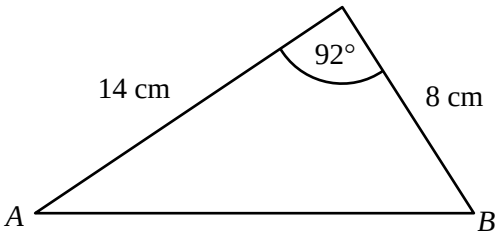
The Cosine Rule

SCAN ME

REVISE THIS TOPIC

1 Here is triangle *ABC*.



Work out the length of *AB*.
Give your answer to 1 decimal place.

$x^2 = 14^2 + 8^2 - 2 \times 14 \times 8 \times \cos(92)$

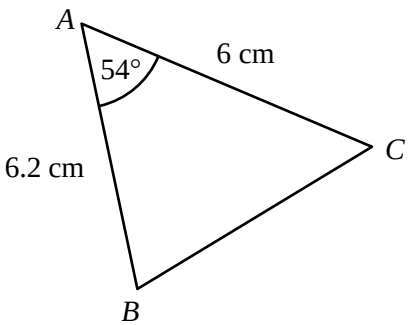
$x^2 = 267.8174873$

$x = \sqrt{267.8174873}$

16.4 ..... cm

(Total for Question 1 is 3 marks)

2 Here is triangle *ABC*.



Work out the length of *BC*.
Give your answer to 1 decimal place.

$x^2 = 6.2^2 + 6^2 - 2 \times 6.2 \times 6 \times \cos(54)$

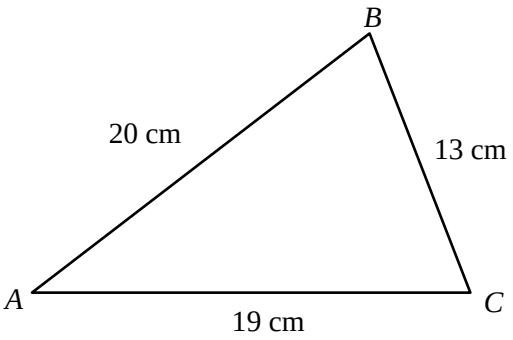
$x^2 = 30.70877723$

$x = \sqrt{30.70877723}$

5.5 ..... cm

(Total for Question 2 is 3 marks)

3 Here is triangle *ABC*.



Work out the size of angle *BAC*.
Give your answer to 1 decimal place.

$$\cos(x) = \frac{20^2+19^2-13^2}{2\times 20\times 19}$$

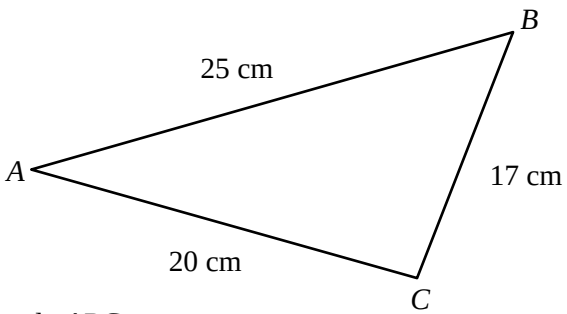
$$\cos(x) = 0.7789473684$$

$$x = \cos^{-1}(0.7789473684)$$

38.8 °

(Total for Question 3 is 3 marks)

4 Here is triangle *ABC*.



Work out the size of angle *ABC*.
Give your answer to 1 decimal place.

$$\cos(x) = \frac{25^2+17^2-20^2}{2\times 25\times 17}$$

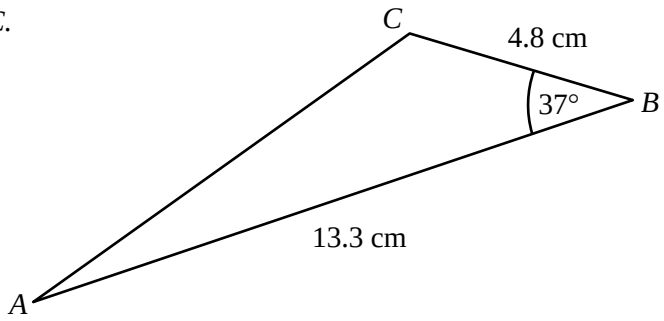
$$\cos(x) = 0.6047058824$$

$$x = \cos^{-1}(0.6047058824)$$

52.8 °

(Total for Question 4 is 3 marks)

5 Here is triangle *ABC*.



Work out the length of *AC*.
Give your answer to 1 decimal place.

