

Old Exam Questions – Old Course
The Sine Rule, The Cosine Rule, Area of a Triangle

(C2 Winter 2005)

4. The lengths of the three sides of a triangle are 8.5 cm, 6.8 cm and 9.4 cm. Find, correct to one decimal place,
- (a) the largest angle of the triangle,
- (b) the area of the triangle. [5]

(C2 Summer 2005)

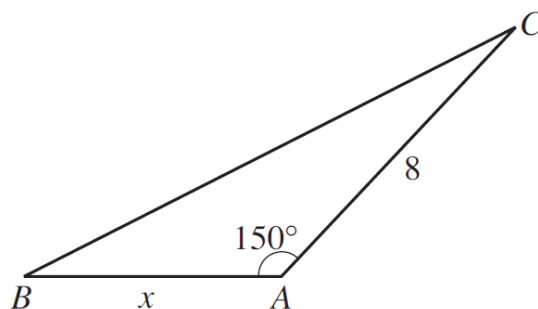
8. The triangle ABC is such that $AB = x$ cm, $BC = (x - 3)$ cm, $CA = (x - 1)$ cm and $\widehat{ABC} = 60^\circ$.
- (a) Use the cosine rule to show that $x = 8$. [4]
- (b) Find the area of triangle ABC , giving your answer in surd form. [2]

(C2 Winter 2006)

3. The triangle ABC is such that $AB = 12$ cm, $BC = 10$ cm and $\widehat{CAB} = 45^\circ$.
- (a) Find the possible values of \widehat{BCA} and \widehat{ABC} . [4]
- (b) Find the possible values of the area of the triangle ABC . [2]

(C2 Summer 2006)

3. The diagram below shows the triangle ABC with $AB = x$ cm, $AC = 8$ cm and $\widehat{BAC} = 150^\circ$.



Given that the area of the triangle ABC is 10 cm^2 ,

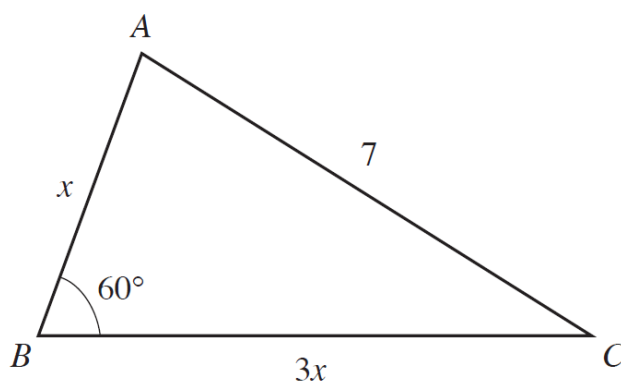
- (a) find x , [3]
- (b) calculate the length of the longest side of the triangle ABC , giving your answer correct to two decimal places. [3]

(C2 Winter 2007)

6. The triangle ABC is such that $AB = 6$ cm, $AC = 10$ cm and \hat{BAC} is an **obtuse** angle. The area of triangle ABC is $15\sqrt{3}$ cm².
- (a) Find the size of \hat{BAC} . [3]
- (b) Calculate the length of BC . [3]

(C2 Summer 2007)

3. The diagram below shows the triangle ABC with $AB = x$ cm, $BC = 3x$ cm, $AC = 7$ cm and $\hat{ABC} = 60^\circ$.



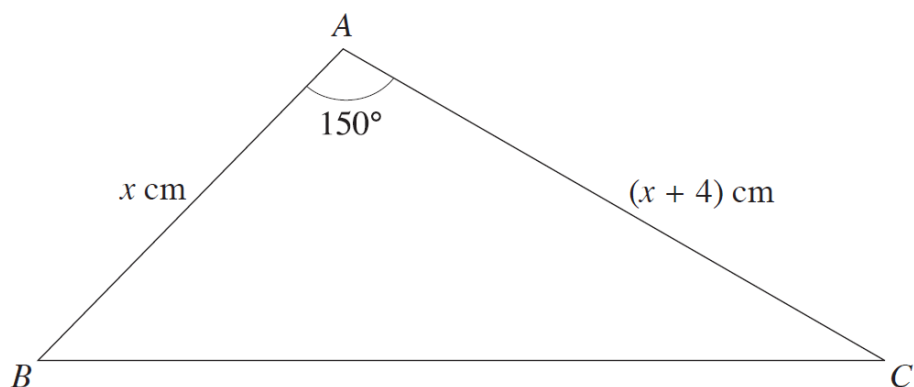
- (a) Show that $x = \sqrt{7}$. [3]
- (b) Find \hat{ACB} . [2]

