

Angles on a Straight Line - Worksheet

Skill

Group A - Core skill practice

Calculate the missing angle x in each diagram.

1)



2)



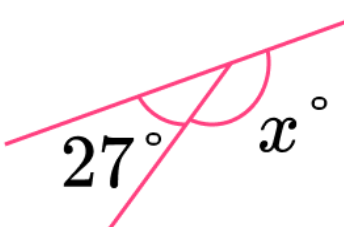
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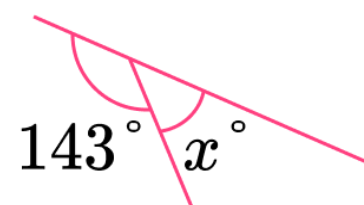
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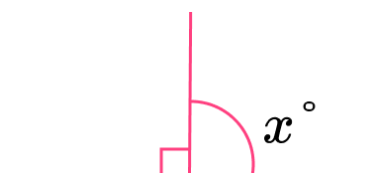
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6)



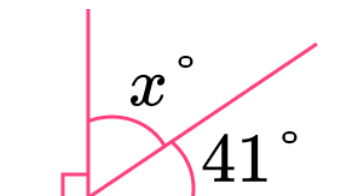
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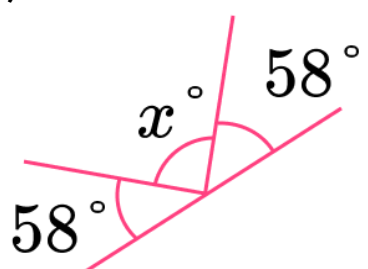
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9)



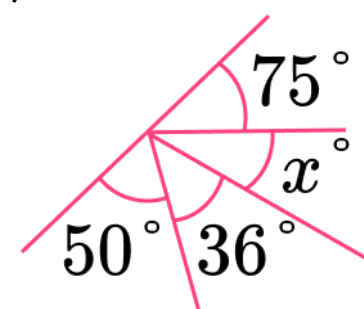
10)



11)



12)



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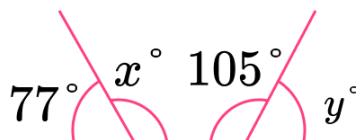
Group B - Complex diagrams

Calculate the size of the missing angles in each diagram.

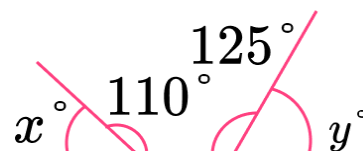
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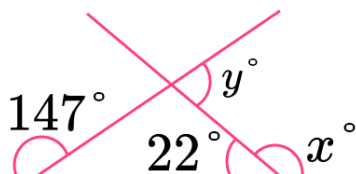
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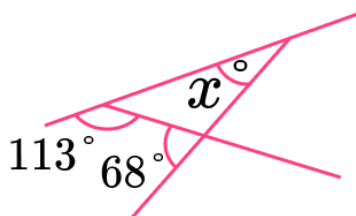
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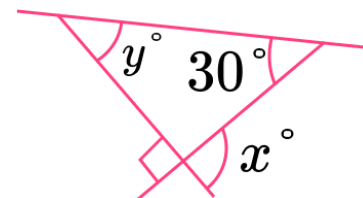
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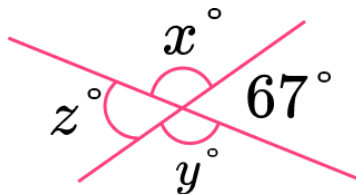
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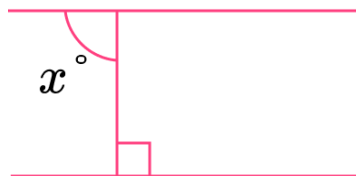
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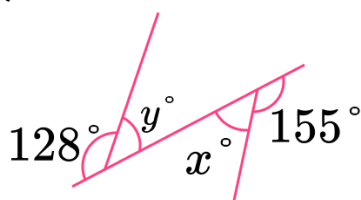
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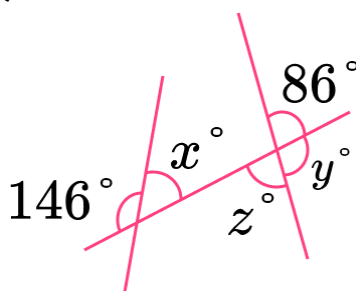
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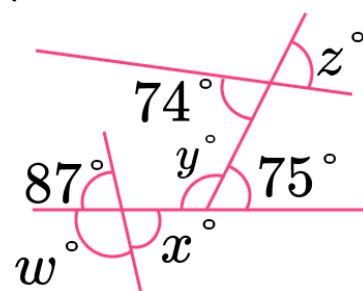
10)



