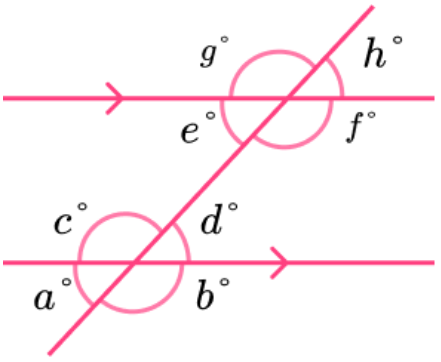
Angles in Parallel Lines - Worksheet

Skill

Group A - Types of angles in parallel lines

Using the diagram below, state whether the pair of letters are alternate interior/exterior, co-interior, or corresponding to each other.



1) a and e are ...

2) b and f are ...

3) c and f are ...

4) c and g are ...

5) d and f are ...

6) d and h are ...

7) a and h are ...

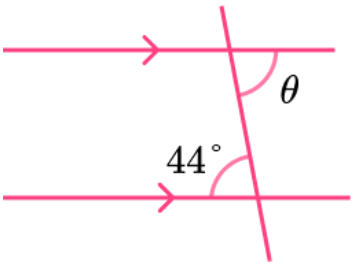
8) b and g are ...

9) c and e are ...

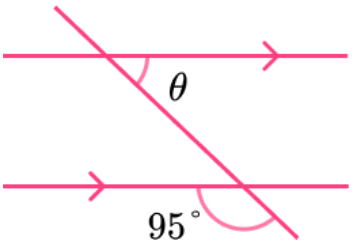
Group B - Calculate missing angles

Calculate the size of angle θ. State any angle facts that you use for each question.

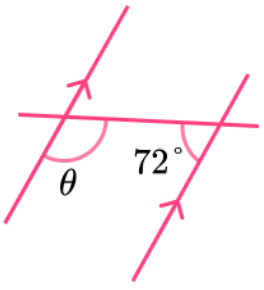
1)



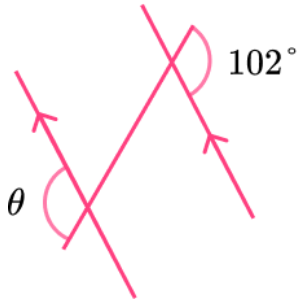
2)



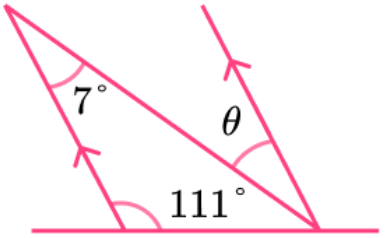
3)



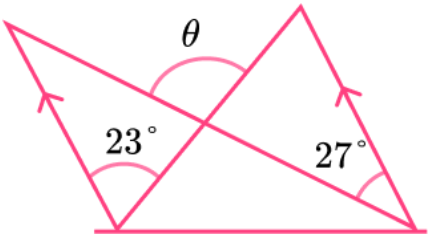
4)



5)

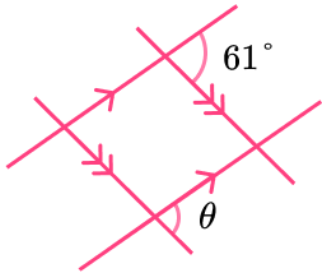


6)

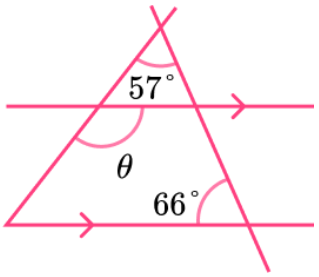


Angles in Parallel Lines - Worksheet

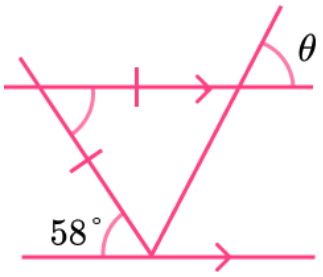
7)



8)



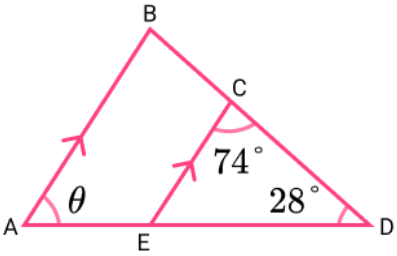
9)



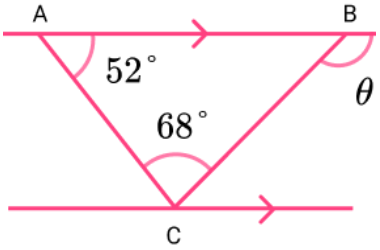
Group C - Angles in parallel lines, including triangles

Calculate the size of angle θ. You must use the sum of angles in a triangle in each solution. State any other angle facts that you use.

