4.10 Angles in Parallel Lines: 1-hour Pack

EDEXCEL 1MA1 · Calculator allowed · about 60 minutes

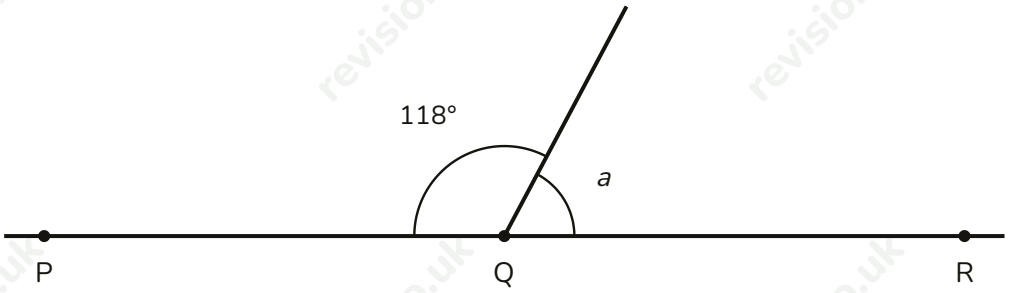
Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 P, Q and R lie on a straight line. Angle a and an angle of 118 degrees lie on the same side of the line at Q. Work out the size of angle a.

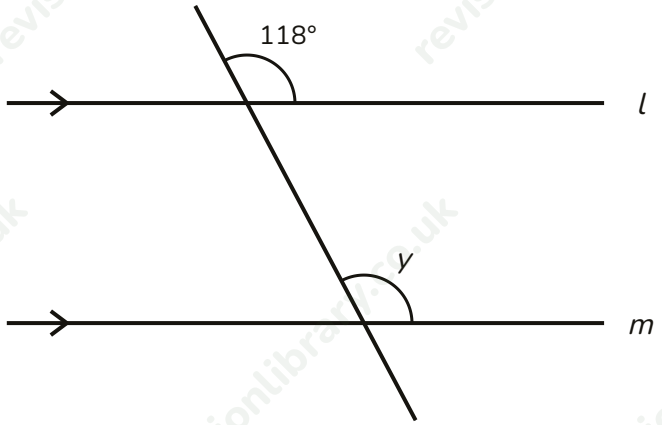
Diagram NOT accurately drawn



(Total for Question 1 is 1 mark)

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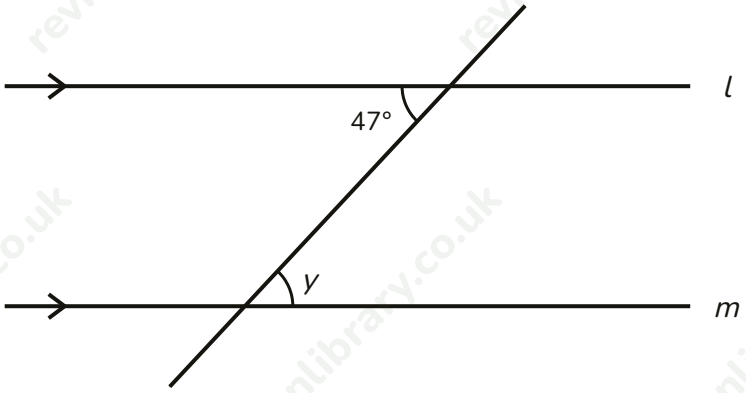
2 Lines l and m are parallel and are crossed by a straight transversal. Angle y is in the corresponding position to the 118 degree angle marked above line l. Work out the value of y. Give a reason for your answer.



