Algebra 1-5: Variables in Formulas

Warm-Up

1. Evaluate $4n^2$ when n = 3. 36 $4 \cdot 3^2 = 4 \cdot 9 = 36$

2. **Evaluate $(4n)^2$** when n = 3. 144 $(4 \cdot 3)^2 = 12^2 = 144$

3. Find a value of n so that the value of $4n^2$ is the same as the value of $(4n)^2$.

n = 0 $4(0)^2 \stackrel{?}{=} (4 \cdot 0)^2$ $0 = 0$

n = 1 $4 \cdot 1^2 = (4 \cdot 1)^2$ $4 \neq 4^2$

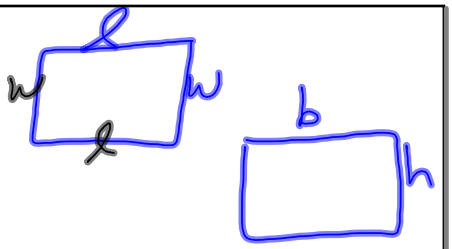
Vocabulary	Definition	Example
Formula	an equation that helps you find something	$C = \pi \cdot D$, $A = l \cdot w$
"In terms of ..."	$A = l \cdot w$ A is in terms of l and w	
"Depends on..."	A depends on l and w	

Area depends on the length and width of a rectangle.

Ex) $C = \pi \cdot D$ C is in terms of D.

Common Formulas

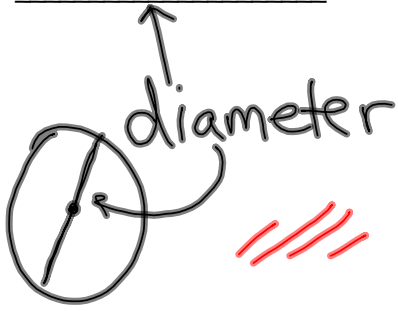
Perimeter of a Square/Rectangle = $2l + 2w$
↳ distance around the outside



Area of a Square/Rectangle = lw or bh
↳ space inside

Distance = Rate · Time $(D = R \cdot T)$

Circumference (distance around) of a Circle = $\pi \cdot D$



Example Problems

1. If a car is traveling at r miles per hour and the brakes are applied, the car will take approximately d feet to stop, where $d = r + \frac{r^2}{20}$

a. This is a formula for d in terms of r.

b. d depends on r.

c. What is the approximate braking distance for a car traveling 50 miles per hour?

$$d = 50 + \frac{50^2}{20} = 50 + \frac{2{,}500}{20} = 50 + 125 = 175 \text{ feet}$$

2. Find the circumference of a circle with a radius of 5 cm.

$C = \pi \cdot D$

$C = \pi \cdot 10 =$

$= 3.14(10)$

$= 31.4\text{cm}$

$D = 10\text{cm}$

3. Find the distance you traveled if you drove 60 mph for 2.5 hours. (rate, time)

$D = R \cdot T \quad D = 60(2.5) = 150 \text{ miles}$

4. Find the perimeter of a rectangle with a length of 4 feet and a width of 3.5 feet.

3.5 | 4 | 3.5

$4 + 4 + 3.5 + 3.5 = 15 \text{ feet}$

5. Book Example- pg. 28.

$$N = \frac{20Ld}{600 + s^2}$$

is a formula for finding the number of cars that should be allowed on a road at a given time.

L = number of lanes on road

d = length of road (in feet)

s = average speed of car (mph)

$N = \#$ of cars

$5 \times 5280 = 26{,}400$

About how many cars can safely be on a 5-mile stretch of a 4-lane highway if the average speed of the cars is 60 mph? 503 cars

$$N = \frac{20(4)(26{,}400)}{600 + (60)^2} = \frac{2{,}112{,}00}{600 + 3600}$$

$$= \frac{2{,}112{,}000}{4200}$$

$$= 502.9$$