Area of a Triangle 1/2abSin(C) - Worksheet

Skill

Group A - Substitute into A=1/2abSin(C)

Substitute the values of a, b, and C into the formula $A = \frac{1}{2}ab\sin(C)$ and solve for A.

1) $a = 5,\ b = 8,\ C = 90^\circ$

2) $a = 13,\ b = 12,\ C = 30^\circ$

3) $a = 7.4,\ b = 11,\ C = 30^\circ$

4) $a = 33,\ b = 41,\ C = 60^\circ$

5) $a = 2\sqrt{2},\ b = 3,\ C = 45^\circ$

6) $a = 3\sqrt{3},\ b = 10,\ C = 120^\circ$

7) $a = 0.4,\ b = 0.8,\ C = 72^\circ$

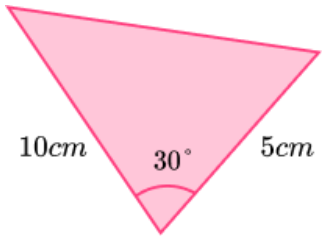
8) $a = 5\sqrt{2},\ b = 3\sqrt{3},\ C = 53^\circ$

9) $a = 2.7,\ b = 3\sqrt{2},\ C = 38^\circ$

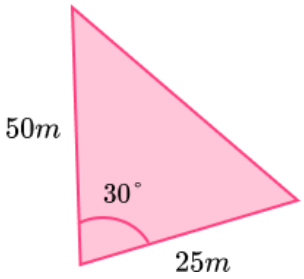
Group B - Calculate the area using A=1/2abSin(C)

Calculate the area of each triangle correct to 2dp. All diagrams not to scale.

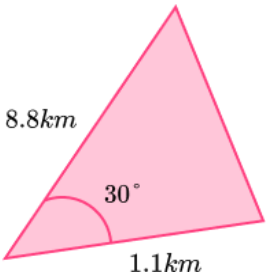
1)



2)



3)



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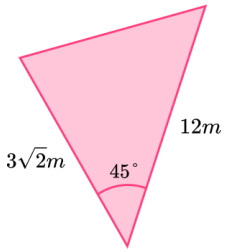
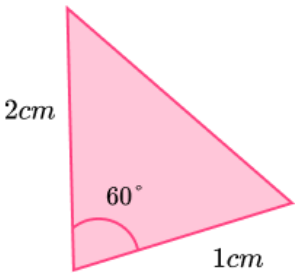
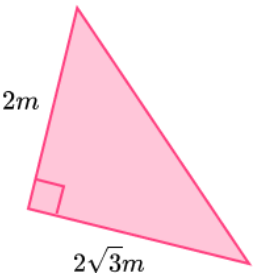


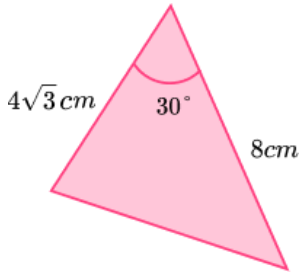
5)



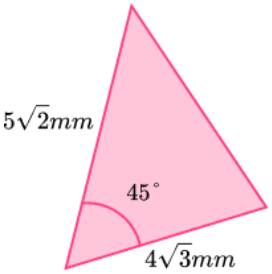
6)



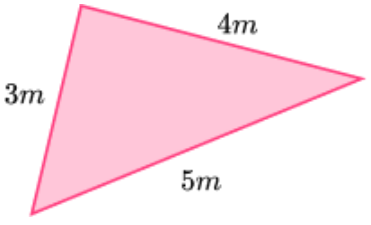
7)



8)



9)



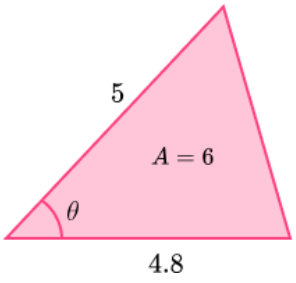
Area of a Triangle 1/2abSin(C) - Worksheet

