Name Key
8A; Algebra 1

Perimeter formula for a rectangle

Hmwk: 4, 6, 7

Date
8R Period

#24

$P = 2L + 2W$

Perimeter Word Problems

I. Definitions-

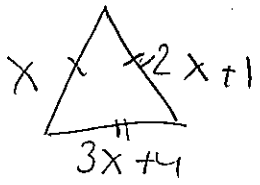
A) Perimeter- The total sum of the lengths of the sides of a polygon

B) Regular polygon- A polygon whose sides are all congruent (equal)

*** When solving perimeter word problems, make sure to draw a correctly labeled diagram**

II. Part I type problems-

1) Find the perimeter of a triangle whose sides are x, 2x + 1 and 3x + 4.



$x + 2x + 1 + 3x + 4$

$6x + 5$

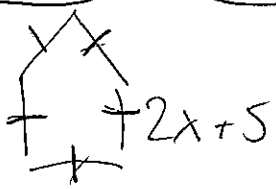
2) The perimeter of a square is 4x - 4. Express the length of one side of the square in terms of x.

$P = 4x - 4$

$\frac{4x-4}{4} = \frac{4x}{4} - \frac{4}{4} = x - 1$

3) If one side of a regular pentagon is 2x + 5, what is the perimeter?

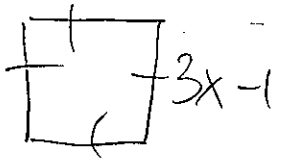
*a regular means all sides are congruent



$5(2x + 5)$

$10x + 25$

4) The length of a side of a square is represented by 3x - 1. If the perimeter of the square is 68 find the value of x. Create an equation



$4(3x - 1) = 68$

$12x - 4 = 68$

$+4 \quad +4$

$\frac{12x}{12} = \frac{72}{12}$

$x = 6$

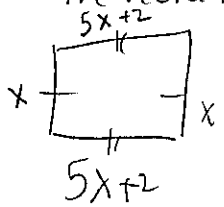
III. Part II type problems. Use LESC to solve. (Remember your diagrams)

1) The perimeter of a rectangle is 40 feet. The length is 2 feet more than 5 times the width. Find the dimensions of the rectangle.

$x + x + 5x+2 + 5x+2 = 40$

L

Let
x = the width of the rectangle
$5x+2$ = the length of the rectangle



E (or)

$2(x) + 2(5x+2) = 40$
$2x + 10x + 4 = 40$
$12x + 4 = 40$
$-4 \quad -4$
$\frac{12x}{12} = \frac{36}{12}$
$x = 3$
$5x+2 = 17$

S

The width of the rectangle is 3 ft & the length of the rectangle is 17 ft

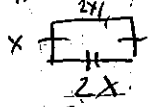
C

$3+3+17+17 = 40$ ○
$5(3) = 15$
$15+2 = 17$ ✓

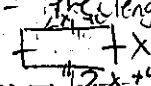
2) The length of a rectangle is twice the width. If the length is increased by 4 inches and the width is decreased by 1 inch, a new rectangle is formed whose perimeter is 198 inches. Find the dimensions of the original rectangle.

L

Let
x = the width of the original rectangle
$2x$ = the length of the original rectangle



$x-1$ = the width of the new rectangle
$2x+4$ = the length of the new rectangle



E

$2(2x+4) + 2(x-1) = 198$
$4x + 8 + 2x - 2 = 198$
$6x + 6 = 198$
$-6 \quad -6$
$\frac{6x}{6} = \frac{192}{6}$
$x = 32$
$2x = 64$
$2x+4 = 68$
$x-1 = 31$

S

The original width of the rectangle is 32 inches & the original length of the rectangle is 64 inch

C

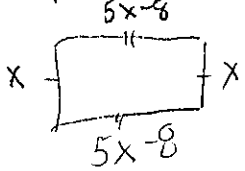
$32(2) = 64$
$64+4 = 68$ ○
$32-1 = 31$
$68+68+31+31 = 198$

3) The length of a rectangle is 8 meters less than 5 times its width. If the perimeter of the rectangle is at most 104 meters, find the greatest possible width of the rectangle.