(Total for Question 2 is 2 marks)

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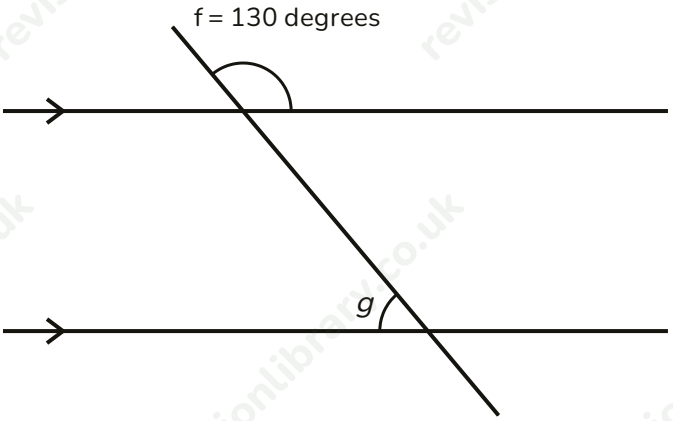
3 Lines l and m are parallel and are crossed by a straight transversal. Angle y is in the alternate position to the 47 degree angle marked between l and m. Work out the value of y. Give a reason for your answer.



(Total for Question 3 is 2 marks)

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4 A transversal crosses two parallel lines. At the top intersection, angle f lies above the top line and to the right of the transversal, and f = 130 degrees. At the lower intersection, angle g lies above the lower line and to the left of the transversal. The diagram is not drawn to scale.



(a) Work out the size of angle g. **(3)**

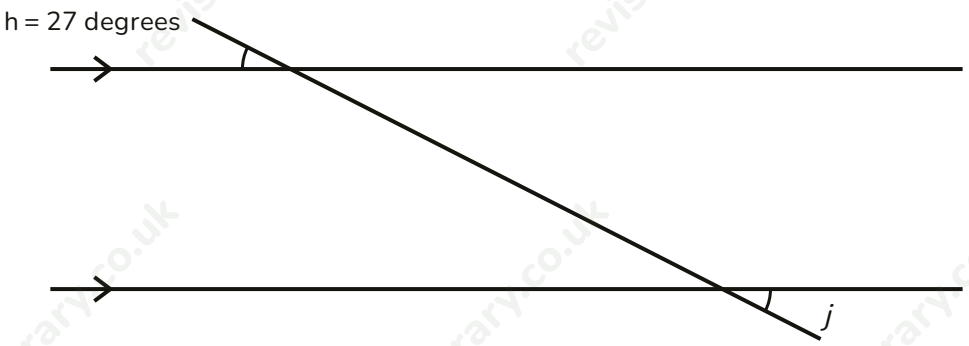
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(b) Give a brief reason for your answer to part (a). **(2)**

(Total for Question 4 is 5 marks)

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5 A transversal meets two parallel lines. Angle h at the top left intersection is 27 degrees. Angle j at the bottom right intersection is vertically opposite to an angle corresponding to h. Work out angle j.



(a) Work out the size of angle j. Show your reasoning in two short steps. **(5)**

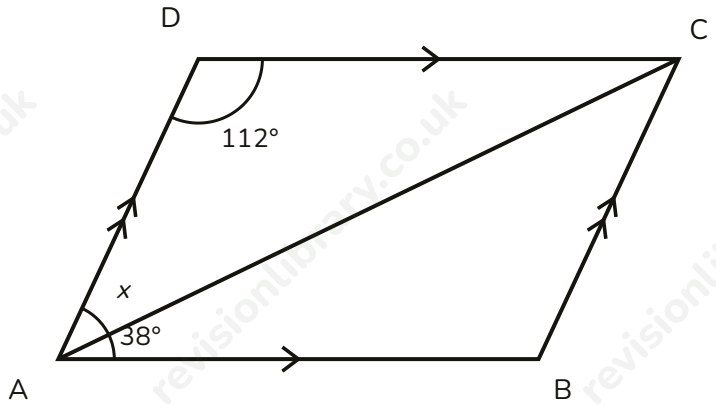
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(Total for Question 5 is 5 marks)

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6 ABCD is a parallelogram, so AB is parallel to DC. The diagonal AC is drawn. Angle CAB = 38 degrees and angle ADC = 112 degrees. Work out the size of angle x.

Diagram NOT accurately drawn



(Total for Question 6 is 3 marks)

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7 Two parallel lines are crossed by a straight line. Angle a is 133 degrees. Angle b is a corresponding angle to angle a. Angle c is vertically opposite to angle b.
Work out the size of angle c, giving reasons.

(Total for Question 7 is 2 marks)

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8 Two parallel lines are crossed by a straight line. One of the angles made is 57 degrees. Another angle, y, is a co-interior angle with the 57 degree angle.
Work out the size of angle y and give a reason for your answer.

