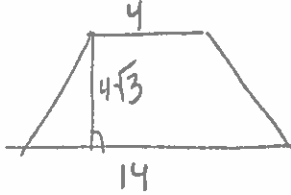Name __key__

1. The measure of the bases of a trapezoid are 4 inches and 14 inches. If the altitude is $4\sqrt{3}$ inches, then find
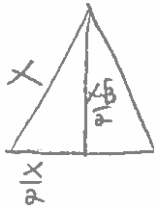
   (a) The area of the trapezoid

   $A = \frac{1}{2}(4\sqrt{3})(4+14)$

   $\boxed{A = 36\sqrt{3}}$

   (b) The measure of the side of an equilateral triangle whose area is equal to the area of the trapezoid.

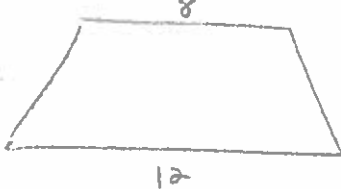 $36\sqrt{3} = \frac{1}{2}(x)\left(\frac{x\sqrt{3}}{2}\right)$

   $36\sqrt{3} = \frac{x^2\sqrt{3}}{4}$

   $144\sqrt{3} = x^2\sqrt{3}$

   $144 = x^2$

   $\boxed{12 = x}$

2. The lengths of the bases of a trapezoid are 12 and 8 inches and the area of the trapezoid is 70 square inches. Find the length of the trapezoid's altitude and median.
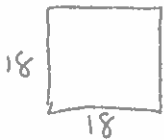

   $70 = \frac{1}{2}(h)(12+8)$

   $\boxed{7 = h}$

   $Median = \frac{1}{2}(8+12)$
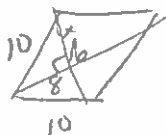
   $\boxed{Median = 10}$

3. A square and a rectangle have the same area. If a side of the square measures 18 inches and the base of the rectangle measures 6 inches, what is the width of the rectangle?

   $18^2 = 6w$

   $\boxed{54 = w}$

4. If the perimeter of a rhombus is 40 and the measure of one diagonal is 16, find the area of rhombus.
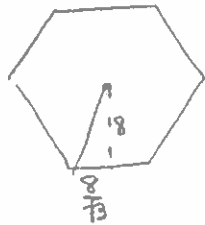

   $x^2 + 8^2 = 10^2$

   $x = 6$

   $diag. = 12$

   $A = \frac{1}{2}(12)(16)$

   $\boxed{A = 96}$

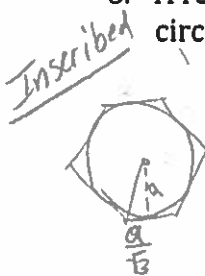5. A regular hexagon has an apothem of 8. Find the area of the hexagon.

$Side = \frac{16}{\sqrt{3}} = \frac{16\sqrt{3}}{3}$

$A = \frac{1}{2}(8)\left(\frac{16\sqrt{3}}{3} \cdot 6\right)$

$A = 128\sqrt{3}$

6. A regular hexagon has an area of $36\sqrt{3}$ cm². Find the radius of inscribed and circumscribed circles.
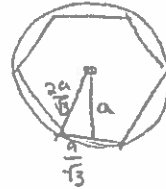
Inscribed

$36\sqrt{3} = \frac{1}{2}(a)(4a\sqrt{3})$

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

$18 = a^2$

$3\sqrt{2} = a = r$

$Side = \frac{2a}{\sqrt{3}} \rightarrow P = \frac{12a}{\sqrt{3}} = 4a\sqrt{3}$

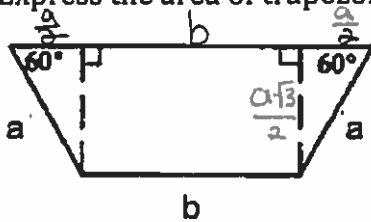Circumsc. $a = 3\sqrt{2}$

$\frac{2(3\sqrt{2})}{\sqrt{3}} = r$

$\frac{6\sqrt{6}}{3} = 2\sqrt{6} = r$

7. Express the area of trapezoid in terms of a and b.

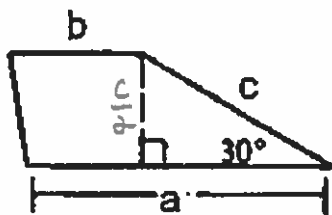$A = \frac{1}{2}\left(\frac{a\sqrt{3}}{2}\right)\left(b + b + \frac{2a}{2}\right)$

$A = \left(\frac{a\sqrt{3}}{4}\right)(2b + a)$

$A = \frac{2ab\sqrt{3} + a^2\sqrt{3}}{4}$ OR $\frac{a\sqrt{3}(2b+a)}{4}$
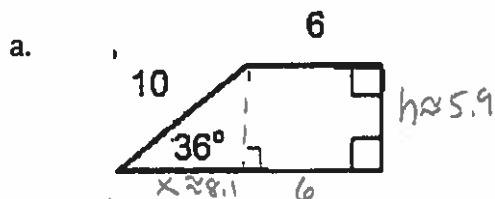
8. Express the area of trapezoid in terms of a, b, and c.

$A = \frac{1}{2}\left(\frac{c}{2}\right)(b + a)$

$A = \left(\frac{c}{4}\right)(b + a)$

$A = \frac{cb + ca}{4}$

9. Find the area of each trapezoid.

a.

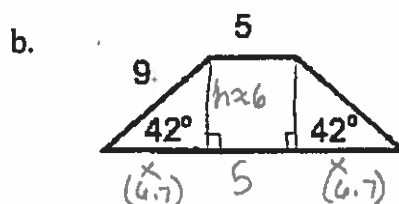$h \approx 5.9$

$\sin 36 = \frac{h}{10}$ $\cos 36 = \frac{x}{10}$

$5.9 \approx h$ $8.1 \approx x$

$A = \frac{1}{2}(5.9)(6 + 6 + 8.1) = 59.3$

b.

9.

$h \approx 6$

$42°$ $42°$

(4.7) 5 (4.7)

$\sin 42 = \frac{h}{9}$ $\cos 42 = \frac{x}{9}$

$6 \approx h$ $6.7 \approx x$

$A = \frac{1}{2}(6)(5 + 5 + 2(4.7)) = 70.2$