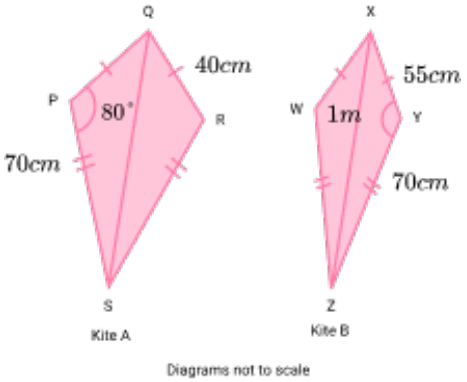
THIRD SPACE LEARNING

GCSE Exam Questions

Cosine Rule | Geometry & Measure

GCSE Exam Questions: Cosine Rule

1) **(a)** *PQRS* and *WXYZ* are kites. Using the diagram, calculate the length of *QS*, correct to 3 significant figures.



(3)

(b) Calculate the interior angle at *Y* for kite *B*, correct to 2 decimal places.

(3)

(6 marks)

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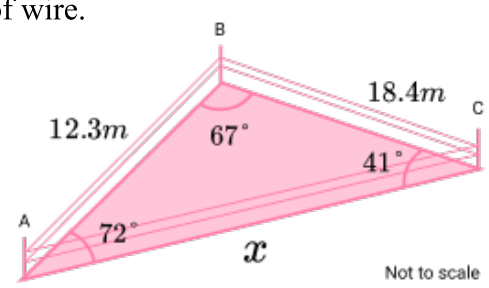
2) Derek needs to replace a wire fence around a field.

He has 100*m* of wire.



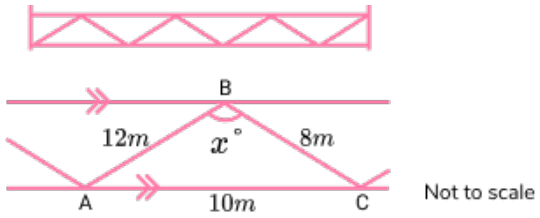
Does Derek have enough wire to go around the field twice?

Give a reason for your answer.

(4 marks)

GCSE Exam Questions: Cosine Rule

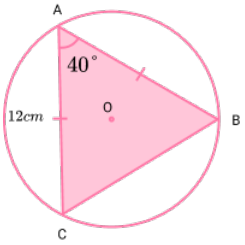
3) A bridge is being constructed over a river. Using the diagram below, calculate the interior angle x. You must show your working.



Not to scale

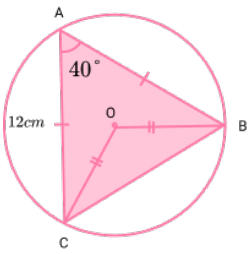
(3 marks)

4) (a) An isosceles triangle is inscribed in a circle. Use the cosine rule to find the length of BC. Write your answer to 3 significant figures.



(3)

(b) Two radii are added to the same diagram connecting OB and OC as shown below. Calculate the radius of the circle using the cosine rule.

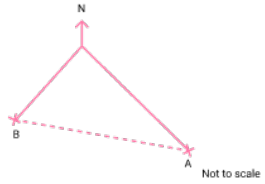


(5)

(8 marks)

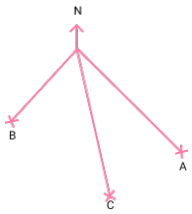
GCSE Exam Questions: Cosine Rule

5) **(a)** Two planes set off from the same airport. Plane A flies at a bearing of 130° and Plane B flies at a bearing of 200°. After 30 minutes, Plane A has travelled 21.4*km*, and Plane B has travelled 16.9*km*.
Given that the planes are flying at the same height, how far apart are they from each other, 30 minutes after take off? Write your answer correctly to 2 decimal places.



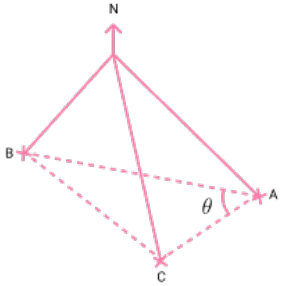
(3)

(b) Plane C takes off from the same airport at the same time at a bearing of 155° travelling 27.3*km* in 30 minutes. How far is *A* from *C*, 30 minutes after take off?



(3)

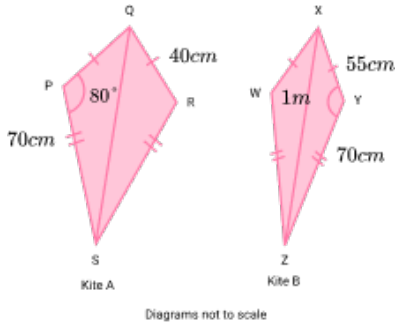
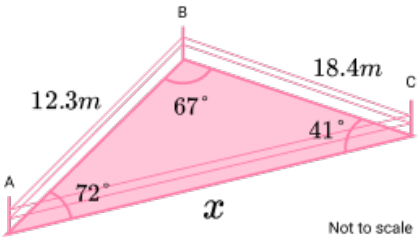
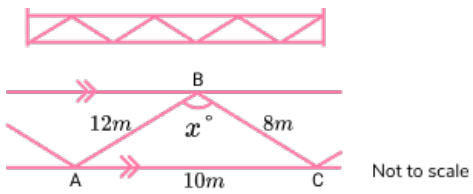
(c) 30 minutes after take off, the distance BC=19.45km. Using your answer for parts (a) and (b), calculate the angle BAC, labelled θ



