Questions

Pythagoras' Theorem
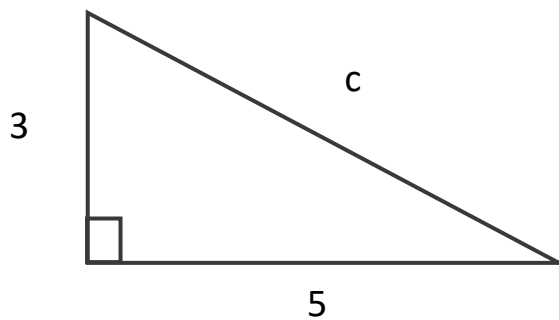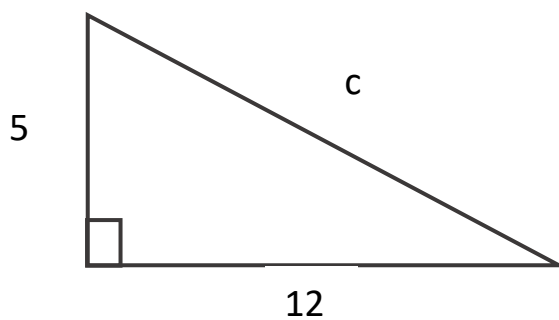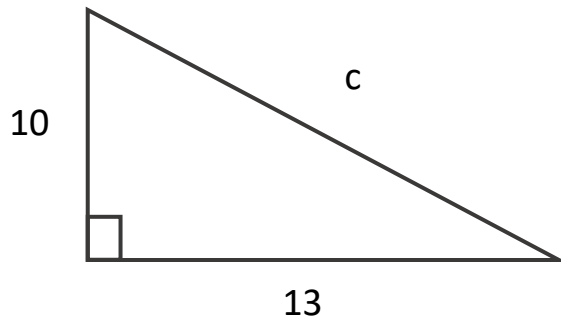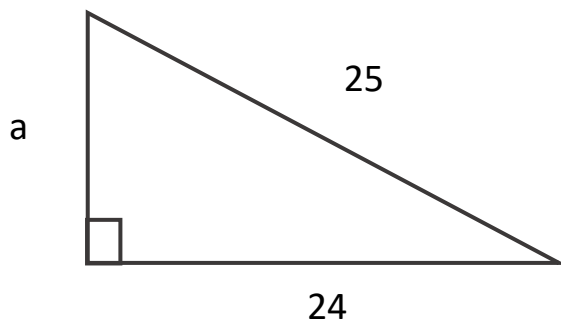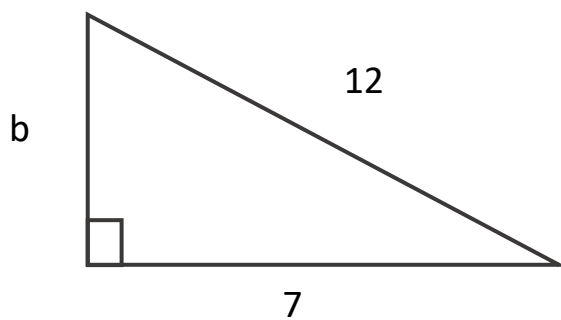
Q1 a) Find the missing side, c, in the following right-angled triangle.

b) Find the missing side, c, in the following right-angled triangle.

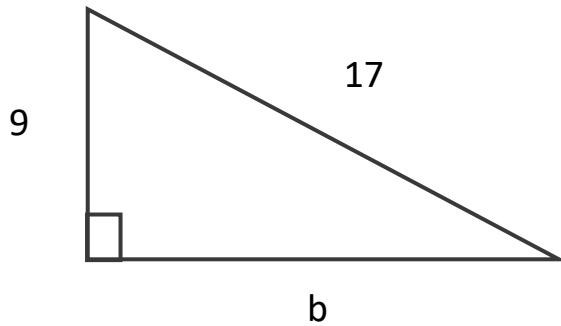c) Find the missing side, c, in the following right-angled triangle.

10

c

13

d) Find the missing side, a, in the following right-angled triangle.

25

a

24

e) Find the missing side, b, in the following right-angled triangle.

12

b

7

f) Find the missing side, *b*, in the following right-angled triangle.