(Total for Question 8 is 2 marks)

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9 Two parallel lines are crossed by a straight line. Two of the angles made are alternate angles. They are (2x + 5) degrees and (5x - 91) degrees.
Work out the value of x.

(Total for Question 9 is 3 marks)

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10 In triangle PQR, the point S is on PQ and the point T is on PR so that ST is parallel to QR. Angle PST = 40 degrees and angle PRQ = 36 degrees.
Work out the size of angle QPR. Give reasons for your answer.

(Total for Question 10 is 3 marks)

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11 Two parallel lines are crossed by a straight line. One of the angles made is 147 degrees. Another angle, y, is a corresponding angle to the 147 degree angle.
Work out the size of angle y and give a reason for your answer.

(Total for Question 11 is 2 marks)

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12 Two parallel lines are crossed by a straight line. Angle a is 75 degrees. Angle b is an alternate angle to angle a. Angle c is next to, on a straight line with angle b.
Work out the size of angle c, giving reasons.

(Total for Question 12 is 2 marks)

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13 Two parallel lines are crossed by a straight line. One of the angles made is 62 degrees.
Another angle, y, is a co-interior angle with the 62 degree angle.
Work out the size of angle y and give a reason for your answer.

(Total for Question 13 is 2 marks)

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14 In triangle ABC, the point D is on AB and the point E is on AC so that DE is parallel to BC.
Angle ADE = 44 degrees and angle ACB = 85 degrees.
Work out the size of angle BAC. Give reasons for your answer.

(Total for Question 14 is 3 marks)

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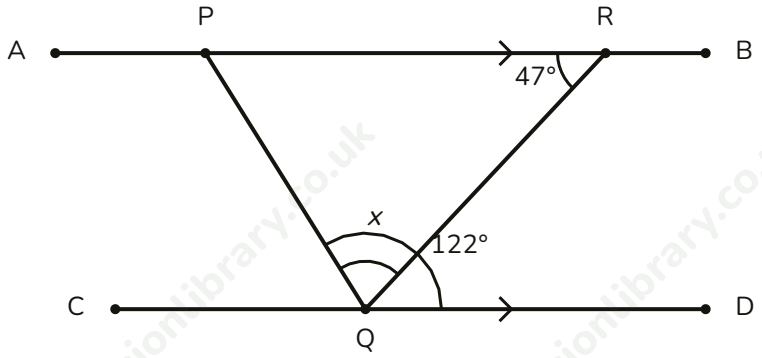
15 Two parallel lines are crossed by a straight line. Angle a is 138 degrees. Angle b is an alternate angle to angle a. Angle c is next to, on a straight line with angle b.
Work out the size of angle c, giving reasons.

(Total for Question 15 is 2 marks)

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16 AB and CD are parallel lines. P lies on AB and Q lies on CD. A straight line from Q also meets AB at point R, so that P, Q and R form a triangle, with points A, P and R lying in that order on line AB. Angle DQP = 122 degrees. Angle PRQ = 47 degrees. Work out the size of angle x.

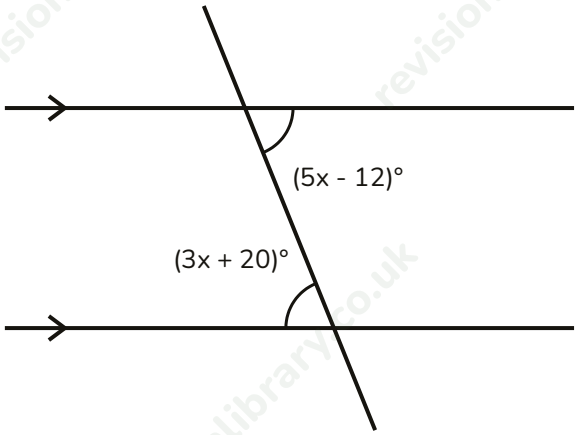
Diagram NOT accurately drawn



(Total for Question 16 is 3 marks)

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17 The diagram shows two parallel lines cut by a transversal. Two alternate angles are marked (5x - 12) degrees and (3x + 20) degrees.



