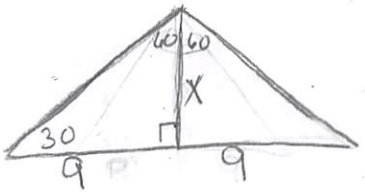
Right Δ's - Using What You Know

① The vertex angle of an isosceles triangle is 120°. The base length is 18 cm. Find the length of the altitude to the base (in simplest √ form).

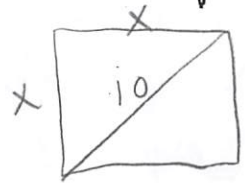


$LL = \sqrt{3}(SL)$

$9 = \sqrt{3}x$

$\frac{9}{\sqrt{3}} = x$ $\quad \frac{9\sqrt{3}}{3} = 3\sqrt{3}$

② The diagonal of a square is 10 in. Find the area of the square.



$Hyp = \sqrt{2} \cdot x$

$10 = \sqrt{2} \cdot x$

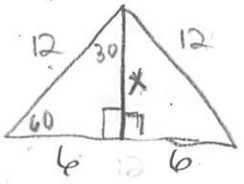
$\frac{10}{\sqrt{2}} = x$ $\quad \frac{10\sqrt{2}}{2} = x$

$5\sqrt{2} = x$

area $(5\sqrt{2})^2$

$25 \cdot 2 = 50 \text{ in}^2$

③ The perimeter of an equilateral triangle is 36 in. Find the area.



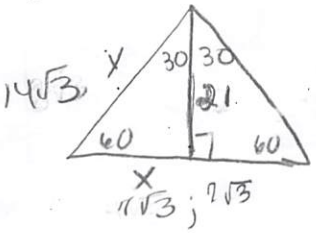
$LL = \sqrt{3} \cdot 6$

$LL = 6\sqrt{3}$

$A = \frac{12 \cdot 6\sqrt{3}}{2}$

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

④ The altitude of an equilateral triangle is 21 ft. Find the perimeter.



$LL = \sqrt{3} \cdot SL$

$21 = \sqrt{3} \cdot SL$

$\frac{21}{\sqrt{3}} = SL$

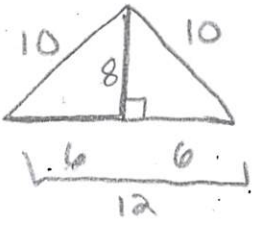
$\frac{21\sqrt{3}}{3} = 7\sqrt{3}$

$P = 3(14\sqrt{3})$

$= 42\sqrt{3}$

⑤ An isosceles triangle has sides 10, 10, and 12. How long is the altitude to the base?

Triple



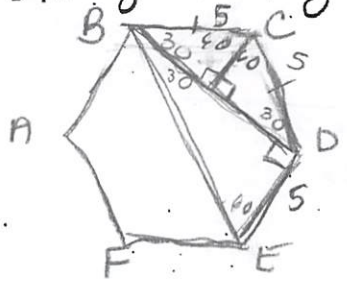
$10^2 = 6^2 + x^2$

$100 = 36 + 36$

$64 = x^2$

$8 = x$

⑥ In regular hexagon ABCDEF, BC = 5. Find BD and BE.



$Hyp = 2SL$

$5 = 2 \cdot SL$

$2.5 = SL$

$LL = 2.5\sqrt{3}$

$BD = 2(2.5\sqrt{3})$

$= 5\sqrt{3}$

$LL = SL \cdot \sqrt{3}$

$\frac{5\sqrt{3}}{\sqrt{3}} = \frac{SL \cdot \sqrt{3}}{\sqrt{3}}$

$5 = SL$

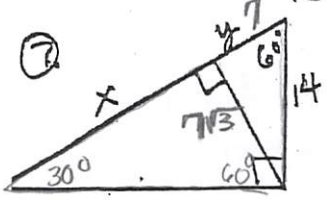
DE

$Hyp = 2(5)$

$= 10$

Solve using special right triangles.

(7)



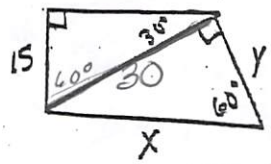
$y = 14 \div 2 = 7$

$LL = \sqrt{3} \cdot (7\sqrt{3})$

$LL = 7 \cdot 3$

$x = 21$

(8)



Hyp = 15(2)

$LL = 30$

$LL = \sqrt{3} \cdot SL$

$30 = \sqrt{3} \cdot y$

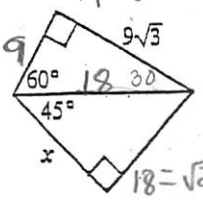
$\frac{30\sqrt{3}}{3} = y$

$y = 10\sqrt{3}$

Hyp = 2(10√3)

$x = 20\sqrt{3}$

(9)



$LL = \sqrt{3} \cdot SL$

$9\sqrt{3} = \sqrt{3} \cdot SL$

$9 = SL$

$18 = \sqrt{2} \cdot L$

$\frac{18}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = L$

$9\sqrt{2} = x$

(10)

$2 = \sqrt{2} \cdot L$

$m = \sqrt{2}$

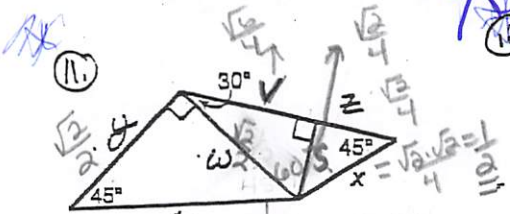
$x = \sqrt{2}$

$z = 2$

$LL = \sqrt{3} \cdot (1)$

$y = \sqrt{3}$

(11)