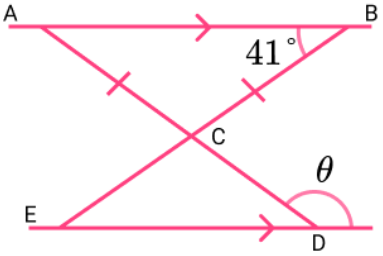
1)



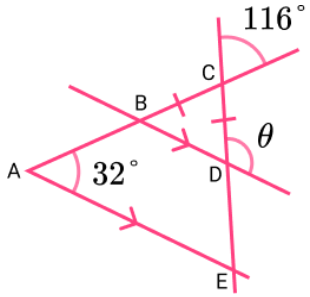
2)



3)



4)



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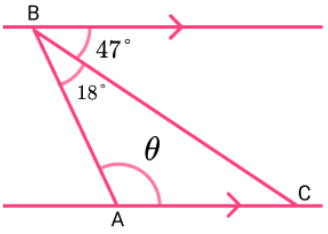

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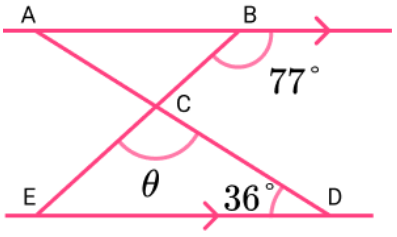

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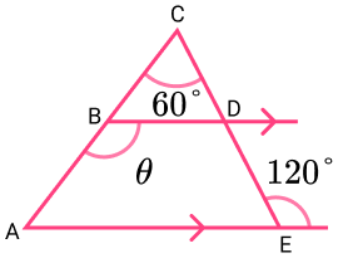
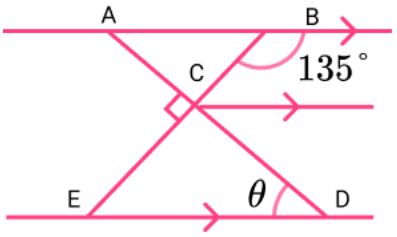


8)



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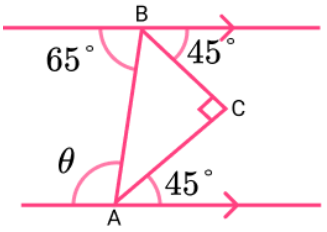
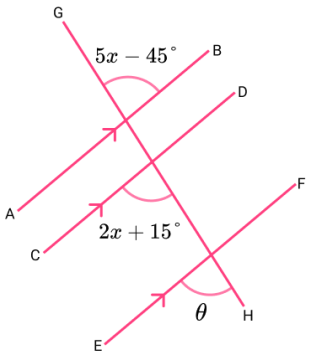


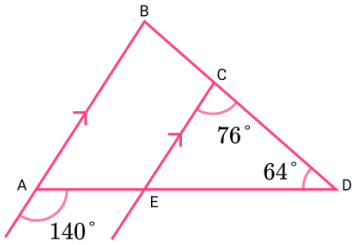
Angles in Parallel Lines - Worksheet

Applied

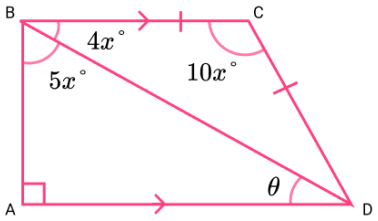
1) Lines AB, CD and EF are parallel. Line GH is the intersecting transversal across each parallel line. By calculating the value of x, find the size of the angle θ. Show all your workings.



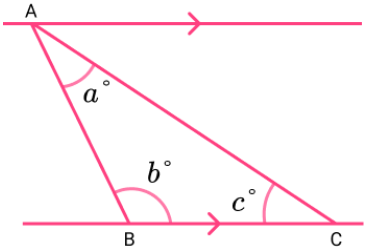
2) ABD and CDE are scalene triangles. Show that the lines AB and CE are parallel.