(C2 Winter 2008)

5. In triangle ABC , $AB = 6$ cm, $BC = 13$ cm and $CA = 9$ cm.
- (a) Find the value of $\cos \hat{BAC}$ as a fraction in its lowest terms. [3]
- (b) Show that the area of triangle ABC is $4\sqrt{35}$ cm². [3]

(C2 Summer 2008)

3. The diagram below shows the triangle ABC with $AB = x$ cm, $AC = (x + 4)$ cm and $\widehat{BAC} = 150^\circ$.

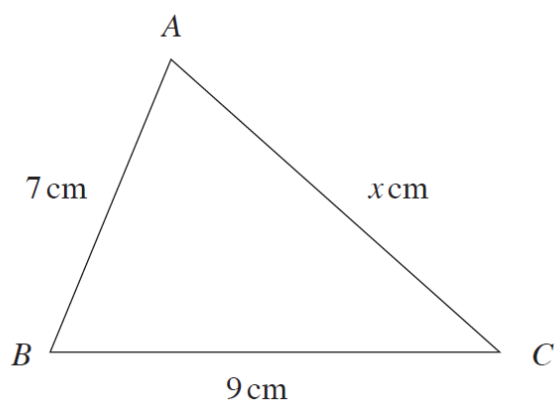


Given that the area of the triangle ABC is 15 cm^2 ,

- (a) find the value of x , [3]
 (b) find the length of BC correct to one decimal place. [2]

(C2 Winter 2009)

3. The diagram below shows a sketch of the triangle ABC with $AB = 7$ cm, $AC = x$ cm, $BC = 9$ cm and $\cos \widehat{BAC} = \frac{2}{7}$.



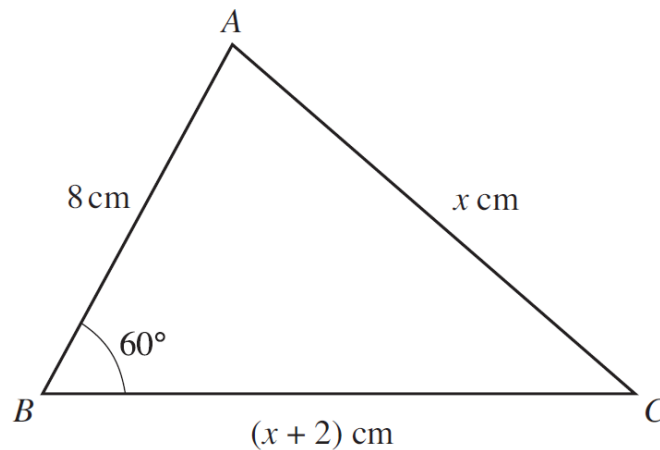
- (a) Write down and simplify a quadratic equation satisfied by x . Hence evaluate x . [3]
 (b) (i) Express $\sin \widehat{BAC}$ in the form $\frac{\sqrt{m}}{n}$, where m, n are integers whose values are to be found.
 (ii) Express $\sin \widehat{ACB}$ in the form $\frac{\sqrt{p}}{3}$, where p is an integer whose value is to be found. [4]

(C2 Summer 2009)

3. The triangle ABC is such that $AB = 16$ cm, $AC = 9$ cm and $\hat{A}BC = 23^\circ$.
- (a) Find the possible values of $\hat{A}CB$. Give your answers correct to the nearest degree. [2]
- (b) Given that $\hat{B}AC$ is an **acute** angle, find
- the size of $\hat{B}AC$, giving your answer correct to the nearest degree,
 - the area of triangle ABC , giving your answer correct to one decimal place. [4]

(C2 Winter 2010)

