

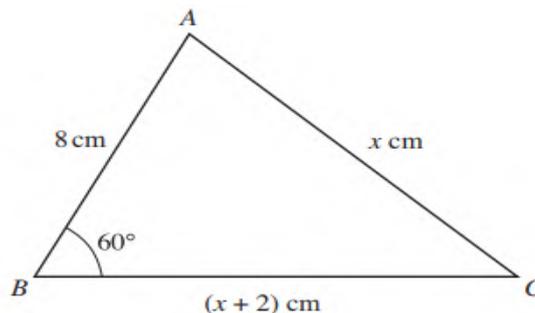
# TRIG TRIANGLES

## AS Unit 1: Pure Mathematics A

### WJEC past paper questions: 2010 – 2017

Total marks available 88 (approximately 1 hour 45 minutes)

1. The diagram below shows a sketch of the triangle ABC with  $AB = 8$  cm,  $AC = x$  cm,  $BC = (x + 2)$  cm and  $\angle ABC = 60^\circ$ .



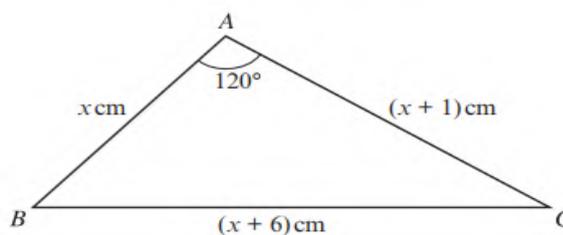
- a) Write down and simplify an equation satisfied by  $x$ . Hence evaluate  $x$ . (3)  
 b) Find the size of  $\angle ACB$ . (2)

(January 10)

2. a) The triangle ABC is such that  $AB = 11$  cm and  $\angle BAC = 110^\circ$ . Given that the area of the triangle ABC is  $31\text{cm}^2$ , find the length of BC. (4)  
 b) The triangle XYZ is such that  $XY = 2$  cm,  $YZ = (2\sqrt{3} - 1)$  cm and  $\angle YXZ = 60^\circ$ . Find an expression for  $\sin \angle XZY$  in the form  $\frac{m + \sqrt{3}}{n}$  where  $m, n$  are integers whose values are to be found. (3)

(Summer 10)

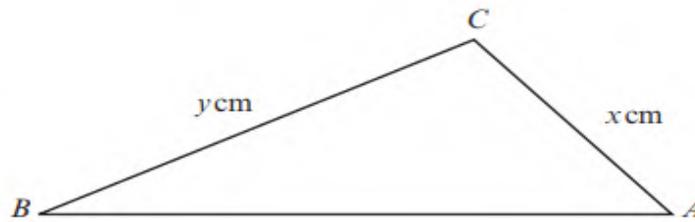
3. The diagram below shows a sketch of the triangle ABC with  $AB = x$  cm,  $AC = (x + 1)$  cm,  $BC = (x + 6)$  cm and  $\angle BAC = 120^\circ$ .



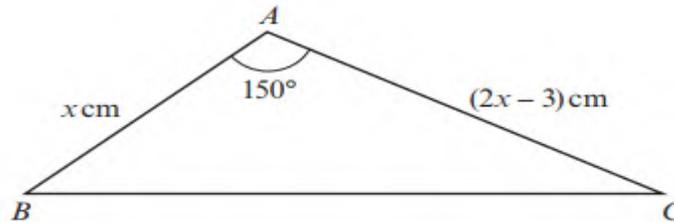
- a) Show that  $x$  satisfies the equation  $2x^2 - 9x - 35 = 0$ . Hence evaluate  $x$ . (4)  
 b) Find the area of triangle ABC. Give your answer correct to two decimal places. (2)

(January 11)

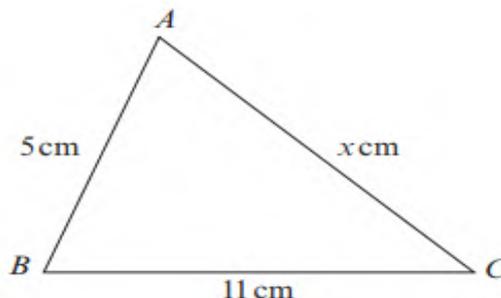
4. The diagram below shows a sketch of the triangle ABC with  $\sin A = \frac{3}{5}$ ,  $\sin B = \frac{5}{13}$ ,  $\sin C = \frac{56}{65}$ ,  $AC = x$  cm and  $BC = y$  cm.