Group C - Calculate a missing side or angle

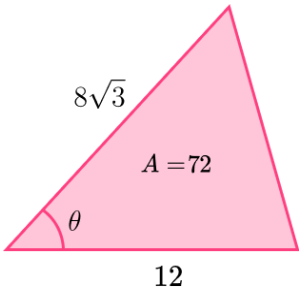
Use the two formulae to calculate the missing side or angle of the triangle. Write your answer to a suitable degree of accuracy. All diagrams not to scale.

$$\sin(C) = \frac{2A}{ab} \text{ and } b = \frac{2A}{a\sin(C)}$$

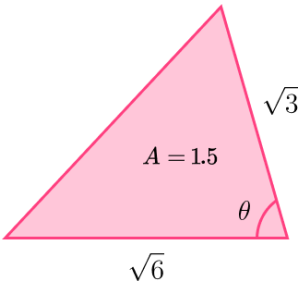
1)



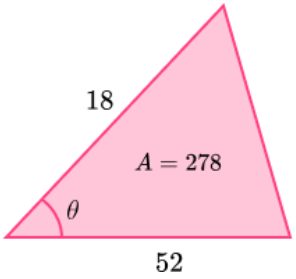
2)



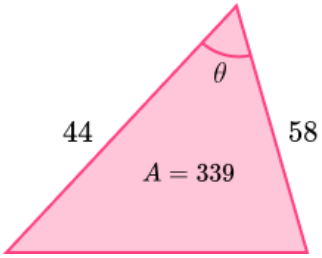
3)



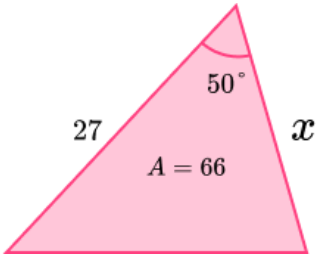
4)



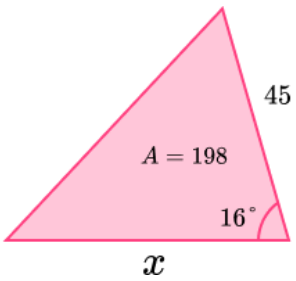
5)



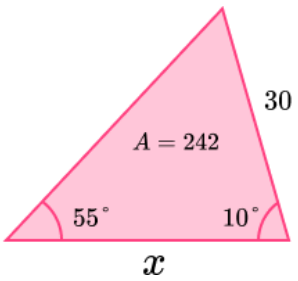
6)



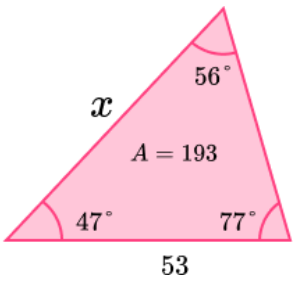
7)



8)



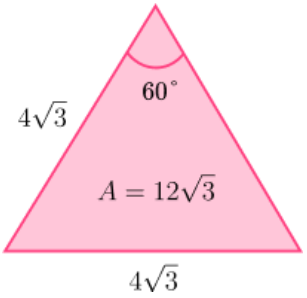
9)



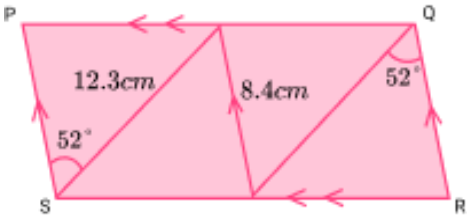
Area of a Triangle 1/2abSin(C) - Worksheet

Applied

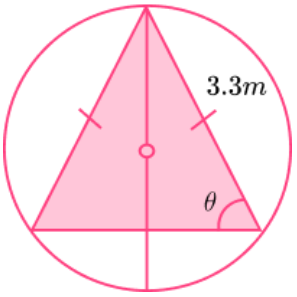
1) Prove that this triangle is equilateral.