11)



12)

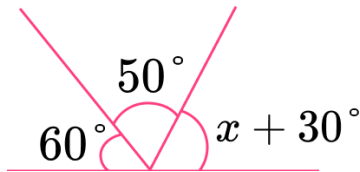


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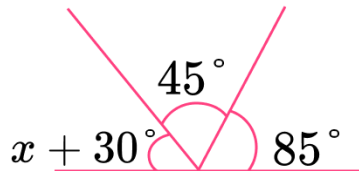
Group C - Forming and solving equations

Calculate the value of x in each diagram.

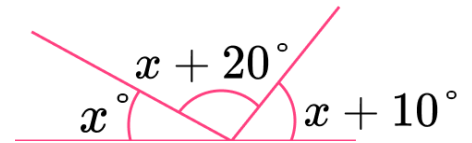
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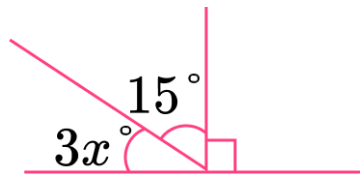
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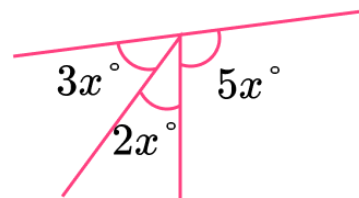
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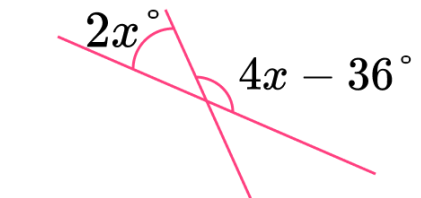
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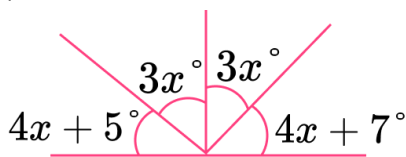
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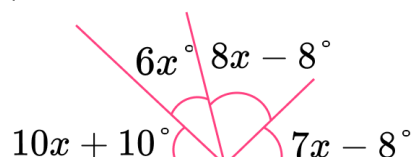
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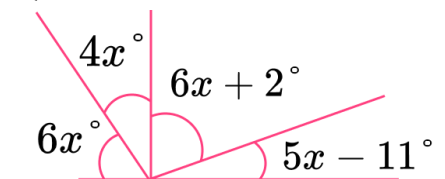
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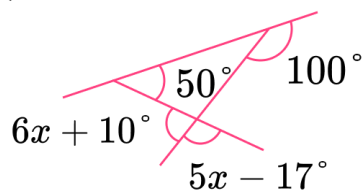
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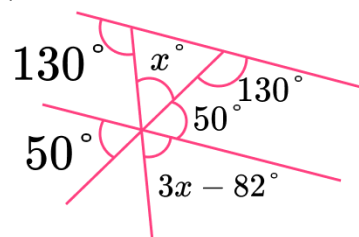
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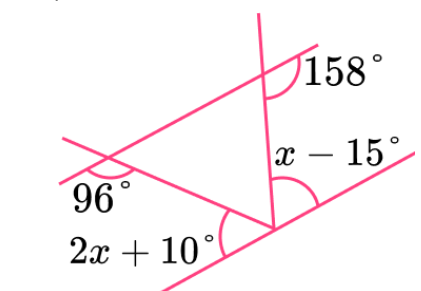
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11)



