

OBJECTIVE 1: Using Formulas to Solve Problems

Formulas we need to recall to use include: distance, time, volume, weight & money. We use letters to represent unknowns in the formula so we can use them for different scenarios.

Steps for Problem Solving

- 1) **UNDERSTAND** the problem
 - Read and reread the problem
 - Choose a variable for the unknown
 - Draw a picture if one is not provided
 - Propose a solution and check that answer in the original problem
- 2) **TRANSLATE** the problem into an equation
- 3) **SOLVE** the equation
- 4) **INTERPRET** the solution
 - Check the answer in terms of the problem
 - Use appropriate units

Formulas

Their Meanings

$A = lw$	Area of a rectangle = length (width)
$I = PRT$	Simple Interest = principal (rate)(time)
$P = a + b + c$	Perimeter of a Triangle = side a + side b + side c
$d = rt$	Distance = rate (time)
$V = lwh$	Volume of a rectangular solid = length(width)(height)
$F = 1.8C + 32$	Degrees Fahrenheit = (1.8) degrees Celsius + 32

TASK 1: Finding Time Given Rate & Distance

a) A glacier is a giant mass of rocks and ice that flows downhill like a river. Portage Glacier in Alaska is about 6 miles, or 30,680 feet, long and moves 400 feet per year. Icebergs are created when the front end of the glacier flows into Portage Lake. How long does it take for ice at the head (beginning) of the glacier to reach the lake?

$d = rt$

$30,680 = 400t$

$t \approx 79.2 \text{ years}$

b) The Stromboli Volcano, in Italy, began erupting in 2002 and continues to be active after a dormant period of over 17 years. In 2007, a volcanologist measured the lava flow to be moving at 5 meters/second. If the path the lava follows to the sea is 580 meters long, how long does it take the lava to reach the sea?

$d = rt$

$580 = 5t$

$t = 116 \text{ secs}$

TASK 2: Calculating the Length of a Garden

a) Charles Pecot can afford enough fencing to enclose a rectangular garden with a perimeter of 140 feet. If the width of his garden must be 30 feet, find the length.

$P = 2L + 2w$ $140 = 2L + 2(30) \rightarrow 140 = 2L + 60 \rightarrow 80 = 2L \rightarrow L = 40 \text{ ft}$

b) Evelyn Gryk fenced in part of her backyard for a dog run. The dog run was 40 feet in length and used 98 feet of fencing. Find the width of the dog run.

$P = 2L + 2w$ $98 = 2(40) + 2w \rightarrow 98 = 80 + 2w \rightarrow 2w = 18 \rightarrow w = 9 \text{ ft}$

TASK 3: Finding an Equivalent Temperature

a) The average minimum temperature for July in Shanghai, China, is 77° Fahrenheit. Find the equivalent temperature in degrees Celsius.

$77 = \frac{9}{5}C + 32 \rightarrow \frac{9}{5}(45) = \frac{9}{5}C$ $[25^\circ C]$

b) The average minimum temperature for July in Sydney, Australia, is 8° Celsius. Find the equivalent temperature in degrees Fahrenheit.

$F = \frac{9}{5}(8) + 32 = [46.4^\circ F]$

TASK 4: Finding Road Sign Dimensions

a) The length of a rectangular road sign is 2 feet less than three times its width. Find the dimensions if the perimeter is 28 feet.

$P = 2L + 2w \rightarrow 28 = 2(3w - 2) + 2w \rightarrow 28 = 6w - 4 + 2w \rightarrow 28 = 8w - 4 \rightarrow 32 = 8w$

b) The new street signs along Route 114 have a length that is 3 inches more than 5 times the width. Find the dimensions of the signs if the perimeter of the signs is 66 inches.

$P = 2L + 2w \rightarrow 66 = 2(5w + 3) + 2w \rightarrow 66 = 10w + 6 + 2w \rightarrow 66 = 12w + 6 \rightarrow 60 = 12w$

Still need help with:

$L = 5w + 3 = 5(5) + 3 = 25 + 3 = 28$

$[L = 28 \text{ in}]$

$W = 5 \text{ in}$

$L = 10 \text{ ft}$
 $W = 4 \text{ ft}$

$P = 140$

$P = 98$

$F = \frac{9}{5}C + 32$

$P = 28$

$P = 66$