Pythagoras & SohCahToa

Solutions

Pythagoras' Theorem

Q1) a) $3^2 + 5^2 = c^2$

$9 + 25 = c^2$

$34 = c^2$

$c = \sqrt{34}$

$c = 5.83$ units

b) $5^2 + 12^2 = c^2$

$25 + 144 = c^2$

$169 = c^2$

$c = \sqrt{169}$

$c = 13$ units

c) $a^2 + 24^2 = 25^2$

$a^2 = 25^2 - 24^2$

$a^2 = 625 - 576$

$a^2 = 49$

$a = \sqrt{49}$

$a = 7$ units

d) $a^2 + 9^2 = 17^2$

$a^2 = 17^2 - 9^2$

$a^2 = 289 - 81$

$a^2 = 208$

$a = \sqrt{208}$

$a = 14.4$ units

Q2) a) $20^2 + 21^2 = 400 + 441 = 841$

$29^2 = 841$

Since $20^2 + 21^2 = 29^2$ the triangle is right-angled.

b) $9^2 + 40^2 = 81 + 1600 = 1681$

$41^2 = 1681$

Since $9^2 + 40^2 = 41^2$ the triangle is right-angled.

c) $8^2 + 9^2 = 64 + 81 = 145$

$12^2 = 144$

Since $8^2 + 9^2 \neq 12^2$ the triangle is not right-angled.

SohCahToa

Q1) a) Since we're trying to find (o) we must use one of the ratios with an (o) in it.

$Sin\ 24.6 = \frac{o}{h} = \frac{o}{25}$

Rearranging gives

$25\ Sin\ 24.6 = o$

$o = 10.4$ cm

b) Since we're trying to find (o) we must use one of the ratios with an (o) in it.

$Tan\ 48.2 = \frac{o}{a} = \frac{o}{10}$

Rearranging gives

$10\ Tan\ 48.2 = o$

$o = 11.2$ cm

c) Opposite (o) = 3 Adjacent (a) = 4 Hypotenuse (h) = 5

Since we have all three sides we can use any trigonometric ratio.

$Cos\ x = \frac{a}{h} = \frac{4}{5} = 0.8$

$x = cos^{-1}(0.8) = 36.9°$

d) Opposite (o) = 5 Adjacent (a) = 12 Hypotenuse (h) = 13

Since we have all three sides we can use any trigonometric ratio.

$Sin\ x = \frac{o}{h} = \frac{5}{12}$

$x = sin^{-1}\left(\frac{5}{12}\right) = 24.6°$