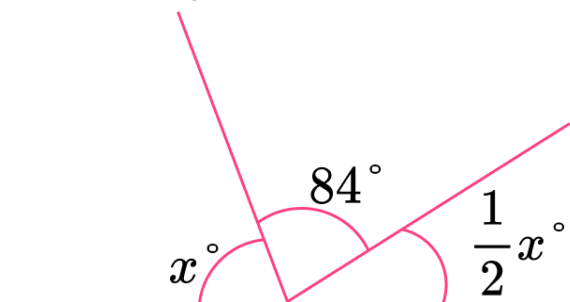
12)



Angles on a Straight Line - Worksheet

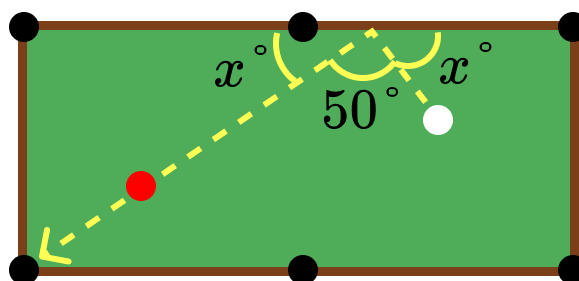
Applied

- 1) (a) A ball is thrown forwards. The ball hits the floor at an angle of x° and bounces at half of the angle away. The angle between the path of the ball is 84° .



Not drawn accurately. Calculate the size of each angle.

- (b) If the ball continues to lose half of the angle on each bounce, what would the angle between the path of the ball be at the next bounce?
- 2) (a) Below shows the set-up of a snooker table.

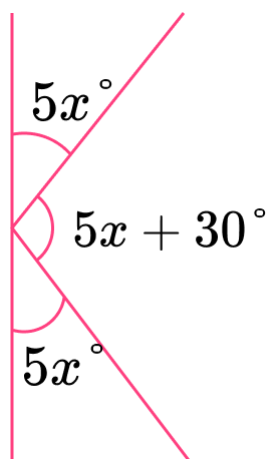


What angle must the cue ball be hit to ensure the red ball ends up in the bottom left hand pocket?

- (b) Another shot is set up as shown below. What angle must the cue ball hit the blue ball at so that the cue ball ends up at point X and the blue ball enters the middle pocket?

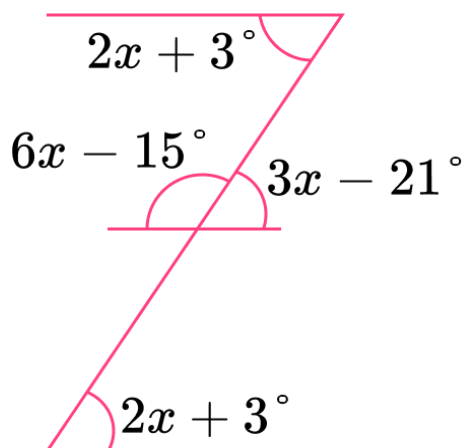
Angles on a Straight Line - Worksheet

- 3) (a) The letter *K* is drawn with the following angles:



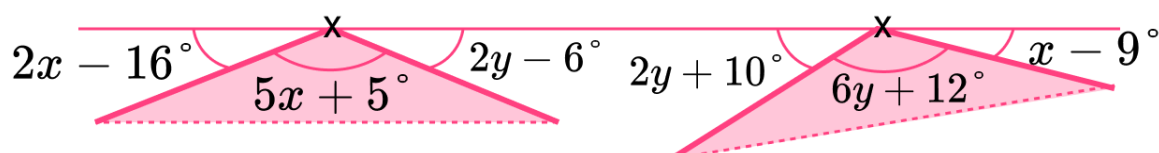
Calculate the value of each angle on the straight line.