3) $ABCD$ is a trapezium made up of a right angle triangle and an isosceles triangle. Calculate the exact value of θ. Justify your answer.

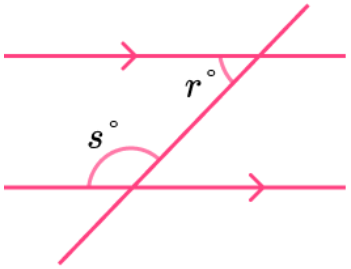


4) Triangle ABC lies between two parallel lines. Using facts about angles in parallel lines, show that the sum of a, b and c is equal to 180°.



Angles in Parallel Lines - Exam Questions

1) **(a)** Below is a diagram showing two parallel lines intersected by a transversal. Write an equation connecting r and s.



.....

(1)

(b) Given that the angle $r: s = 3: 5$, circle another equation connecting r and s. Circle your answer.

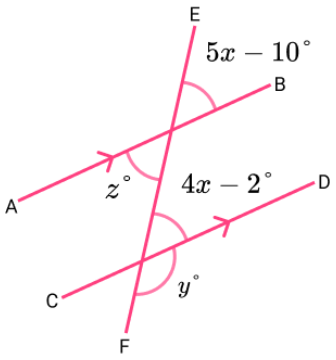
$3r = 5s$ $\quad 5r = 3s$ $\quad 8r = s$ $\quad s = 8r$ $\quad rs = 15$

(1)

(2 marks)

---

2) Lines AB and CD are parallel.



(a) By finding the value of x, calculate the exact value of $z°$.

.....

(3)

(b) Calculate the value of $y°$.

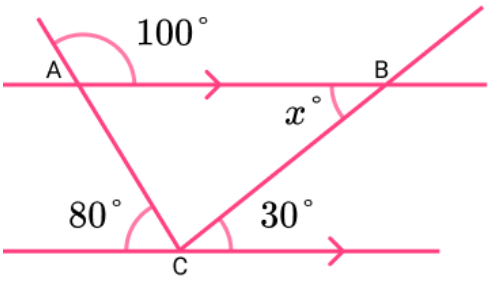
.....

(1)

(4 marks)

Angles in Parallel Lines - Exam Questions

3) Look at the diagram below.



(a) Tick the box next to the correct statement:

- ☐ x is vertically opposite 30°.
- ☐ x is alternate to 30°.
- ☐ x is corresponding to 80°.
- ☐ x is co-interior with 30°.

(1)

(b) Show that triangle ABC is scalene.

.....

(4)

(5 marks)

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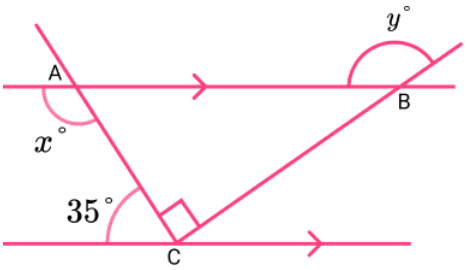
4) Look at the diagram below.



(a) Calculate the value of x°. Show your working (this can be on the diagram). You must state any angle facts used.

.....

(2)

Angles in Parallel Lines - Exam Questions

(b) Show that $y = 125°$. Explain your answer.

.....

(3)

(c) A similar right angle triangle has double the side lengths of the triangle ABC. How does this affect the angles inside the enlarged triangle?

.....

(1)

(6 marks)