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



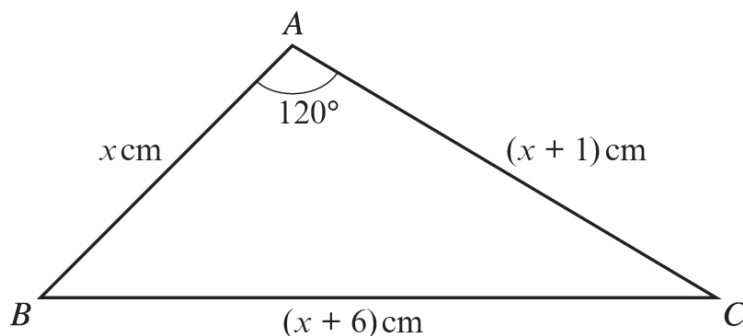
- (a) Write down and simplify an equation satisfied by x . Hence evaluate x . [3]
- (b) Find the size of $\hat{A}CB$. [2]

(C2 Summer 2010)

3. (a) The triangle ABC is such that $AB = 11$ cm and $\hat{B}AC = 110^\circ$. Given that the area of the triangle ABC is 31 cm², find the length of BC . [4]
- (b) The triangle XYZ is such that $XY = 2$ cm, $YZ = (2\sqrt{3} - 1)$ cm and $\hat{Y}XZ = 60^\circ$. Find an expression for $\sin \hat{X}ZY$ in the form $\frac{m + \sqrt{3}}{n}$, where m, n are integers whose values are to be found. [3]

(C2 Winter 2011)

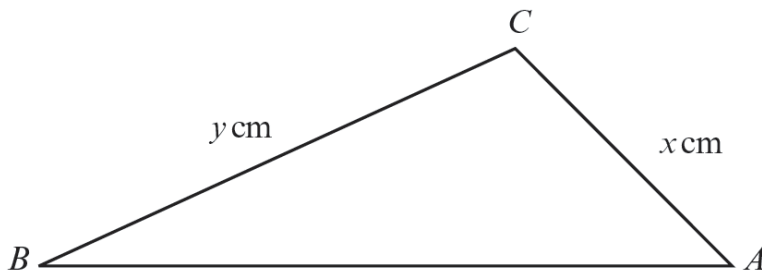
3. The diagram below shows a sketch of the triangle ABC with $AB = x$ cm, $AC = (x + 1)$ cm, $BC = (x + 6)$ cm and $\widehat{BAC} = 120^\circ$.



- (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]

(C2 Summer 2011)

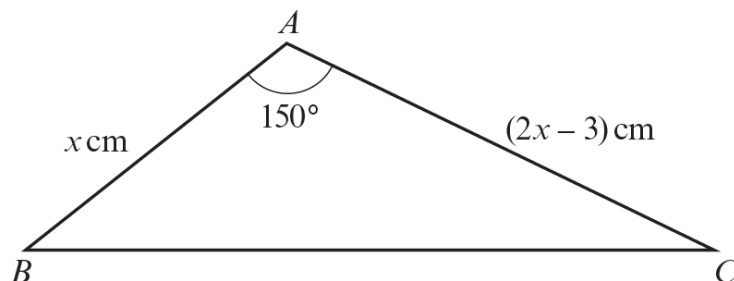
3. The diagram below shows a sketch of the triangle ABC with $\sin A = \frac{3}{5}$, $\sin B = \frac{5}{13}$, $\sin C = \frac{56}{65}$, $AC = x$ cm and $BC = y$ cm.



- (a) Show that $y = 1.56x$. [2]
- (b) Given that the area of triangle ABC is 4.2 cm^2 , find the value of x and the value of y . [5]

(C2 Winter 2012)

3. The diagram below shows a sketch of the triangle ABC with $AB = x$ cm, $AC = (2x - 3)$ cm and $\widehat{BAC} = 150^\circ$. The area of triangle ABC is 6.75 cm².



- (a) Show that x satisfies the equation $2x^2 - 3x - 27 = 0$. Hence evaluate x . [4]

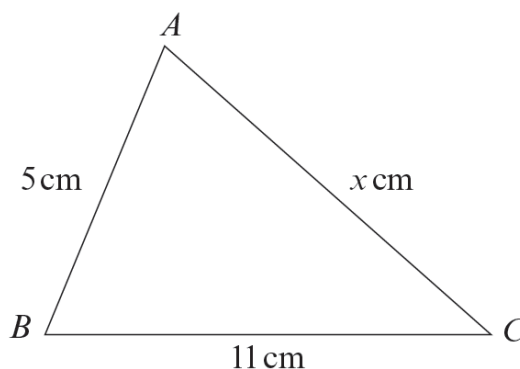
- (b) Find the length of BC . Give your answer correct to two decimal places. [2]

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]

(C2 Summer 2012)

3. (a) The diagram below shows a sketch of the triangle ABC with $AB = 5$ cm, $AC = x$ cm, $BC = 11$ cm and $\cos \widehat{BAC} = \frac{2}{5}$.