- (b) The letter *Z* is drawn with the following angles:



Show that the 3 horizontal lines are parallel.

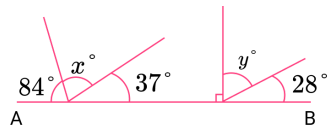
- 4) Two identical lights are attached to a ceiling. One light is displaced. Calculate the value of x and y and hence the value of each angle in the diagram.



Angles on a Straight Line - Exam Questions

- 1) (a) AB is a straight line. Calculate the size of the missing angle x .

.....
(2)

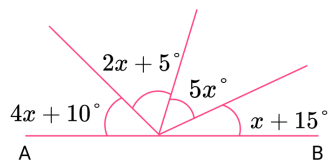


- (b) Calculate the size of the missing angle y .

.....
(2)
(4 marks)

- 2) (a) AB is a straight line. Calculate the value of x to 1 decimal place.

.....
(3)

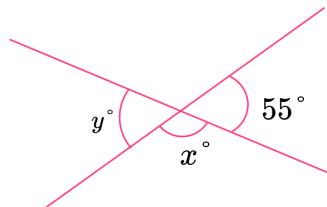


- (b) Hence calculate the size of each angle on the straight line AB .

.....
(4)
(7 marks)

- 3) (a) Jen is trying to work out the value of x for the question: Calculate the values of x and y in the diagram.

.....
(1)



Here is Jen's working:

$$360 - 55 = 305$$

$$\text{so } x = 305^\circ$$

$$360 - 305 = 55^\circ$$

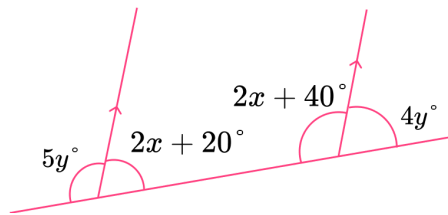
$$\text{so } y = 55^\circ$$

Explain why Jen's solution is **not** correct.

Angles on a Straight Line - Exam Questions

- (b) Work out the correct values for x and y using knowledge of angles on a straight line **only**.
(2)
(3 marks)

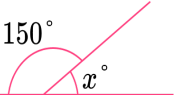
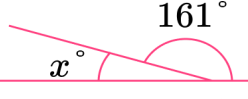
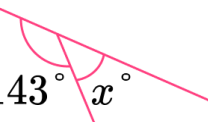
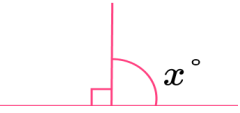
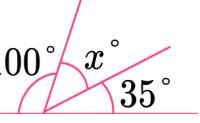
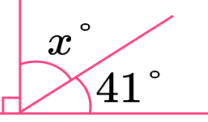
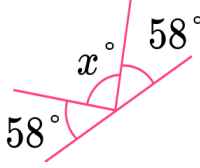
- 4) (a) Two parallel lines cross through a single, straight line.
(4)



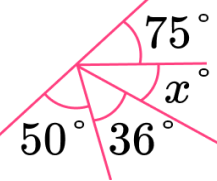
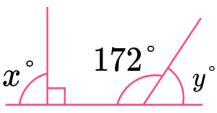
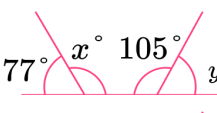
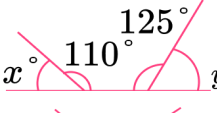
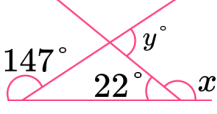
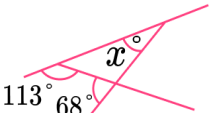
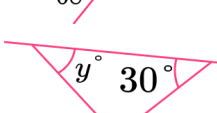
Form two equations written in terms of x and y .