Angles in Parallel Lines - Answers

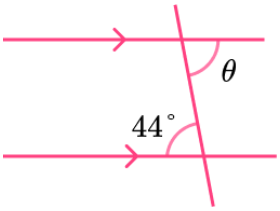
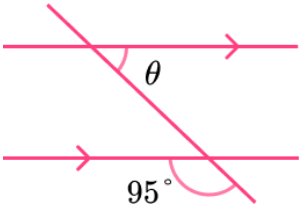
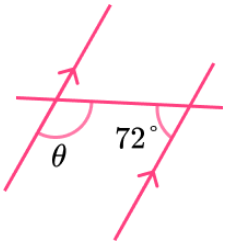
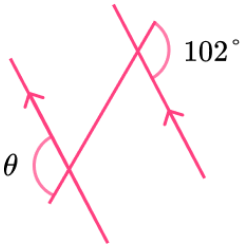
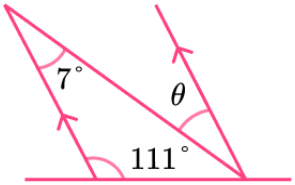
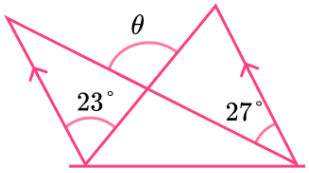
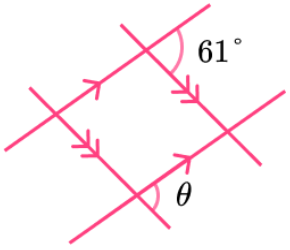
	Question	Answer
	Skill Questions	
Group A	Using the diagram below, state whether the pair of letters are alternate interior/exterior, co-interior, or corresponding to each other.	
	1) a and e are ...	**1)** Corresponding
	2) b and f are ...	**2)** Corresponding
	3) c and f are ...	**3)** Alternate Interior
	4) c and g are ...	**4)** Corresponding
	5) d and f are ...	**5)** Co-interior
	6) d and h are ...	**6)** Corresponding
	7) a and h are ...	**7)** Alternate Exterior
	8) b and g are ...	**8)** Alternate Exterior
	9) c and e are ...	**9)** Co-interior

For Group B and Group C answers, refer to the list of abbreviations below:

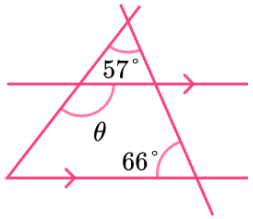
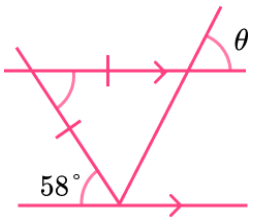
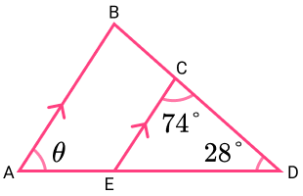
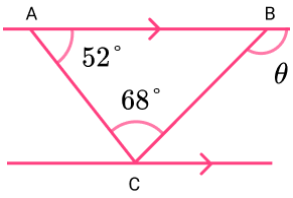
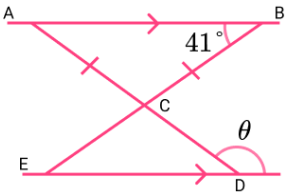
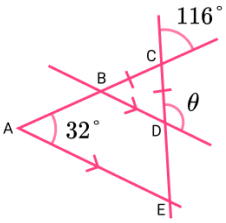
Abbreviations:

- AI = Alternate Interior
- AE = Alternate Exterior
- C = Corresponding
- CI = Co-Interior
- VO = Vertically Opposite
- SL = Straight Line
- T = (angles in a) Triangle
- IT = Isosceles Triangle
- P = (angles around a) Point

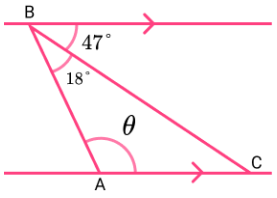
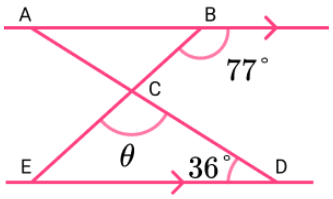
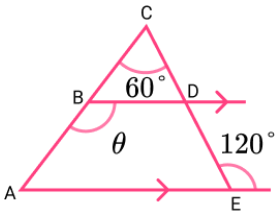
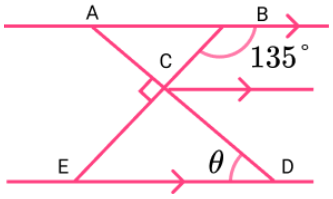
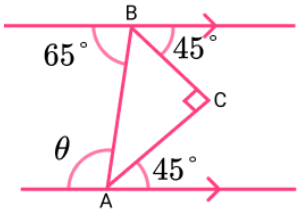
Angles in Parallel Lines - Answers