$x + x + 5x-8 + 5x-8 \leq 104$

L

Let
x = the width of the rectangle
$5x-8$ = the length of the rectangle



E

$2(x) + 2(5x-8) \leq 104$
$2x + 10x - 16 \leq 104$
$12x - 16 \leq 104$
$+16 \quad +16$
$\frac{12x}{12} \leq \frac{120}{12}$
$x \leq 10$
$5x-8 \leq 42$

S

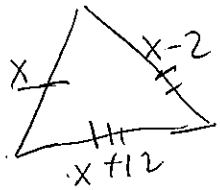
The greatest possible width of the rectangle is 10 meters

C

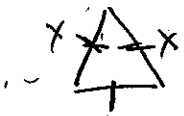
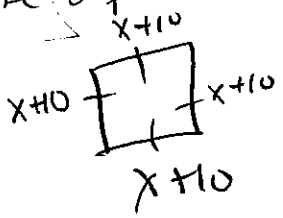
$5(10) = 50$
$50-8 = 42$
$10+10+42+42 = 104$
$104 \leq 104$

$5(20) = 100$
$100-8 = 92$
$20+20+92+92 = 224$ ○
$224 \not\leq 104$ X

4) The length of the second side of a triangle is 2 inches less than the length of the first side. The length of the third side is 12 inches more than the length of the first side. The perimeter of the triangle is 73 inches. Find the length of each side of the triangle.

L	E	S	C
let x = the length of the 1st side of the triangle x − 2 = the length of the 2nd side of the triangle x + 12 = the length of the 3rd side of the triangle 	x + x − 2 + x + 12 = 73 3x + 10 = 73 −10 −10 3x = 63 3 3 x = 21 x − 2 = 19 x + 12 = 33	the 1st side of the triangle is 21 inches, the 2nd side is 19 inches & the 3rd side is 33 inches	21 − 2 = 19 ✓ 21 + 12 = 33 ✓ 21 + 19 + 33 = 73 ✓

5) A side of a square is 10 meters longer than the side of an equilateral triangle. The perimeter of the square is 3 times the perimeter of the triangle. Find the length of each side of the triangle.

L	E	J	C
let x = the length of each side of the equilateral triangle  x + 10 = the length of each side of the square 	x + 10 + x + 10 + x + 10 + x + 10 = 3(x + x + x) or 4(x + 10) = 3(3x) 4x + 40 = 3(3x) 4x + 40 = 9x −4x −4x 40 = 5x 5 5 x = 8 x + 10 = 18	the length of each side of the equilateral triangle is 8 meters	8 + 10 = 18 18(4) = 72 8(3) = 24 24(3) = 72 ✓

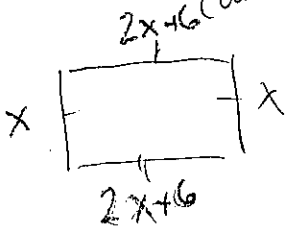
6) The perimeter of a rectangular tennis court is 228 feet. If the length of the court exceeds twice its width by 6 feet, find its dimensions.

2x + 6

L

Let
x = the width of the tennis court.

2x+6 = the length of the tennis court



E

$2(x) + 2(2x+6) = 228$

$2x + 4x + 12 = 228$

$6x + 12 = 228$

$-12 \quad -12$

$\frac{6x}{6} = \frac{216}{6}$

$x = 36$

$2x+6 = 78$

S

the width of the tennis court is 36 ft + the length is 78 ft

C

$36+36+78+78=228$ ✓

$2(36) = 72$

$72+6 = 78$ ✓

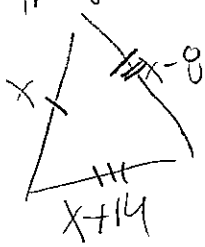
7) The length of the second side of a triangle is 8 inches less than the length of the first side. The length of the third side is 14 inches more than the length of the first side. The perimeter of the triangle is 63 inches. Find the length of each side of the triangle.

L

Let
x = the length of the 1st side of the triangle

x−8 = the length of the 2nd side of the triangle

x+14 = the length of the third side of the triangle



E

$x + x - 8 + x + 14 = 63$

$3x + 6 = 63$

$-6 \quad -6$

$\frac{3x}{3} = \frac{57}{3}$

$x = 19$

$x-8 = 11$

$x+14 = 33$

S

the 1st side of the triangle is 19 inches, the 2nd side is 11 inches, the third side is 33 inches

C

$19-8=11$ ✓

$19+14=33$ ✓

$19+11+33=63$ ✓