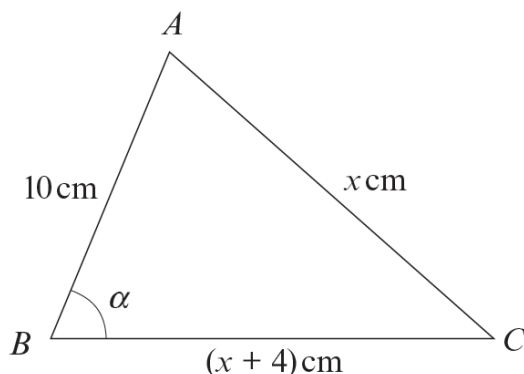


Write down and simplify a quadratic equation satisfied by x .
Hence evaluate x . [3]

- (b) The triangle XYZ is such that $XY = 32$ cm, $XZ = 15$ cm and $\widehat{XYZ} = 19^\circ$.
Find the possible values of \widehat{YXZ} . Give your answers correct to the nearest degree. [4]

(C2 Winter 2013)

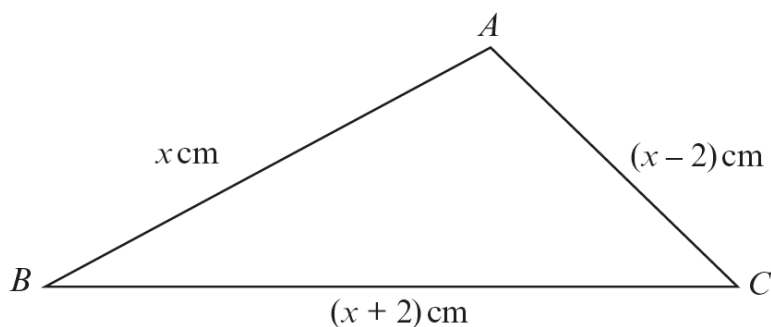
3. The diagram below shows a sketch of the triangle ABC with $AB = 10$ cm, $AC = x$ cm, $BC = (x + 4)$ cm and $\widehat{ABC} = \alpha$, where $\cos \alpha = \frac{3}{5}$.



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

(C2 Summer 2013)

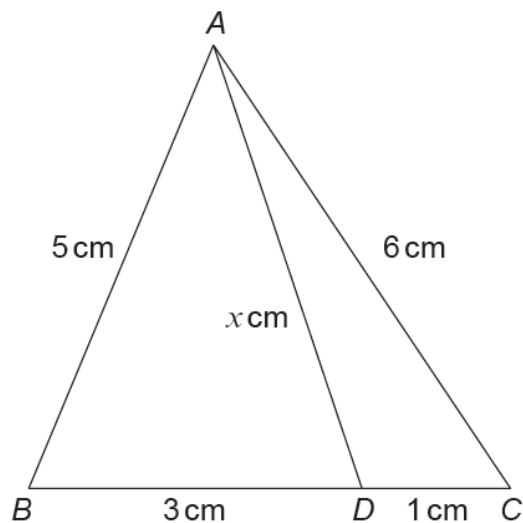
3. The diagram below shows a sketch of the triangle ABC with $AB = x$ cm, $AC = (x - 2)$ cm and $BC = (x + 2)$ cm.



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

(C2 Winter 2014)

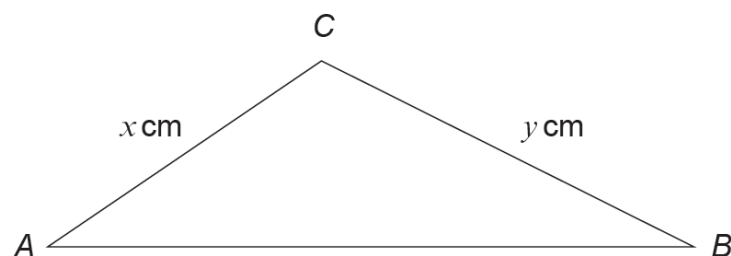
5. The diagram below shows a sketch of the triangle ABC with $AB = 5$ cm and $AC = 6$ cm. The point D is on BC such that $BD = 3$ cm, $DC = 1$ cm and $AD = x$ cm.