- (b) Calculate the size of the four angles in the diagram in part (a).
(6)
(10 marks)

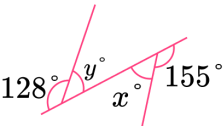
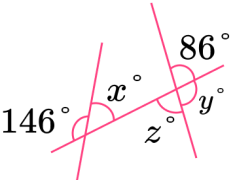
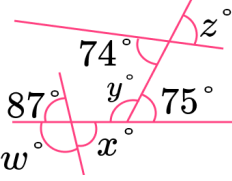
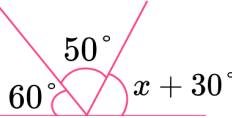
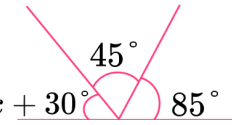
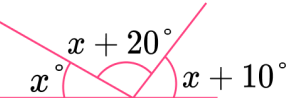
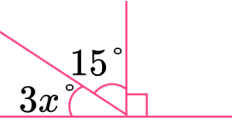
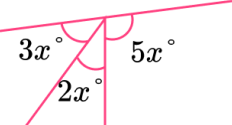
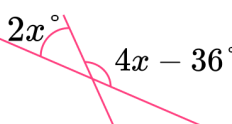
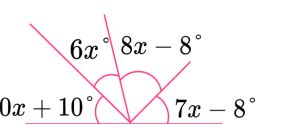
Angles on a Straight Line - Answers

	Question	Answer
	Skill Questions	
Group A	Calculate the missing angle x in each diagram. 1)  2)  3)  4)  5)  6)  7)  8)  9)  10) 	1) $x = 30^\circ$ 2) $x = 110^\circ$ 3) $x = 138^\circ$ 4) $x = 19^\circ$ 5) $x = 153^\circ$ 6) $x = 37^\circ$ 7) $x = 90^\circ$ 8) $x = 45^\circ$ 9) $x = 49^\circ$ 10) $x = 64^\circ$

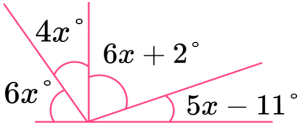
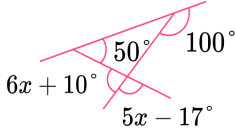
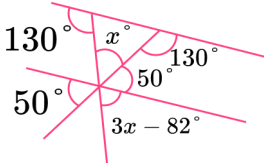
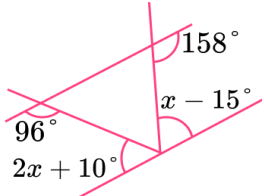
Angles on a Straight Line - Answers

	11)  12) 	11) $x = 26^\circ$ 12) $x = 19^\circ$
Group B	Calculate the size of the missing angles in each diagram. 1)  2)  3)  4)  5)  6)  7)  8)  9) 	1) $x = 90^\circ, y = 8^\circ$ 2) $x = 113^\circ, y = 75^\circ$ 3) $x = 70^\circ, y = 55^\circ$ 4) $x = 158^\circ, y = 125^\circ$ 5) $x = 1^\circ$ 6) $x = 90^\circ, y = 60^\circ$ 7) $x = 113^\circ, y = 113^\circ, z = 67^\circ$ 8) $x = 90^\circ$ 9) $x = 119^\circ, y = 61^\circ$

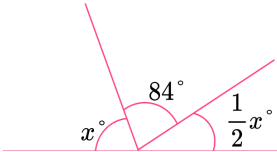
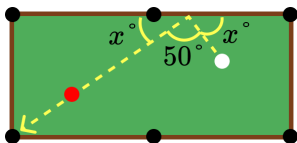
Angles on a Straight Line - Answers