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    |\
    | \  17
  9 |  \
    |___\
      b
```

Q2 a) Show that the triangle with short sides 20 & 21 and long side 29 is a right-angled triangle.

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    |\
    | \  29
 20 |  \
    |___\
     21
```
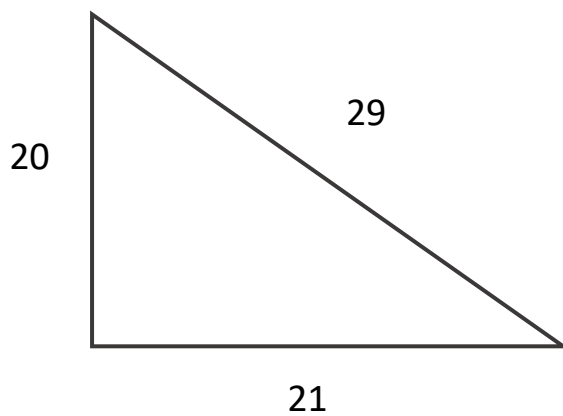
b) Show that the triangle with short sides 9 & 40 and long side 41 is a right- angled triangle.

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    |\_____
    |      \___ 41
  9 |          \
    |_____
        40
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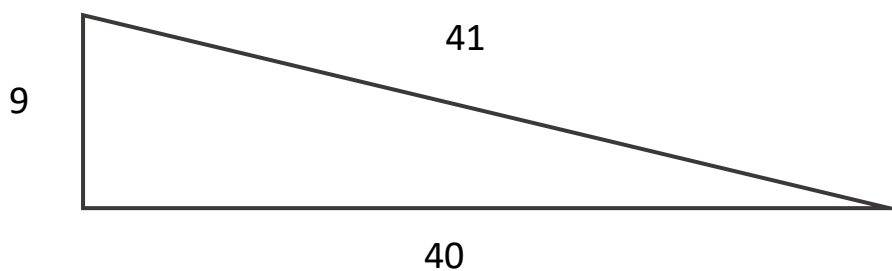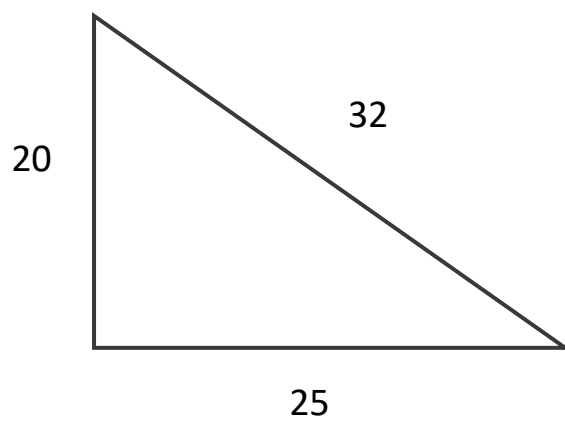
c) Is the following triangle right-angled?

8

12

9
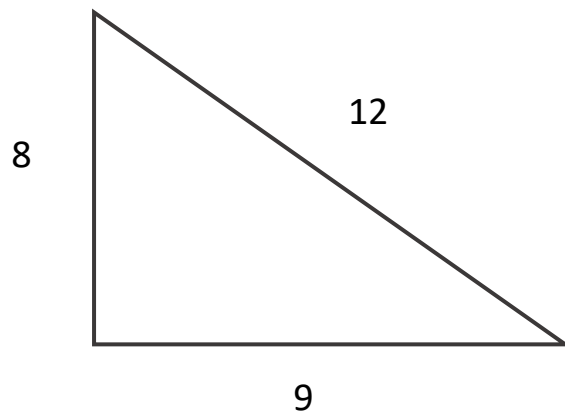
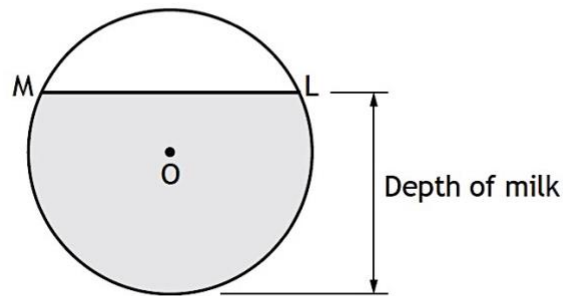d) Is the following triangle right-angled?

20

32

25

Pythagoras' Theorem in Circles

The following questions are taken from past SQA National 5 Mathematics exams

available from: www.sqa.org.uk/pastpapers/findpastpaper.htm

Q1)

The diagram below shows the circular cross-section of a milk tank.
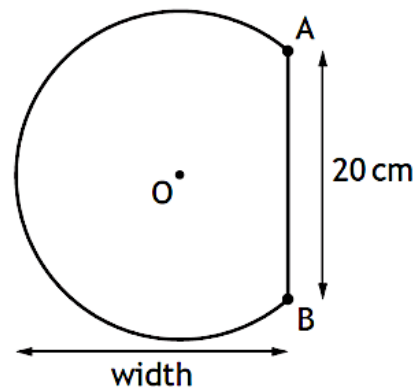

The radius of the circle, centre O, is 1·2 metres.