- (a) (i) By applying the cosine rule in each of the triangles ADB and ADC , show that $\cos \hat{A}DB = \frac{x^2 - 16}{6x}$ and find a similar expression for $\cos \hat{A}DC$.
- (ii) Noting that $\hat{A}DB$ and $\hat{A}DC$ 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]

(C2 Summer 2014)

3. 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.



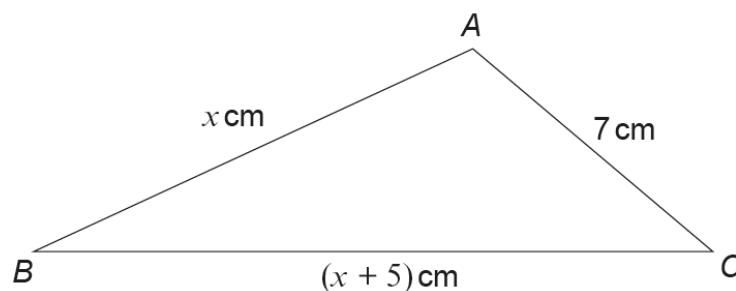
- (a) Show that $y = 1.7x$. [2]
- (b) Given that $AB = 10.5$ cm, use the cosine rule to find the exact value of x . [4]

(C2 Summer 2015)

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

(C2 Summer 2016)

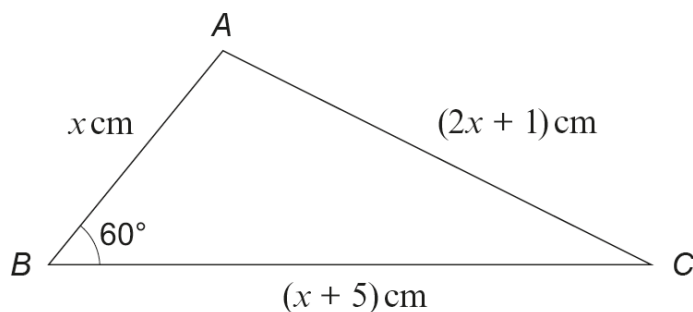
3. The diagram below shows a sketch of the triangle ABC with $AB = x$ cm, $BC = (x + 5)$ cm, $AC = 7$ cm and $\cos \hat{B}AC = -\frac{3}{5}$.



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

(C2 Summer 2017)

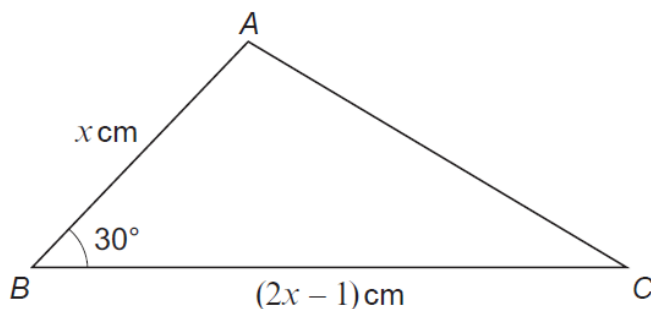
3. The diagram below shows a sketch of the triangle ABC with $AB = x$ cm, $BC = (x + 5)$ cm, $AC = (2x + 1)$ cm and $\hat{A}BC = 60^\circ$.



- (a) Show that x satisfies the equation $3x^2 - x - 24 = 0$. Hence evaluate x . [4]
- (b) Find the size of $\hat{A}CB$. [2]

(C2 Summer 2018)

3. (a) The diagram below shows a sketch of the triangle ABC with $AB = x$ cm, $BC = (2x - 1)$ cm and $\hat{A}BC = 30^\circ$. The area of triangle ABC is 11.25 cm².



- (i) Write down and simplify a quadratic equation satisfied by x . Hence show that $x = 5$.
- (ii) Find the length of AC . Give your answer correct to one decimal place. [6]
- (b) The triangle XYZ is such that $XY = 29$ cm, $XZ = 16$ cm and $\hat{X}YZ = 17^\circ$. Find the possible values of \hat{YXZ} . Give your answers correct to the nearest degree. [4]