Group B	Calculate the size of angle θ. State any angle facts that you use for each question.	Angle facts used may not be unique. See abbreviations list.
	1) 	**1)** 44°, AI
	2) 	**2)** 85°, SL, AI
	3) 	**3)** 108°, CI
	4) 	**4)** 102°, AE
	5) 	**5)** 7°, AI
	6) 	**6)** 50°, AI, T, SL
	7) 	**7)** 61°, C, C

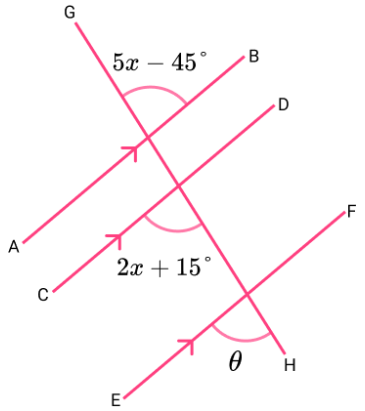
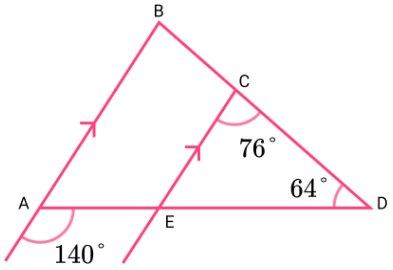
Angles in Parallel Lines - Answers

Group B contd	**8)**  **9)** 	**8)** 123°, C, T, SL **9)** 61°, AI, IT, VO
Group C	Calculate the size of angle θ. You must use the sum of angles in a triangle in each solution. State any other angle facts that you use. **1)**  **2)**  **3)**  **4)** 	Angle facts used may not be unique. See abbreviations list. **1)** 78°, T, C **2)** 120°, T, SL **3)** 139°, IT, SL **4)** 148°, VO, T, C, SL

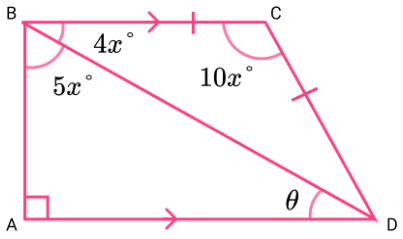
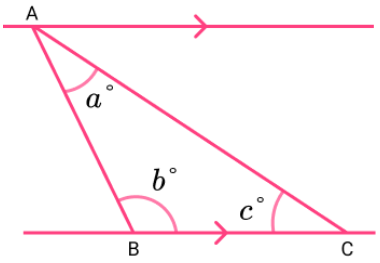
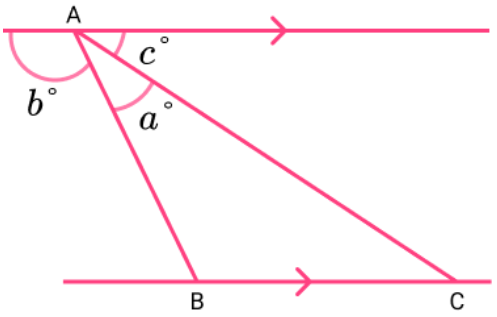
Angles in Parallel Lines - Answers

Group C contd	**5)** 	**5)** 115°, AI, T
	6) 	**6)** 67°, CI, T
	7) 	**7)** 120°, SL, T, CI
	8) 	**8)** 45°, CI, SL, T
	9) 	**9)** 115°, CI

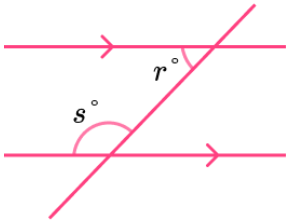
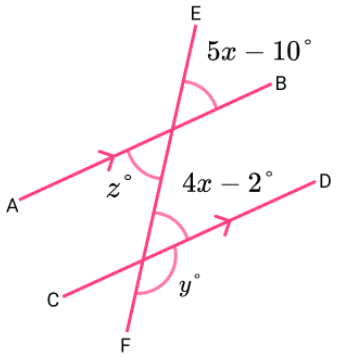
Angles in Parallel Lines - Answers

	Question	Answer
	Applied Questions	
1)	Lines AB, CD and EF are parallel. Line GH is the intersecting transversal across each parallel line. By calculating the value of x, find the size of the angle θ. Show all your workings. 	$5x - 45 = 2x + 15$ Alternate exterior angles are equal. $3x = 60$ $x = 20$ $\theta = 2x + 15 = 55°$
2)	ABD and CDE are scalene triangles. Show that the lines AB and CE are parallel. 	Shared angle of $64°$. Angle BAD = $40°$ as on a straight line. Angle CED = $40°$ as in a triangle CDE. Angle ABD = $76°$ as in a triangle ABD. ABD and CDE are similar triangles with a shared angle. Therefore, AB and CE are parallel.