The width of the surface of the milk in the tank, represented by ML in the diagram, is 1·8 metres.

Calculate the depth of the milk in the tank.

Q2)

The shape below is part of a circle, centre O.
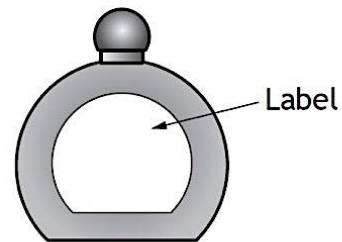

The circle has radius 13 centimetres.

AB is a chord of length 20 centimetres.
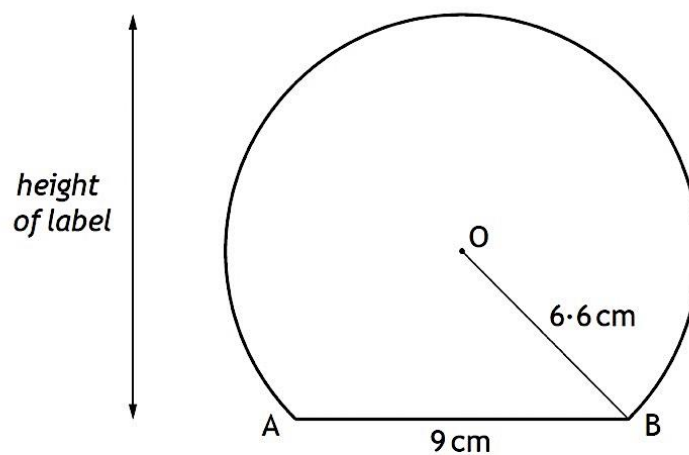
Calculate the width of the shape.

Q3)

This perfume bottle has a label in the shape of part of a circle.

Label

A diagram of the label is shown below.

height of label

O

6·6 cm

A

9 cm

B

- The centre of the circle is O.
- The chord AB is 9 centimetres.
- The radius OB is 6·6 centimetres.

Find the height of the label.

The Graphs of Trigonometric Functions

Q1) Sketch the graph of the following functions for $0 \leq x \leq 360°$

a) $y = 2 \sin x$

b) $y = 3 \cos x$

c) $y = -2 \cos x$

Q2) Sketch the graph of the following functions for $0 \leq x \leq 360°$

a) $y = \sin x + 1$

b) $y = \cos x - 2$

c) $y = -\sin x - 3$

Q3) Sketch the graph of the following functions for $0 \leq x \leq 360°$

a) $y = \sin (x - 30)°$
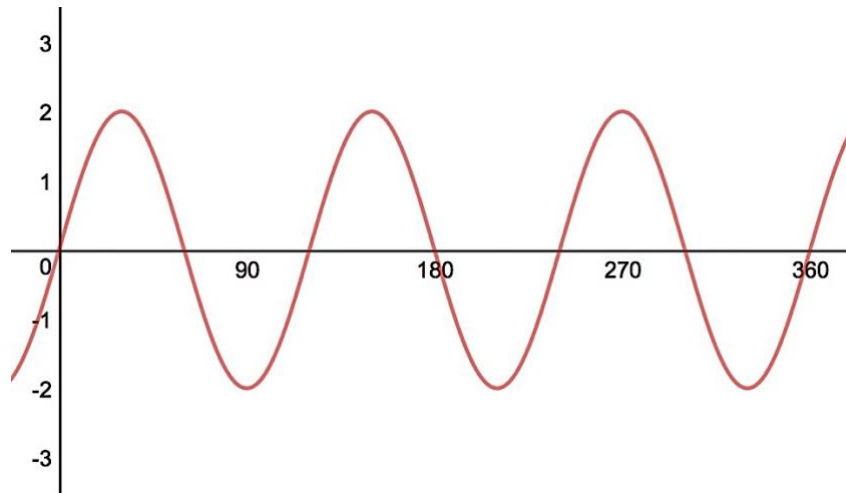
b) $y = \cos(x + 45)°$