2) Calculate the area of the parallelogram $PQRS$.



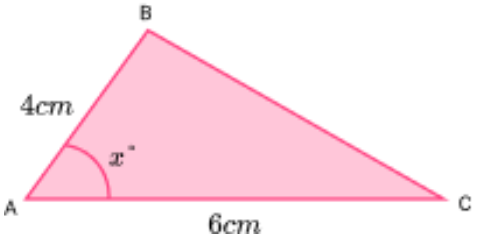
3) An isosceles triangle is inscribed inside a circle.



The area of the triangle is $3.2\ m^2$.
Calculate the angle θ correct to 1 decimal place.

Area of a Triangle 1/2abSin(C) - Exam Questions

1) **(a)** Which expression represents the area of the triangle ABC?
Circle your answer.



$24 \sin x$ $12 \sin x$

$24 \cos x$ $12 \cos x$

(1)

(b) The area of the triangle is equal to $9.829\ cm^2$.
Calculate the value of x correct to 1 decimal place.

.....

(2)

(3 marks)

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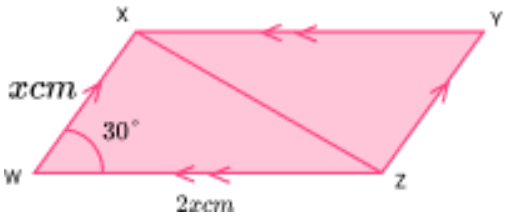
2) **(a)** Write an expression for the area of the parallelogram $WXYZ$.
Write your answer in its simplest form.



.....

(2)

(b) The area of $WXYZ$ is equal to $2500\ cm^2$.
Calculate the value of x.

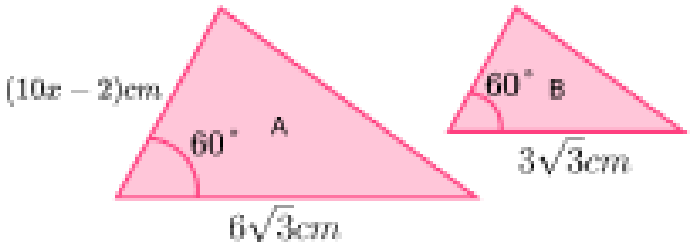
.....

(1)

(3 marks)

Area of a Triangle 1/2abSin(C) - Exam Questions

3) **(a)** Triangles A and B are similar. Write an expression in the simplest form for the area of triangle A.



.....

(2)

(b) Hence or otherwise, find the area of B when $x = 5$.

.....

(3)

(5 marks)

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4) The diagram shows the sector of a circle O, radius $12.3\ cm$. Work out the area of the segment AB, correct to 3 significant figures.

