Right angled triangles: Part I

- *an introduction to trigonometry –*

Check -points

Activity 1: Recall properties of similar triangles

Write your number here:*[any number between 2 and 3]*

Record your measurements here:

ΔABC:
AB = 4, BC = 3, AC = 5, ∠ACB = 53°, ∠CBA = 90°, ∠BAC = 37°

ΔAB'C':
AB' = *any*, B'C' = *any*, AC' = *any*, ∠AC'B' = 53°, ∠C'B'A = 90°, ∠B'AC' = 37°

Next compare the proportions of the two triangles:

$\frac{AB'}{AB}$ = *[same as page 1 scale factor]* $\frac{AC'}{AC}$ = *[same]* $\frac{B'C'}{BC}$ = *[same]*

You can also compare the proportions in a different way:

$\frac{BC}{AC}$ = 0.6 $\frac{AB}{AC}$ = 0.8 $\frac{BC}{AB}$ = 0.75

$\frac{B'C'}{AC'}$ = 0.6 $\frac{AB'}{AC'}$ = 0.8 $\frac{B'C'}{AB'}$ = 0.75

What do you notice?

The values for ΔABC are the same as those for ΔAB'C'.

Checkpoint

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Activity 2: Apply the properties of similar triangles

Look back at your previous calculatio ns for this triangle. Complete these statements .

$\frac{BC}{AC} = \frac{opp}{hyp} = 0.6$ *so length of opposite side is* ***60%*** *of hypotenuse*

$\frac{AB}{AC} = \frac{adj}{hyp} = 0.8$ *so length of adjacent side is* ***80%*** *of hypotenuse*

$\frac{BC}{AB} = \frac{opp}{adj} = 0.75$ *so length of opposite side is* ***75%*** *of adjacent side*

How can we use these ratios?

If ΔABC is enlarged so that the hypotenuse is 70cm,

then the side *opposite* the 37° angle is 60% of 70cm, or 42cm

and the side *adjacent* to the 37° angle is 80% of 70cm, or 56cm.

1. If ΔABC is enlarged so that the hypotenuse is 90cm,
   a) how long is the side *opposite* the 37° angle? $0.6 \times 90 = 54$cm
   b) how long is the side *adjacent* to the 37° angle? $0.8 \times 90 = 72$cm

2. If ΔABC is enlarged so that the hypotenuse is 160cm,
   a) how long is the side *opposite* the 37° angle? $0.6 \times 160 = 96$cm
   b) how long is the side *adjacent* to the 37° angle? $0.8 \times 160 = 128$cm

3. If ΔABC is enlarged so that the side adjacent to the 37° angle is 250cm,
   a) how long is the side *opposite* the 37° angle? $0.75 \times 250 = 187.5$cm
   b) how long is the *hypotenuse?* $250 \div 0.8 = 312.5$cm

4. If ΔABC is enlarged so that the side opposite the 37° angle is 600cm,
   a) how long is the side *adjacent* to the 37° angle? $600 \div 0.75 = 800$cm
   b) how long is the *hypotenuse?* $600 \div 0.6 = 1000$cm

Checkpoint