Name: ANSWERS

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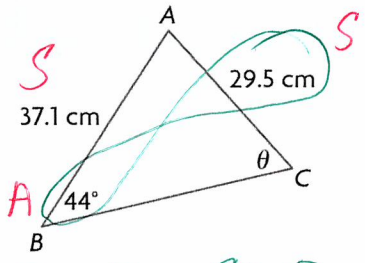
SINE LAW & COSINE LAW ..... and a bit of ambiguity.....

1. Find the indicated angle or side length. (2 marks each)

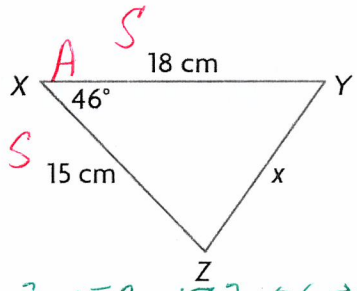


$\frac{\sin 44}{29.5} = \frac{\sin \theta}{37.1}$

$\frac{.6947(37.1)}{29.5} = \frac{\sin\theta(29.5)}{29.5}$

$.8736 = \sin\theta$

Θ = 61°



$x^2 = 15^2 + 18^2 - 2(15)(18)(\cos 46°)$

$= 225 + 324 - 540(.6947)$

$= 225 + 324 - 375.12$

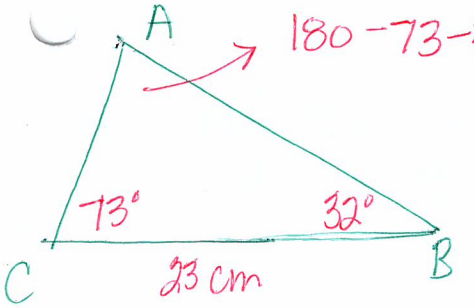
$x^2 = \sqrt{173.88}$

$x = 13.186$

x = 13.2cm

2. Sketch the following triangles, then solve for all side lengths and all interior angles. (3 marks each)

a) In $\Delta ABC, \angle C = 73°, \angle B = 32°, and\ a = 23\ cm.$



$180 - 73 - 32 = 75$

$\frac{\sin 75}{23} = \frac{\sin 32}{b}$

$b = \frac{(\sin 32)(23)}{\sin 75}$

$b = 12.62$

$\frac{\sin 75}{23} = \frac{\sin 73}{c}$

$c = \frac{\sin 73(23)}{\sin 75}$

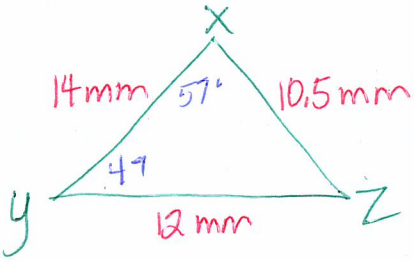
$c = 22.77$

∠A = 75°

b = 12.6 cm

c = 22.8 cm

b) In $\Delta XYZ, x = 12\ mm, y = 10.5\ mm\ and\ z = 14\ mm$



$\cos X = \frac{x^2 - y^2 - z^2}{-2yz}$

$\cos X = \frac{12^2 - 14^2 - 10.5^2}{-2(14)(10.5)}$

$\cos X = \frac{-162.25}{-294}$

$\cos X = .5519$

$X = 56.5°$

$57°$

$\frac{\sin 57}{12} = \frac{\sin y}{10.5}$

$.7338 = \sin y$

$47 = y$

$180 - 57 - 47$

$= 76°$

∠X = 57°

∠Y = 47°

∠Z = 76°

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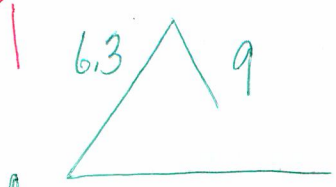
3. Sketch and determine the number of possible triangles for each of the following. **Solve for the case that has two possible triangles.** Show any work necessary to make your conclusion (7 marks)

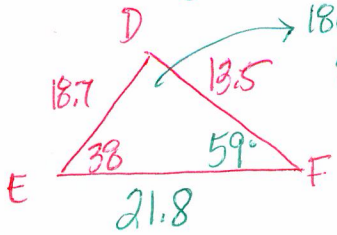
a) $\Delta ABC: \angle A = 68°, a = 9, b = 6.3$

1

# of triangles: 1

I knew this because: the dangling side is longer than other known side length





180 − 38 − 59 = 83°

$\frac{\sin 38}{13.5} = \frac{\sin 83}{d}$

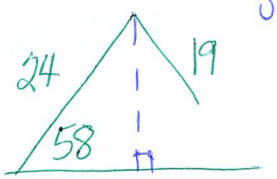
$21.8 = d$

b) $\Delta ABC: \angle A = 58°, b = 24, a = 19$

2

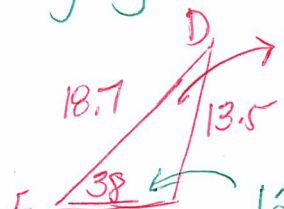
# of triangles: 0

I knew this because: because the dangling side is shorter than the height of the triangle



$\sin 58(24) = h$

$20.35 = h$



180 − 121 − 38 = 21°

121° = 180 − 59°

$\frac{\sin 38}{13.5} = \frac{\sin 21}{d}$

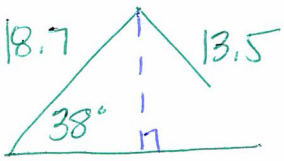
$d = 7.9$

c) $\Delta DEF: \angle E = 38°, f = 18.7, e = 13.5$

4

# of triangles: 2

I knew this because: because the dangling side is longer than height but shorter than the other given side.



$\sin 38(18.7) = \text{height}$

$11.5 = \text{height}$

SOLVE!

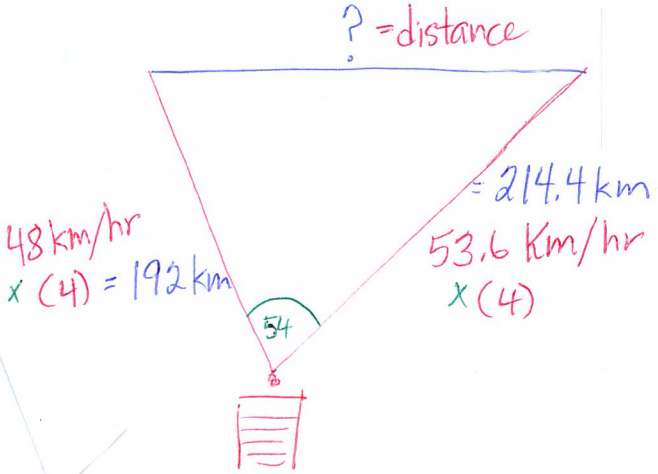
$\frac{\sin 38}{13.5} = \frac{\sin F}{18.7}$

$.8528 = \sin F \sim 58.5°$

59°

4. Two boats leave a dock at the same time. Each travels in a straight line but in different directions. The angle between their courses measures 54°. One boat travels at 48 km/h and the other travels at 53.6 km/h. (3 marks)

a) Sketch a diagram to represent the situation.



b) How far apart are the two boats after 4 h?

.5878

$d^2 = 192^2 + (214.4)^2 - 2(192)(214)(\cos 54)$

$d^2 = 36864 + 45967.36 - 48392.12$

$d^2 = 34439.24$

$d = 185.6$

Distance apart: 185.6 Km

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