c) $y = \cos(x - 90)°$

Q4) State the period of the following functions and sketch the graph for $0 \leq x \leq 360°$
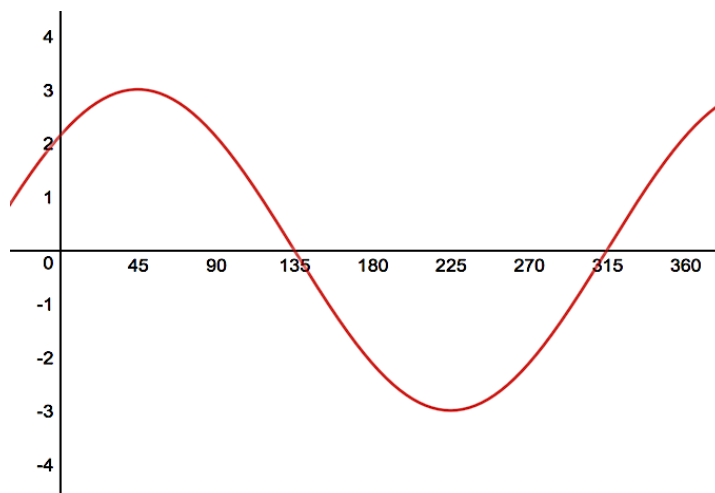
a) $y = \sin 2x$

b) $y = \cos 3x$

c) $y = \cos \frac{1}{2} x$

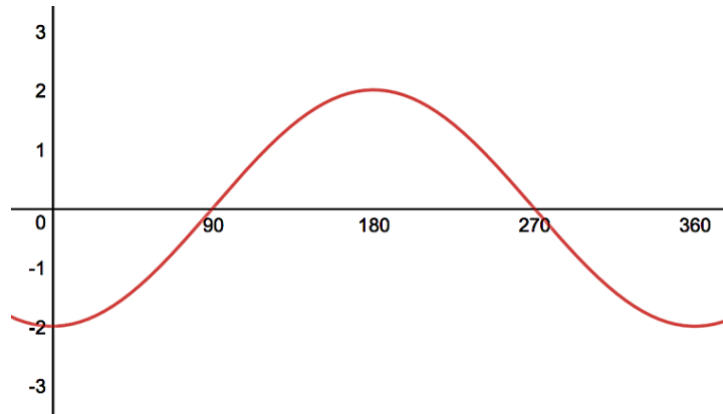Q5 a) The graph of $y = a \sin bx°$ is shown, what are the values of a and b?

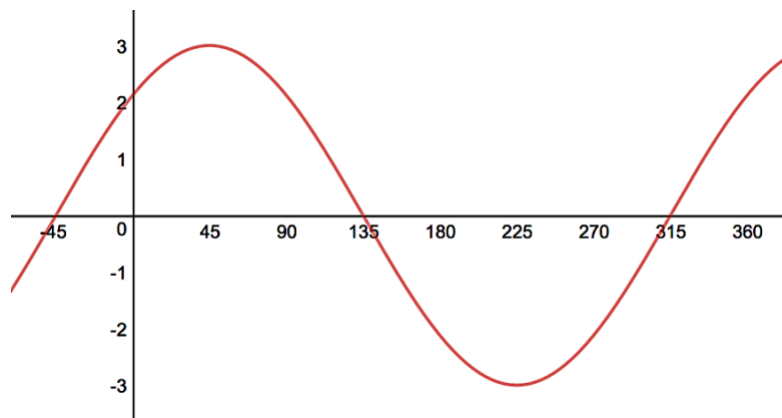b) The graph of $y = a \cos(x - b)°$ is shown, what are the values of a and b?

c) The graph of $y = a\cos x°$ is shown, what is the value of a?

d) The graph of $y = a\sin(x + b)°$ is shown, what are the values of a and b?

Trigonometric Equations

Q1) Mark on a CAST diagram the two quadrants that the solutions to these equations lie in but do not solve the equations.

a) $\cos x = -0.8$ c) $\tan x = -2.5$ e) $3\tan x + 2 = -1$

b) $\sin x = 0.79$ d) $2\sin x - 1 = -0.6$ f) $\sin x + 1.5 = 2.1$

Q2) Estimate the solution to these equations for $0 \le x \le 360°$ by sketching a graph of the relevant function and marking on the desired value.

a) $\cos x = 0.5$ c) $\tan x = 0.5$

b) $\sin x = 0.5$ d) $\cos x = -0.3$

Q3) Solve the equation for $0 \leq x \leq 360°$

    a) $\tan x = 0.192$ c) $\sin x = -0.243$ e) $\tan x = -1.23$

    b) $\cos x = 0.464$ d) $\sin x = 0.258$ f) $\cos x = -0.5$

Q4) Solve the equation for $0 \leq x \leq 360°$

    a) $3 \cos x - 1 = 0$ c) $5 \cos x + 4 = 0$

    b) $2 \tan x - 2 = 0$ d) $\tan x + 1 = 0$