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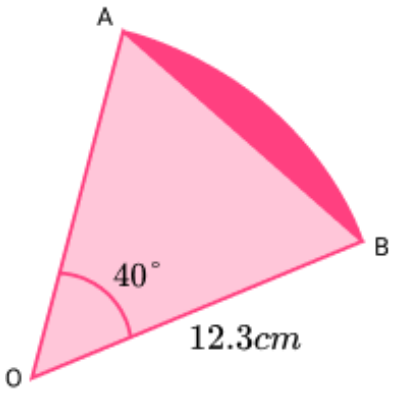
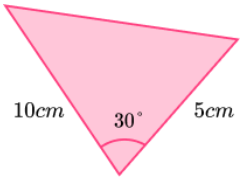
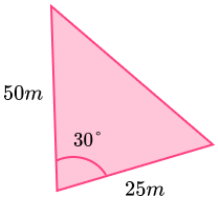
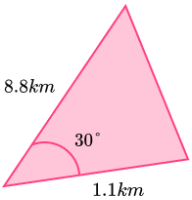
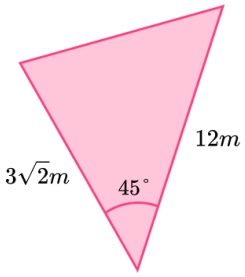
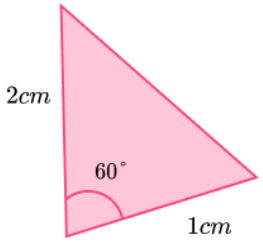
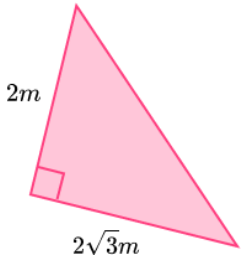
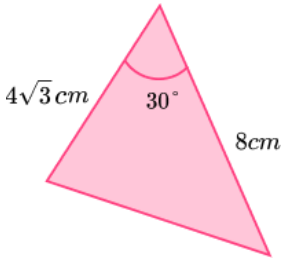
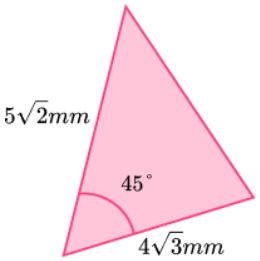
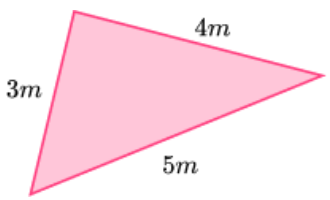
(4 marks)



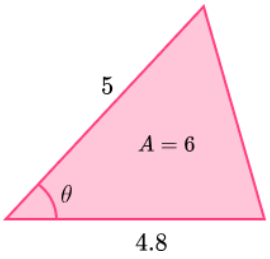
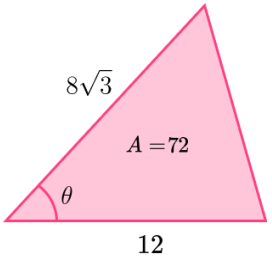
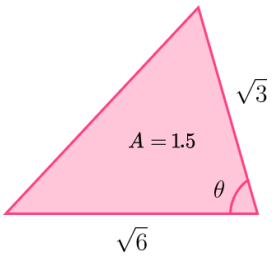
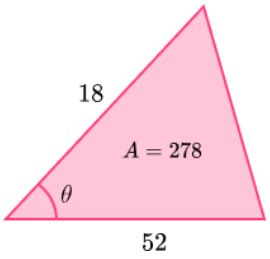
Area of a Triangle 1/2abSin(C) - Answers

	Question	Answer
	Skill Questions	
Group A	Substitute the values of a, b, and C into the formula $A = \frac{1}{2}ab\sin(C)$ and solve for A.	
	1) $a = 5,\ b = 8,\ C = 90^\circ$	**1)** $A = 20$
	2) $a = 13,\ b = 12,\ C = 30^\circ$	**2)** $A = 39$
	3) $a = 7.4,\ b = 11,\ C = 30^\circ$	**3)** $A = 20.35$
	4) $a = 33,\ b = 41,\ C = 60^\circ$	**4)** $A = 585.87$
	5) $a = 2\sqrt{2},\ b = 3,\ C = 45^\circ$	**5)** $A = 3$
	6) $a = 3\sqrt{3},\ b = 10,\ C = 120^\circ$	**6)** $A = 22.5$
	7) $a = 0.4,\ b = 0.8,\ C = 72^\circ$	**7)** $A = 0.15$
	8) $a = 5\sqrt{2},\ b = 3\sqrt{3},\ C = 53^\circ$	**8)** $A = 14.67$
	9) $a = 2.7,\ b = 3\sqrt{2},\ C = 38^\circ$	**9)** $A = 3.53$
Group B	Calculate the area of each triangle correct to 2dp. All diagrams not to scale.	
	1) 	**1)** $A = 12.5\ cm^2$
	2) 	**2)** $A = 312.5\ m^2$
	3) 	**3)** $A = 2.42\ km^2$