	10)  11)  12) 	10) $x = 25^\circ, y = 52^\circ$ 11) $x = 34^\circ, y = 94^\circ, z = 86^\circ$ 12) $w = 93^\circ, x = 87^\circ, y = 105^\circ, z = 74^\circ$
Group C	Calculate the value of x in each diagram. 1)  2)  3)  4)  5)  6)  7)  8) 	1) $x = 40^\circ$ 2) $x = 20^\circ$ 3) $x = 50^\circ$ 4) $x = 25^\circ$ 5) $x = 18^\circ$ 6) $x = 36^\circ$ 7) $x = 12^\circ$ 8) $x = 6^\circ$

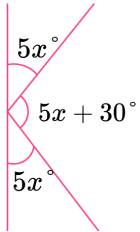
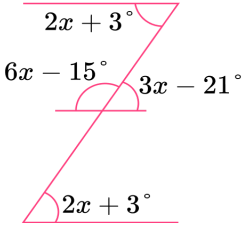
Angles on a Straight Line - Answers

	9)  10)  11)  12) 	9) $x = 9^\circ$ 10) $x = 17^\circ$ 11) $x = 53^\circ$ 12) $x = 37^\circ$
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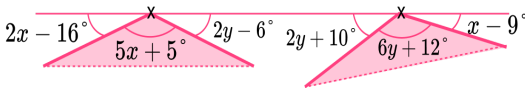
Angles on a Straight Line - Answers

	Question	Answer
	Applied Questions	
1)	(a) A ball is thrown forwards. The ball hits the floor at an angle of x° and bounces at half of the angle away. The angle between the path of the ball is 84°.  Not drawn accurately. Calculate the size of each angle. (b) If the ball continues to lose half of the angle on each bounce, what would the angle between the path of the ball be at the next bounce?	(a) $x + \frac{1}{2}x + 84 = 100$ $\frac{3}{2}x = 96$ $x = 64^\circ$ $\frac{1}{2}x = 32^\circ$ (b) $32 \div 2 = 16$ $180 - (32 + 16) = 132^\circ$
2)	(a) Below shows the set-up of a snooker table.  What angle must the cue ball be hit to ensure the red ball ends up in the bottom left hand pocket? (b) Another shot is set up as shown below. What angle must the cue ball hit the blue ball at so that the cue ball ends up at point X and the blue ball enters the middle pocket?	(a) $2x + 50 = 180$ $2x = 130$ $x = 65^\circ$ (b) $y = 180 - 81 = 99^\circ$

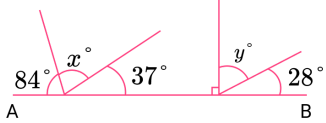
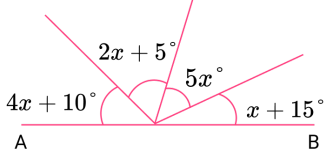
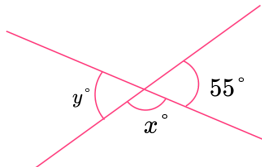
Angles on a Straight Line - Answers

3)	(a) The letter <i>K</i> is drawn with the following angles:  Calculate the value of each angle on the straight line. (b) The letter <i>Z</i> is drawn with the following angles:  Show that the 3 horizontal lines are parallel.	(a) $5x + 5x + 30 + 5x = 180$ $15x + 30 = 180$ $15x = 150$ $x = 10^\circ$ $5x = 50^\circ, 5x + 30 = 80^\circ$ (b) $6x - 15 + 3x - 21 = 180$ $9x - 36 = 180$ $9x = 216$ $x = 24^\circ$ $2x + 3 = 51^\circ$ $3x - 21 = 51^\circ$ Alternate and corresponding angles are the same so the lines are parallel.
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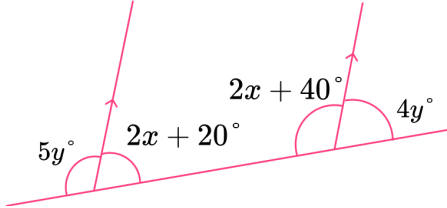
Angles on a Straight Line - Answers

