{27}$