$x^2 = 4.8^2 + 13.3^2 - 2 \times 4.8 \times 13.3 \times \cos(37)$

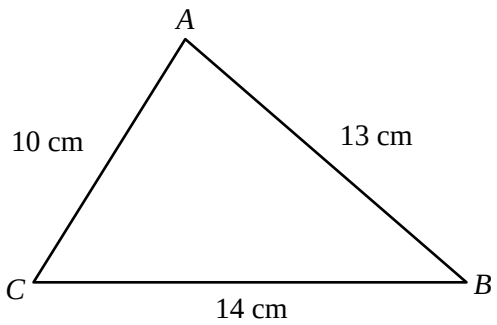
$x^2 = 97.96021808$

$x = \sqrt{97.96021808}$

9.9 cm

(Total for Question 5 is 3 marks)

6 Here is triangle *ABC*.



Work out the size of angle *BCA*.
Give your answer to 1 decimal place.

$\cos(x) = \frac{10^2 + 14^2 - 13^2}{2 \times 10 \times 14}$

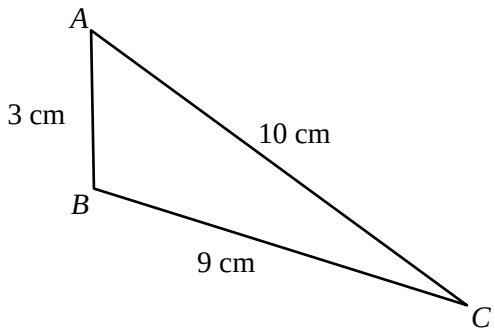
$\cos(x) = 0.453571428 6$

$x = \cos^{-1}(0.453571428 6)$

63.0 °

(Total for Question 6 is 3 marks)

7 Here is triangle *ABC*.



Work out the size of angle *ABC*.
Give your answer to 1 decimal place.

$\cos(x) = \frac{3^2+9^2-10^2}{2\times 3\times 9}$

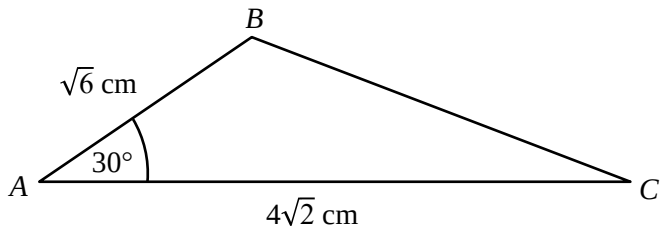
$\cos(x) = -0.185185185...$

$x = \cos^{-1}(-0.185185185...)$

100.7 °

(Total for Question 7 is 3 marks)

8 Here is triangle *ABC*.



Work out the length of *BC*.
Give your answer in the form $\sqrt{k}$, where k is an integer.

$x^2 = (\sqrt{6})^2 + (4\sqrt{2})^2 - 2\times\sqrt{6}\times 4\sqrt{2}\times\cos(30)$