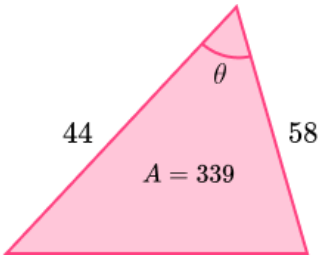
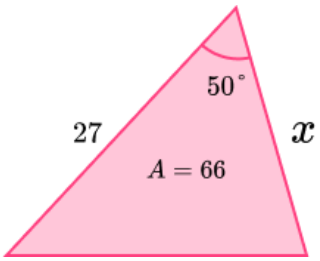
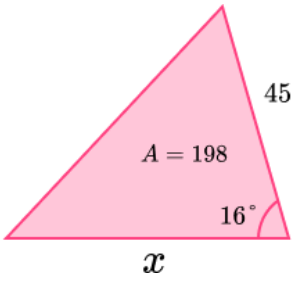
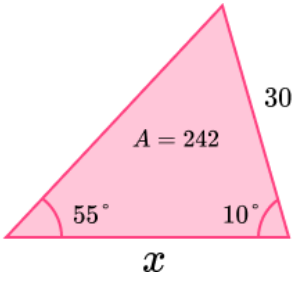
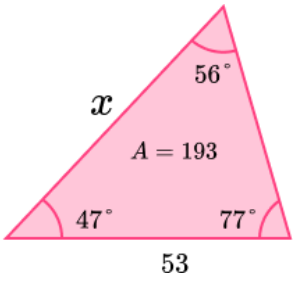
Area of a Triangle 1/2abSin(C) - Answers

Group B contd	**4)** 	**4)** $A = 18\,m^2$
	5) 	**5)** $A = \frac{\sqrt{3}}{2} cm^2$
	6) 	**6)** $A = 2\sqrt{3}\,m^2$
	7) 	**7)** $A = 8\sqrt{3}\,cm^2$
	8) 	**8)** $A = 10\sqrt{3}\,mm^2$
	9) 	**9)** $A = 6\,m^2$

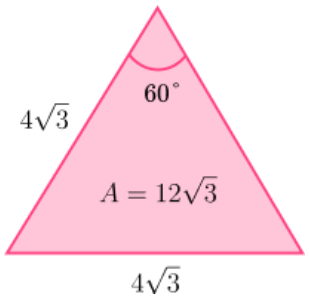
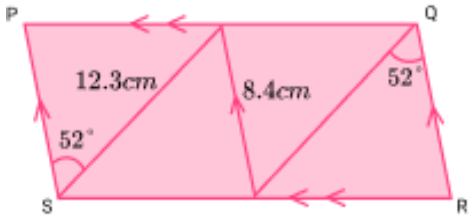
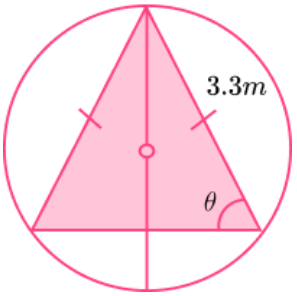
Area of a Triangle 1/2abSin(C) - Answers

Group C	Use the two formulae to calculate the missing side or angle of the triangle. Write your answer to a suitable degree of accuracy. All diagrams not to scale. $\sin(C) = \frac{2A}{ab}$ and $b = \frac{2A}{a\sin(C)}$ **1)**  **2)**  **3)**  **4)**  	**1)** $\theta = 30^{\circ}$ **2)** $\theta = 60^{\circ}$ **3)** $\theta = 45^{\circ}$ **4)** $\theta = 36.44^{\circ}$

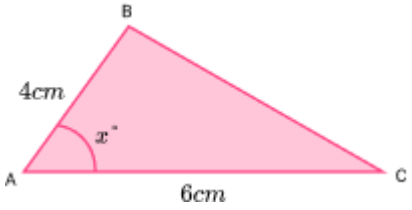
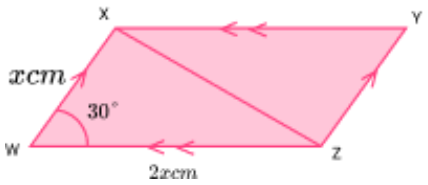
Area of a Triangle 1/2abSin(C) - Answers