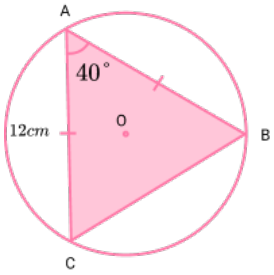
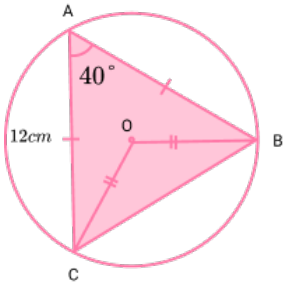
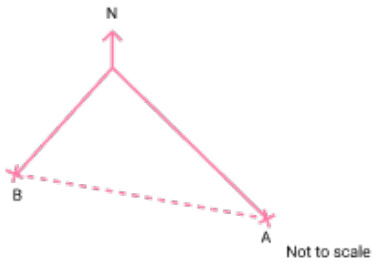
(3)

(9 marks)

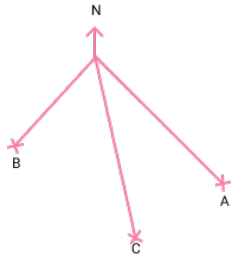
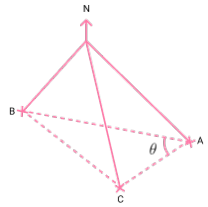
GCSE Exam Questions: Topic Answers

	Question	Answer	Marks
1) (a)	*PQRS* and *WXYZ* are kites. Using the diagram, calculate the length *QS* correct to 3 significant figures. 	Correct substitution into the cosine rule $a^2 = 5527.57...$ or $a = 74.3476...$ $74.3cm$	**(1)** **(1)** **(1)**
(b)	Calculate the interior angle at *Y* for kite *B*, correct to 2 decimal places.	Correct substitution into the cosine rule $\cos(Y) = -\frac{83}{308}$ or $Y = 105.633357...$ 105.63^0	**(1)** **(1)** **(1)**
2)	Derek needs to replace a wire fence around a field. He has $100m$ of wire.  Does Derek have enough wire to go around the field twice? Give a reason for your answer.	Correct substitution into the cosine rule $x = 17.69…$ $P = 48.347...$ or $2P = 96.783...$ Yes.	**(1)** **(1)** **(1)** **(1)**
3)	A bridge is being constructed over a river. Using the diagram below, calculate the interior angle *x*. You must show your working. 	Correct substitution into the cosine rule $\cos x = \frac{9}{16}$ or $x = 55.77113...$ 55.77^o	**(1)** **(1)** **(1)**

GCSE Exam Questions: Cosine Rule Answers

	Question	Answer	Marks
4) (a)	An isosceles triangle is inscribed in a circle. Use the cosine rule to find the length of BC. Write your answer to 3 significant figures. 	Correct substitution into the cosine rule $a^2 = 67.379...$ or $a = 8.20848...$ $8.21cm$	**(1)** **(1)** **(1)**
(b)	Two radii are added to the same diagram connecting OB and OC as shown below. Calculate the radius of the circle. 	Angle $BOC = 40 \times 2 = 80^o$ Reason: The angle at the centre is twice the angle at the circumference. $8.21^2 = x^2 + x^2 - 2x^2 \cos(80)$ $x^2 = \frac{8.21^2}{2 - 2cos(80)}$ $x = 6.39cm$ (2dp)	**(1)** **(1)** **(1)** **(1)** **(1)**
5) (a)	Two planes set off from the same airport. Plane A flies at a bearing of 130° and Plane B flies at a bearing of 200°. After 30 minutes, Plane A has travelled 21.4km, and Plane B has travelled 16.9km. Given that the planes are flying at the same height, how far apart are they from each other, 30 minutes after take off? Write your answer correctly to 2 decimal places. 	Correct substitution into the cosine rule $AB^2 = 496.1799899...$ or $AB = 22.27509798...$ $22.28km$	**(1)** **(1)** **(1)**

GCSE Exam Questions: Cosine Rule Answers

	Question	Answer	Marks
(b)	Plane C takes off from the same airport at the same time at a bearing of 155° travelling 27.3km in 30 minutes. How far is A from C, 30 minutes after take off?  	Correct substitution into the cosine rule $AC^2 = 144.2837293...$ or $AC = 12.01181624...$ 12.01km (2dp)	**(1)** **(1)** **(1)**
(c)	30 minutes after take off, the distance BC = 19.45km. Using your answer for parts (a) and (b), calculate the angle BAC labelled θ  	Correct substitution into the cosine rule $\cos\theta = \frac{22.28^2 + 12.01^2 - 19.45^2}{2 \times 22.28 \times 12.01}$ ... or $\theta = \cos^{-1}(0.4901959319)...$ $= 60.65^{o}$	**(1)** **(1)** **(1)**

Where to go next?

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