$x^2 = 6 + 32 - 8\sqrt{12}\times\frac{\sqrt{3}}{2}$

$x^2 = 38 - 4\sqrt{36}$

$x^2 = 38 - 24$

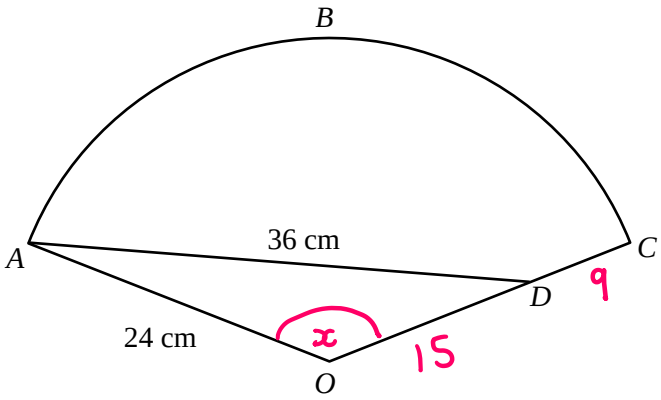
$x^2 = 14$

$x = \sqrt{14}$

$\sqrt{14}$ cm

(Total for Question 8 is 4 marks)

9 *ABCO* is a sector with centre *O*.



D is the point on *OC* so that *OD* : *DC* = 5 : 3
AO = 24 cm
AD = 36 cm

Work out the area of the sector.
Give your answer to 1 decimal place.

$OC = 24$

$24 \div (5+3) = 3$

$5 \times 3 = 15$ (OD)

$3 \times 3 = 9$ (DC)

$\cos(x) = \dfrac{24^2 + 15^2 - 36^2}{2 \times 24 \times 15}$

$\cos(x) = -0.6875$

$x = \cos^{-1}(-0.6875)$

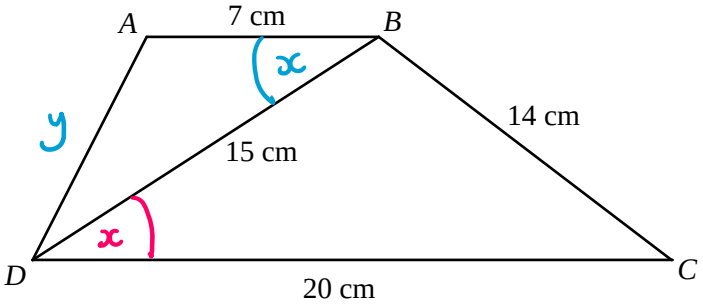
$x = 133.4325366$

$\text{Area} = \dfrac{133.4\ldots}{360} \times \pi \times 24^2$

670.7 ..... cm^2

(Total for Question 9 is 5 marks)

10 *ABCD* is a trapezium with *AB* parallel to *CD*.



Work out the length of line *AD*.
Give your answer to 1 decimal place.

$$\cos(x) = \frac{15^2 + 20^2 - 14^2}{2 \times 15 \times 20}$$

$$\cos(x) = 0.715$$

$$x = \cos^{-1}(0.715)$$

$$x = 44.356800084$$

Angle BDC = Angle ABD as they are alternate angles

$$y^2 = 7^2 + 15^2 - 2 \times 7 \times 15 \times \cos(44.3\ldots)$$

$$y^2 = 123.85$$

$$y = \sqrt{123.85}$$

$$y = 11.12879149$$

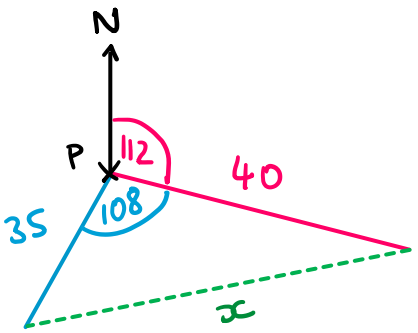
11.1 ..... cm

(Total for Question 10 is 5 marks)

11 Boat *A* and Boat *B* both leave the Port P at 12pm.

Boat *A* travels on a bearing of 112° and travels at a constant speed of 16 mph.
Boat *B* travels on a bearing of 220° and travels at a constant speed of 14 mph.

At 2:30 pm, what is the direct distance between the two boats.



$220 - 112 = 108°$

$16 \times 2.5 = 40$ miles
$14 \times 2.5 = 35$ miles

$x^2 = 40^2 + 35^2 - 2 \times 40 \times 35 \times \cos(108)$
$x^2 = 3690.247584$
$x = \sqrt{3690.247584}$

60.7 miles

(Total for Question 11 is 5 marks)