- a) Show that  $y = 1.56x$ . (2)  
 b) Given that the area of triangle ABC =  $4.2 \text{ cm}^2$ , find the value of  $x$  and the value of  $y$  (5)  
 (Summer 11)
5. The diagram below shows a sketch of the triangle ABC with  $AB = x$  cm,  $AC = (2x - 3)$  cm and  $\hat{BAC} = 150^\circ$ . The area of the triangle ABC is  $6.75 \text{ cm}^2$ .

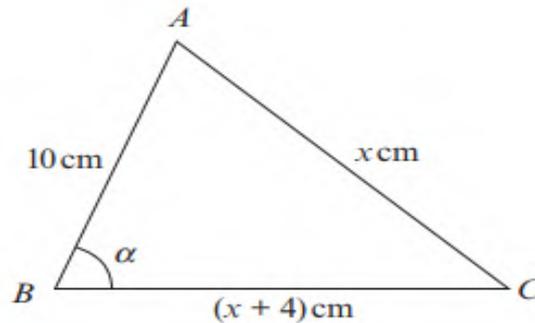


- a) Show that  $x$  satisfies the equation  $2x^2 - 3x - 27 = 0$ . Hence evaluate  $x$ . (4)  
 b) Find the length of BC. Give your answer correct to two decimal places. (2)  
 The point D lies on BC and is such that AD is perpendicular to BC.  
 c) Find the length of AD. Give your answer correct to two decimal places. (2)  
 (January 12)
6. a) The diagram below shows a sketch of the triangle ABC with  $AB = 5$  cm,  $AC = x$  cm,  $BC = 11$  cm and  $\cos \hat{BAC} = \frac{2}{5}$ .



- Write down and simplify a quadratic equation satisfied by  $x$ . Hence evaluate  $x$ . (3)  
 b) The triangle XYZ is such that  $XY = 32$  cm,  $XZ = 15$  cm and  $\hat{XYZ} = 19^\circ$ . Find the possible values of  $\hat{YXZ}$ . Give your answers correct to the nearest degree. (4)  
 (Summer 12)

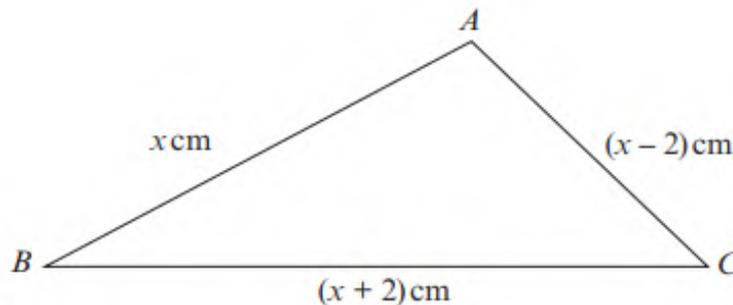
7. The diagram below shows a sketch of the triangle ABC with  $AB = 10$  cm,  $AC = x$  cm,  $BC = (x + 4)$  cm and  $\angle ABC = \alpha$ , where  $\cos \alpha = \frac{3}{5}$



- a) Write down and simplify an equation satisfied by  $x$ . Hence, evaluate  $x$ . (3)  
 b) Find the exact value of the area of the triangle ABC. (3)

(January 13)

8. The diagram below shows a sketch of the triangle ABC with  $AB = x$  cm,  $AC = (x - 2)$  cm and  $BC = (x + 2)$  cm.



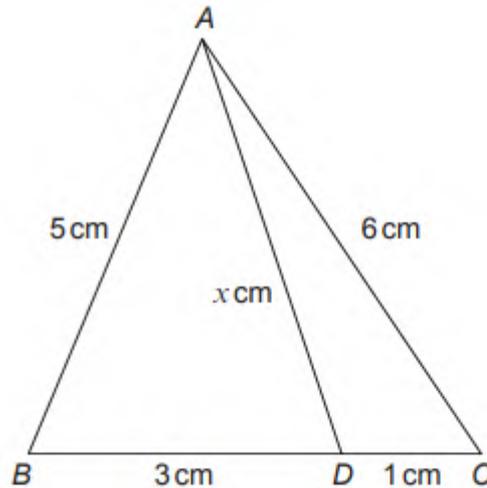
- a) Show that  $\cos \hat{BAC} = \frac{x-8}{2x-4}$ . (3)  
 b) Given that  $\hat{BAC} = 120^\circ$ ,  
 i) find the value of  $x$   
 ii) find the size of  $\angle ABC$ . (4)

