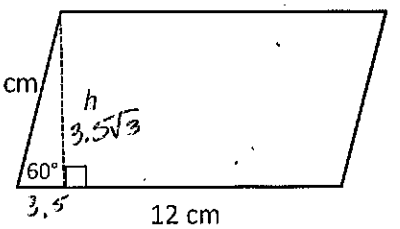
11-2 Area of Parallelograms, Triangles, and Rhombuses

Area of a Parallelogram: $A_{para} = bh$

Area of a Triangle: $A_{tri} = \frac{1}{2}bh$

Area of a Rhombus: $A_{rhom} = \frac{1}{2}d_1d_2$ where d_1 and d_2 are the diagonals of the rhombus

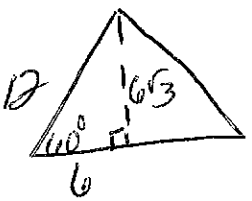
Ex 1) Find the area of the parallelogram shown.



$A = 12(3.5\sqrt{3})$

$= 42\sqrt{3}\ cm^2$

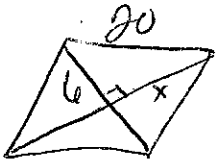
Ex 2) Find the area of an equilateral triangle that has a perimeter of 36 in.



$A = \frac{1}{2}(12)(6\sqrt{3})$

$= 36\sqrt{3}\ in^2$

Ex 3) Find the area of the rhombus that has a perimeter of 80 ft and one diagonal of 12 ft.



$6^2 + x^2 = 20^2$

$36 + x^2 = 400$

$x^2 = 364$

$x = \sqrt{4 \cdot 91}$

$x = 2\sqrt{91}$

$d_2 = 4\sqrt{91}$

$A = \frac{1}{2}(12)(4\sqrt{91})$

$= 24\sqrt{91}\ ft^2$

Ex 4) Find the height of a triangle that has an area of $4\sqrt{3}$ cm^2 and a base of $2\sqrt{2}$ cm.

$A = \frac{1}{2}bh$

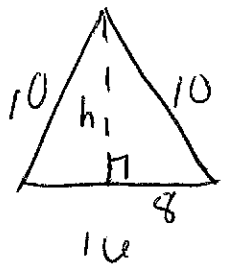
$4\sqrt{3} = \frac{1}{2}(2\sqrt{2})h$

$\frac{4\sqrt{3}}{\sqrt{2}} = \frac{\sqrt{2}h}{\sqrt{2}}$

$\frac{4\sqrt{6}}{2} = h$

$2\sqrt{6}\ cm = h$

Ex 5) Find the area of an isosceles triangle with sides 10, 10, and 16 feet.

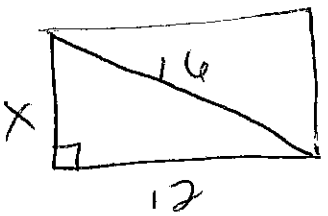


$h = 6$ (6, 8, 10)

$A = \frac{1}{2}(16)(6)$

$= 48 ft^2$

Ex 6) Find the area of a rectangle that is inscribed in a circle with a radius of 8 m and the length of the rectangle is 12 m.



$x^2 + 12^2 = 16^2$

$x^2 + 144 = 256$

$x^2 = 112$

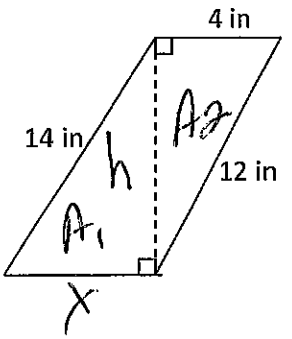
$x = \sqrt{16 \cdot 7}$

$x = 4\sqrt{7}$

$A = 12(4\sqrt{7})$

$= 48\sqrt{7}\ m^2$

Ex 7) Find the area of the shape (it is not a parallelogram).



$h^2 + 4^2 = 12^2$

$h^2 + 16 = 144$

$h^2 = 128$

$h = \sqrt{64 \cdot 2}$

$= 8\sqrt{2}$

$x^2 + (8\sqrt{2})^2 = 14^2$

$x^2 + 128 = 196$

$x^2 = 68$

$x = \sqrt{4 \cdot 17}$

$x = 2\sqrt{17}$

$A_1 = \frac{1}{2}(2\sqrt{17})(8\sqrt{2})$

$= 8\sqrt{34}$

$A_2 = \frac{1}{2}(4)(8\sqrt{2})$

$= 16\sqrt{2}$

Total $A = 8\sqrt{34} + 16\sqrt{2}$

$\approx 69.28\ in^2$