4)	(a) Two identical lights are attached to a ceiling. One light is displaced. Calculate the value of x and y and hence the value of each angle in the diagram.  (b) Hence find the value of each angle in the diagram.	(a) $2x - 16 + 5x + 5 + 2y - 6 = 180$ $(A) 7x + 2y = 197$ $2y + 10 + 6y + 12 + x - 9 = 180$ $(B) 8y + x = 167$ $5x + 5 = 6y + 12$ $(C) 5x - 6y = 7$ $(B) \times 5: 40y + 5x = 835$ $- (C): 5x - 6y = 7$ $46y = 828$ $y = 18^\circ$ When $y = 18$, $8 \times 18 + x = 167$ (B) $144 + x = 167$ $x = 23^\circ$ So $x = 23^\circ, y = 18^\circ$ (b) $2x - 16: 30^\circ$ $5x + 5: 120^\circ$ $2y - 6: 30^\circ$ $2y + 10: 46^\circ$ $6y + 12: 120^\circ$ $x - 9: 14^\circ$
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Angles on a Straight Line - Mark Scheme

	Question	Answer	
	Exam Questions		
1) (a)	AB is a straight line. Calculate the size of the missing angle x. 	(a) $84 + 37 = 121$ $x = 180 - 121 = 59^\circ$	(1) (1)
(b)	Calculate the size of the missing angle y .	(b) $90 + 28 = 118$ $y = 180 - 118 = 62^\circ$	(1) (1)
2) (a)	AB is a straight line. Calculate the value of x to 1 decimal place. 	(a) $4x + 10 + 2x + 5 + 5x + x + 15 = 180$ $12x + 30 = 180$ $12x = 150$ $x = 12.5$	(1) (1) (1)
(b)	Hence calculate the size of each angle on the straight line AB .	(b) $4x + 10 = 60^\circ$ $2x + 5 = 30^\circ$ $5x = 62.5^\circ$ $x + 15 = 27.5^\circ$	(1) (1) (1) (1)
3) (a)	Jen is trying to work out the value of x for the question: Calculate the values of x and y in the diagram.  Here is Jen's working: $360 - 55 = 305$ so $x = 305^\circ$ $360 - 305 = 55^\circ$ so $y = 55^\circ$ Explain why Jen's solution is not correct.	(a) Angles on a straight line add up to 180° but Jen has used 360°.	(1)

Angles on a Straight Line - Mark Scheme

(b)	Work out the correct values for x and y using knowledge of angles on a straight line only .	(b) $x = 180 - 55 = 125^\circ$ $y = 180 - 125 = 55^\circ$	(1) (1)
4) (a)	Two parallel lines cross through a single, straight line.  Form two equations written in terms of x and y.	(a) $5y + 2x + 20 = 180$ $5y + 2x = 160$ $2x + 40 + 4y = 180$ $2x + 4y = 140$	(1) (1) (1) (1)
(b)	Calculate the size of the four angles in the diagram in part (a).	(b) $5y + 2x = 160$ (A) $2x + 4y = 140$ (B) $\text{(A)} - \text{(B)} : y = 20$ When $y = 20^\circ$, $5 \times 20 + 2x = 160$ (A) $100 + 2x = 160$ $\quad -100 \quad -100$ $2x = 60$ $\quad \div 2 \quad \div 2$ $x = 30^\circ$ $5y = 100^\circ$ $2x + 20 = 80^\circ$ $2x + 40 = 100^\circ$ $4y = 80^\circ$	 (1) (1) (1) (1) (1) (1) (1)

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