(Summer 13)

9. The triangle ABC is such that  $AB = 19$  cm,  $AC = 12$  cm and  $\angle ABC = 25^\circ$ .  
 a) Find the possible values of  $\hat{ACB}$ . Give your answers correct to the nearest degree. (2)  
 b) Given that  $\hat{BAC}$  is an **acute** angle, find  
 i) the size of  $\hat{BAC}$ , giving your answer correct to the nearest degree.  
 ii) the area of triangle ABC, giving your answer correct to two decimal places. (4)

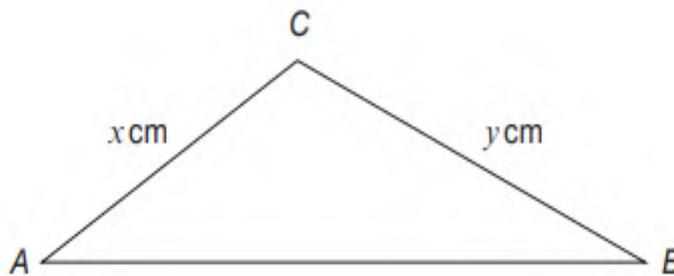
(Summer 15)

10. The diagram below shows a sketch of the triangle ABC with  $AB = 5$  cm and  $AC = 6$  cm. The point D is on BC such that  $BD = 3$  cm,  $DC = 1$  cm and  $AD = x$  cm.



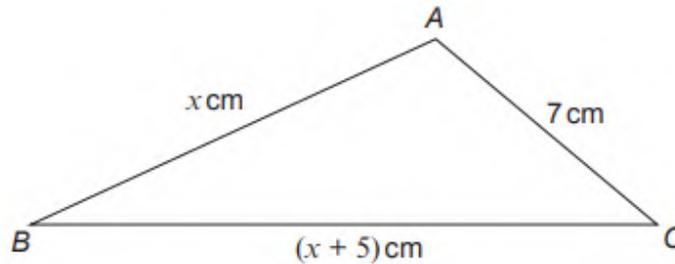
- a) i) By applying the cosine rule in each of the triangles ADB and ADC, show that  $\cos ADB = \frac{x^2 - 16}{6x}$  and find a similar expression for  $\cos ADC$ .  
 ii) Noting that  $\angle ADB$  and  $\angle ADC$  are angles on a straight line, use the expressions derived in part i) to write down an equation satisfied by  $x$ . Hence show that  $x = 5.5$ . (6)  
 b) Find the area of triangle ADB. Give your answer correct to two decimal places. (3)  
 (January 14)

11. The diagram below shows a sketch of the triangle ABC with  $\sin A = \frac{4}{5}$ ,  $\sin B = \frac{8}{17}$ ,  $\cos C = -\frac{13}{85}$ ,  $AC = x$  cm and  $BC = y$  cm.



- a) Show that  $y = 1.7x$ . (2)  
 b) Given that  $AB = 10.5$  cm, **use the cosine rule** to find the exact value of  $x$ . (4)  
 (Summer 14)

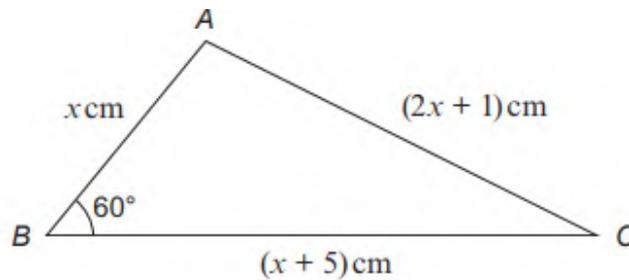
12. The diagram below shows a sketch of the triangle ABC with  $AB = x$  cm,  $BC = (x + 5)$  cm,  $AC = 7$  cm and  $\cos \hat{BAC} = -\frac{3}{5}$ .



- Write down an equation satisfied by  $x$ . Hence show that  $x = 15$ . (3)
- Find the exact value of the area of triangle ABC. (3)
- The point D lies on BC and is such that AD is perpendicular to BC. Find the length of AD. (2)

(Summer 16)

13. The diagram below shows a sketch of the triangle ABC with  $AB = x$  cm,  $BC = (x + 5)$  cm,  $AC = (2x + 1)$  cm and  $\angle ABC = 60^\circ$ .



- Show that  $x$  satisfies the equation  $3x^2 - x - 24 = 0$ . Hence evaluate  $x$ . (4)
- Find the size of  $\hat{ACB}$ . (2)

(Summer 17)