Geometry Part II 1.4 - Similar Right Triangles

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10. $\Delta PQS \sim \Delta QRS \sim \Delta PRQ$

18. $\frac{3}{y} = \frac{y}{9}$ $y^2 = 27$ $y = 3\sqrt{3}$

$y^2 + 9^2 = x^2$ $27 + 81 = x^2$ $x = 6\sqrt{3}$

26. $\frac{\sqrt{8}}{x} = \frac{x}{\sqrt{2}}$ $\sqrt{16} = x^2$ $4 = x^2$ $2 = x$

34. $l_1^{\,2} = 6^2 + 6^2$ $l_1 = 6\sqrt{2}$ $\frac{6}{6\sqrt{2}} = \frac{6\sqrt{2}}{h}$ $h = 12$

$(6\sqrt{2})^2 + l_2^{\,2} = 12^2$ $l_2 = 6\sqrt{2}$ $\frac{s_2}{6\sqrt{2}} = \frac{6\sqrt{2}}{12}$ $s_2 = 6$

40. Call the altitude y: $y = \sqrt{12^2 - x^2}$ and $\frac{x}{y} = \frac{y}{18}$ so $y^2 = 18x$

$\sqrt{12^2 - x^2}^{\,2} = 18x$ $0 = x^2 + 18x - 144$ $0 = (x-6)(x+24)$ so x = 6 or -24

Since the length of a side of a triangle cannot be negative, x = 6

46. a. $\frac{c}{a} = \frac{a}{x}$ $\frac{c}{b} = \frac{b}{y}$

b. Solve for x and y in the above equations: $x = \frac{a^2}{c}$ $y = \frac{b^2}{c}$

since $c = x + y$ by substitution: $c = \frac{a^2}{c} + \frac{b^2}{c}$

multiply both sides by c: $a^2 + b^2 = c^2$

c. The Pythagorean Theorem applies.

50. If the 124 angle and 38 angle are across from each other then the two congruent opposite angle would be 360 - 124 - 38 = 198/2 = 99 .

If the 124 angle is the opposite congruent angle, then the missing angle is 360 - 124 - 124 - 38 = 74 .

If the 38 angle is the opposite congruent angle, then the missing angle is 360 - 38 - 38 - 124 = 160 .

Since all of these are possible angles for the kite, they can both be correct.