$\frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{\sqrt{2}} \cdot x$

$\frac{\sqrt{2}}{2} = y$

$\frac{\sqrt{2}}{2} = 2 \cdot S$

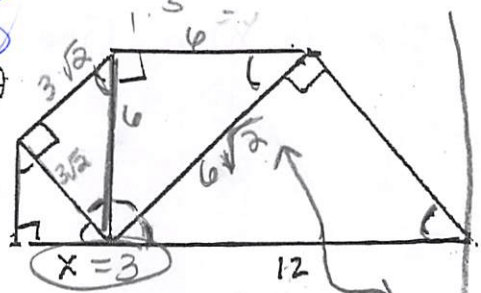
$\frac{\sqrt{2}}{4}$ = Short Lg

$V = \sqrt{3} \cdot \frac{\sqrt{2}}{4}$

$V = \frac{\sqrt{6}}{4}$

$x = \frac{\sqrt{2} \cdot \sqrt{2}}{4} = \frac{2}{4} = \frac{1}{2}$

(12)



$3\sqrt{2} = \sqrt{2} \cdot l$

$3 = l$

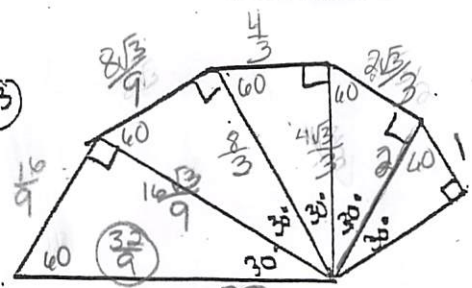
$12 = \sqrt{2} \cdot l$

$\frac{12}{\sqrt{2}} = l$

$12\sqrt{2} = l$

$6\sqrt{2} = l$

(13)



$x = \frac{32}{9}$

$\frac{8}{3} = \sqrt{3} \cdot SL$

$\frac{8}{3\sqrt{3}} = SL$

$\frac{8\sqrt{3}}{9} = SL$

$\frac{4\sqrt{3}}{3} = \sqrt{2} \cdot SL$

$\frac{4\sqrt{3}}{3} \cdot \frac{1}{\sqrt{3}} = \frac{4}{3}$

$\frac{16\sqrt{3}}{9} = SL \cdot \sqrt{3}$

$\frac{16\sqrt{3}}{9} \cdot \frac{1}{\sqrt{3}} = \frac{16}{9}$

$LL = \sqrt{3} \cdot SL$

$2 = \sqrt{3} \cdot SL$

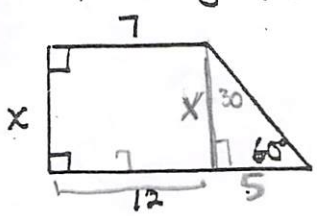
$\frac{2\sqrt{3}}{3} = SL$

$Hyp = 2 \cdot \frac{2\sqrt{3}}{3}$

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

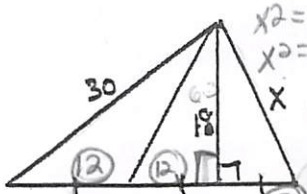
Solve using pythagorean theorem or special right Δ's.

(14)



$x = 5\sqrt{3}$

(15)



$x^2 = 18^2 + 12^2$

$x^2 = 324 + 144$

$x^2 = 468$

$x = 6\sqrt{3}$

$18^2 + b^2 = 30^2$

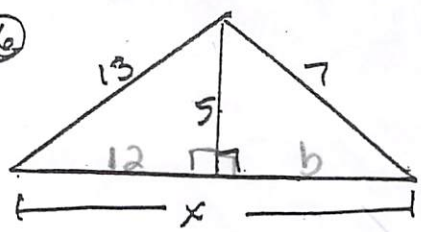
$324 + b^2 = 900$

$-324 \quad -324$

$b^2 = 576$

$b = 24$

(16)



$x = 12 + 2\sqrt{6}$

$5^2 + b^2 = 7^2$

$25 + b^2 = 49$

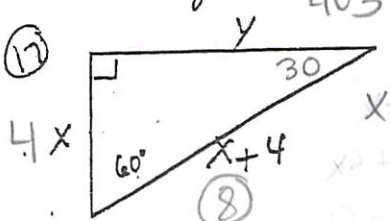
$-25 \quad -25$

$b^2 = 24$

$b = 2\sqrt{6}$

Challenge:

(17)

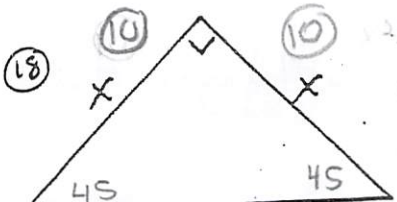


$x + 4 = 2x$

$x = 4$

$y = 4\sqrt{3}$

(18)



$10\sqrt{2}$

$\frac{x+10}{\sqrt{2}}$

$\frac{20}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}}$

$\frac{20\sqrt{2}}{2}$

$10\sqrt{2}$

$\frac{x+10}{\sqrt{2}} = \sqrt{2} \cdot x$

$\frac{x+10}{\sqrt{2}} \cdot \frac{1}{\sqrt{2}} = x$

$\frac{x+10}{2} = \frac{x}{1}$

$2x = x + 10$

$x = 10$