2.4 Perimeter Word Problems

- Identify all parts using the same variable.
- Write the necessary formula.

$P_{\square} = 2l + 2w$

$P_{\triangle} = a + b + c$

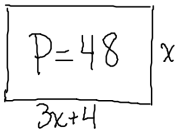
$P_{\square} = 4s$

Examples:

1. The length of a rectangle is 4 more than 3 times the width. The perimeter is 48. Find the length.

let x = width

$3x+4$ = length



$2l + 2w = P$

$2(3x+4)+2(x)=48$

$6x+8+2x=48$

$6x+2x=48-8$

$8x=40$

$x=\frac{40}{8}$

$x=5$

$3x+4$

$3(5)+4$

$15+4$

19

The length is 19.

2. The length of a rectangle is 3 more than 5 times the width. The perimeter is 126 m. Find the length and width.

let x = width

$5x+3$ = length

$2l + 2w = P$

$2(5x+3)+2(x)=126$

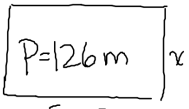
$10x+6+2x=126$

$10x+2x=126-6$

$12x=120$

$x=\frac{120}{12}$

$x=10$



The width is 10 m.
The length is 53 m.

$5x+3$

$5(10)+3$

$50+3$

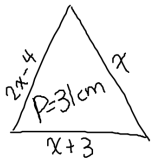
53

3. The first side of a triangle is 3 cm longer than the second side. The third side is 4 cm shorter than twice the length of the second side. If the perimeter is 31 cm, find the length of each side.

let x = second side

$x+3$ = first side

$2x-4$ = third side



$a + b + c = P$

$x+(x+3)+(2x-4)=31$

$x+x+3+2x-4=31$

$4x-1=31$

$4x=31+1$

$4x=32$

$x=\frac{32}{4}$

$x=8$

The 1st side is 11 cm.
The 2nd side is 8 cm.
The 3rd side is 12 cm.

$x+3$

$8+3$

11

$2x-4$

$2(8)-4$

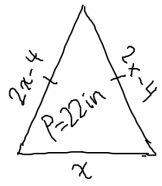
$16-4$

12

4. The length of each leg of an isosceles triangle is 4 inches less than twice the base. Find the length of each side if the perimeter is 22 inches.

let x = base

$2x-4$ = leg



$a + b + c = P$

$(2x-4)+(2x-4)+x=22$

$2x-4+2x-4+x=22$

$5x-8=22$

$5x=22+8$

$5x=30$

$x=\frac{30}{5}$

$x=6$

$2x-4$

$2(6)-4$

$12-4$

8

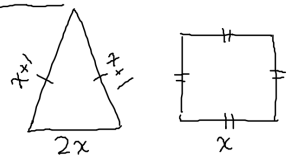
The base is 6 in.
The legs are 8 in.

5. The base of an isosceles triangle is twice as long as the side of a square. Each of the legs is 1 inch longer than a side of the square. Find the length of a leg of the triangle if the sum of the perimeters is 18 inches.

let x = side of $\square$

$2x$ = base of $\triangle$

$x+1$ = leg of $\triangle$



★★★ $P_{\triangle} + P_{\square} = 18$

formulas $a+b+c+4s=18$

$2x+(x+1)+(x+1)+4x=18$

$2x+x+1+x+1+4x=18$

$8x+2=18$

$8x=18-2$

$8x=16$

$x=\frac{16}{8}$

$x=2$

$x+1$

$2+1$

3

The leg is 3 in

HOMEWORK

Worksheet HW - 2.4
Perimeter Problems