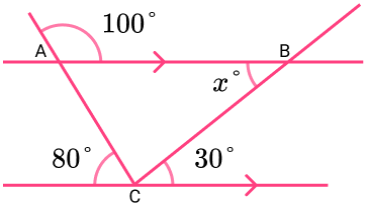
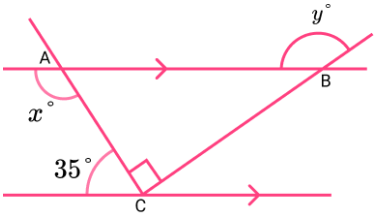
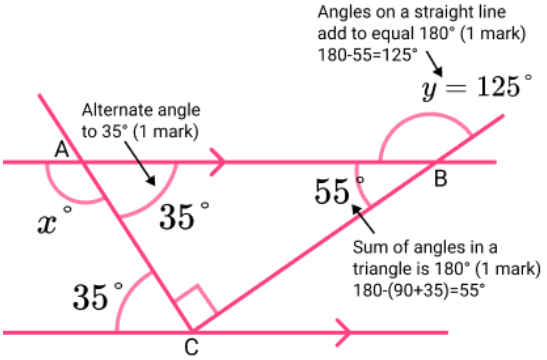
Angles in Parallel Lines - Answers

3)	$ABCD$ is a trapezium made up of a right angle triangle and an isosceles triangle. Calculate the exact value of θ. Justify your answer. 	$10x + 4x + 4x = 180$ so $x = 10°$ $\theta = 180 - (5x + 90) = 180 - 140 = 40°$ $\theta = 40°$
4)	Triangle ABC lies between two parallel lines. Using facts about angles in parallel lines, show that the sum of a, b and c is equal to 180°. 	Angles b and c are alternate to their pair at point A which creates a straight line. This shows that $b + a + c = 180°$. 

Angles in Parallel Lines - Mark Scheme

	Question	Answer	
	Exam Questions		
1) (a)	Below is a diagram showing two parallel lines intersected by a transversal. Write an equation connecting r and s.  	**(a)** $r + s = 180$	**(1)**
(b)	Given that the angle $r: s = 3: 5$, circle another equation connecting r and s. $3r = 5s$ $\quad 5r = 3s$ $\quad 8r = s$ $s = 8r$ $\quad rs = 15$	**(b)** $5r = 3s$	**(1)**
2)	Lines AB and CD are parallel.  		
(a)	By finding the value of x, calculate the exact value of $z°$.	**(a)** $5x - 10 = 4x - 2$ $x = 8°$ $4 \times 8 - 2 = z = 30°$	**(1)** **(1)** **(1)**
(b)	Calculate the value of $y°$.	**(b)** $y = 180 - 30 = 150°$	**(1)**

Angles in Parallel Lines - Mark Scheme

3)	Look at the diagram below.  		
(a)	Tick the box next to the correct statement. ☐ x is vertically opposite 30°. ☐ x is alternate to 30°. ☐ x is corresponding to 80°. ☐ x is co-interior with 30°.	**(a)** ☑ x is alternate to 30°.	**(1)**
(b)	Show that triangle ABC is scalene.	**(b)** $ABC = 30°$ $BAC = 80°$ $ACB = 70°$ All angles are different and so the triangle is scalene.	**(1)** **(1)** **(1)** **(1)**
4)	Look at the diagram below.  		
(a)	Calculate the value of $x°$. Show your working (this can be on the diagram). You must state any angle facts used.	**(a)** $x = 180 - 35 = 145°$ x is co-interior to 35°	**(1)** **(1)**
(b)	Show that $y = 125°$. Explain your answer.	**(b)**  0 marks for calculating angles without any reasoning e.g. $180 - 55 = 125°$ only	**(3)**

Angles in Parallel Lines - Mark Scheme

(c)	A similar right angle triangle has double the side lengths of the triangle ABC. How does this affect the angles inside the enlarged triangle?	**(c)** They stay the same (no change).	**(1)**