Group C contd	**5)** 	**5)** $\theta = 15.41^{\circ}$
	6) 	**6)** $x = 6.38$
	7) 	**7)** $x = 31.93$
	8) 	**8)** $x = 92.91$
	9) 	**9)** $x = 9.96$

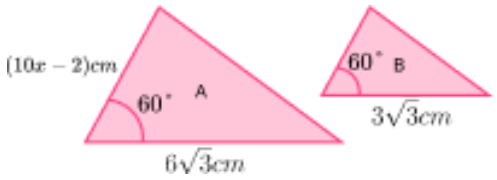
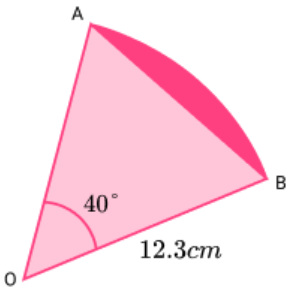
Area of a Triangle 1/2abSin(C) - Answers

	Question	Answer
	Applied Questions	
1)	Prove that this triangle is equilateral. 	$12\sqrt{3} = \frac{1}{2} \times 4\sqrt{3} \times 4\sqrt{3} \times \sin\theta$ $\theta = 60^o$ $180 - (60 + 60) = 60^o$ All three angles are 60^o Must be equilateral
2)	Calculate the area of the parallelogram $PQRS$. 	$162.83\ cm^2$
3)	An isosceles triangle is inscribed inside a circle. The area of the triangle is $3.2\ m^2$. Calculate the angle θ correct to 1 decimal place. 	$180 - 2\theta = \sin^{-1}(\frac{2\times3.2}{3.3\times3.3})$ 72.0°

Area of a Triangle 1/2abSin(C) - Mark Scheme

	Question	Answer	
	Exam Questions		
1) (a)	For the triangle ABC, which expression represents the area of the triangle?  $24\sin(x)$ $12\sin(x)$ $24\cos(x)$ $12\cos(x)$	**(a)** $12\sin(x)$	**(1)**
(b)	The area of the triangle is equal to $9.829\ cm^2$. Calculate the value of x correct to 1 decimal place.	**(b)** $\sin(x) = 0.819...$ $x = 55.0^\circ$	**(1)** **(1)**
2) (a)	Write an expression for the area of the parallelogram $WXYZ$.  Write your answer in its simplest form.	**(a)** $2x^2\sin(30)$ x^2	**(1)** **(1)**
(b)	The area of WXYZ is equal to $2500\ cm^2$. Calculate the value of x.	**(b)** $x^2 = 2500$ so $x = 50cm$	**(1)**

Area of a Triangle 1/2abSin(C) - Mark Scheme

3) (a)	Triangles A and B are similar.  Write an expression in the simplest form for the area of triangle A.	**(a)** $\frac{1}{2} \times (10x - 2) \times (6\sqrt{3}) \times \sin(60)$ $45x - 9$ or $9(5x - 1)$	**(1)** **(1)**
(b)	Hence or otherwise, find the area of B when $x = 5$.	**(b)** Area of $A = 216\ cm^2$ Area enlargement $= 2^2 = 4$ seen Area of $B = 216 \div 4 = 54\ cm^2$	**(1)** **(1)** **(1)**
4)	The diagram shows the sector of a circle O, radius $12.3\ cm$. Work out the area of the shaded segment, correct to 3 significant figures.  	$360 \div 40 = 9$ $\frac{\pi \times 12.3^2}{9}$ $\frac{\pi \times 12.3^2}{9} - \frac{1}{2} \times 12.3^2 \times \sin(40)$ $4.19\ cm^2$ (3sf)	**(1)** **(1)** **(1)** **(1)**