(a) Find the value of x. **(2)**

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(b) Work out the size of the co-interior angle to the (5x - 12) degree angle. **(2)**

.....

(Total for Question 17 is 4 marks)

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Mark scheme · 4.10 Angles in Parallel Lines: 1-hour Pack

Question 1

a = 62 cao **B1**

Answer: a = 62 degrees

Question 2

y = 118 cao **B1**

correct reason: corresponding angles are equal (l parallel to m) **B1**

Answer: y = 118 degrees

Question 3

y = 47 cao **B1**

correct reason: alternate angles are equal (l parallel to m) **B1**

Answer: y = 47 degrees

Question 4

(a) recognise that exterior angle 130 corresponds to an obtuse interior or use supplementary relation depending on position **M1**

(a) compute 180 - 130 = 50 or identify equal alternate/corresponding relation as appropriate **M1**

(a) 50 degrees cao **A1**

(a) Answer: 50 degrees

(b) state that interior and exterior angles on a straight line sum to 180 degrees or that corresponding angles are equal, making g = 50 degrees **B1**

(b) final statement linking the two intersections via parallel lines (e.g. corresponding angles equal or co-interior supplementary) **B1**

(b) Answer: Angles on a straight line sum to 180 degrees, so the angle below f is 180 - 130 = 50 degrees; that angle and g are alternate angles between parallel lines, so g = 50 degrees.

Question 5

(a) identify that corresponding angle to h is equal to 27 degrees **M1**

(a) identify that j is vertically opposite to that corresponding angle **M1**

(a) state j = 27 degrees cao **A1**

(a) give short reasoning e.g. corresponding angles equal and vertically opposite angles equal **B1**

(a) final answer justified (explicit link: j = corresponding angle = h = 27 degrees) **B1**

(a) Answer: 27 degrees

Question 6

angle ACD = 38 (alternate angles are equal, since AB is parallel to DC) **M1**

180 - 38 - 112 (angle sum of triangle ACD) **M1**

x = 30 cao **A1**

Answer: x = 30 degrees

Question 7

b = 133 (corresponding angles are equal) **B1**

c = 133 (vertically opposite angles are equal) **B1**

Answer: c = 133 degrees

Question 8

y = 123 **B1**

correct reason: co-interior angles add up to 180 degrees **B1**

Answer: y = 123 degrees (co-interior angles add up to 180 degrees)

Question 9

2x + 5 = 5x - 91 **M1**

collects terms and solves **M1**

x = 32 **A1**

Answer: x = 32

Question 10

angle PQR = 40 (corresponding angles) **B1**

180 - 40 - 36 **M1**

104 degrees (angles in a triangle add up to 180 degrees) **A1**

Answer: 104 degrees

Question 11

y = 147 **B1**

correct reason: corresponding angles are equal **B1**

Answer: y = 147 degrees (corresponding angles are equal)

Question 12

b = 75 (alternate angles are equal) **B1**

c = 105 (angles on a straight line add up to 180 degrees) **B1**

Answer: c = 105 degrees

Question 13

y = 118 **B1**

correct reason: co-interior angles add up to 180 degrees **B1**

Answer: y = 118 degrees (co-interior angles add up to 180 degrees)

Question 14

angle ABC = 44 (corresponding angles) **B1**

180 - 44 - 85 **M1**

51 degrees (angles in a triangle add up to 180 degrees) **A1**

Answer: 51 degrees

Question 15

b = 138 (alternate angles are equal) **B1**

c = 42 (angles on a straight line add up to 180 degrees) **B1**

Answer: c = 42 degrees

Question 16

angle APQ = 122 (alternate angles are equal, AB parallel to CD) **M1**

angle RPQ = 180 - 122 = 58 (angles on a straight line ARP... APR) **M1**

x = 180 - 58 - 47 = 75 cao (angle sum of triangle PQR) **A1**

Answer: x = 75 degrees

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Question 17

(a) 5x - 12 = 3x + 20 oe (alternate angles are equal) **M1**

(a) x = 16 cao **A1**

(a) Answer: x = 16

(b) their (5x - 12) evaluated: 5(16) - 12 = 68, then 180 - 68 **M1**

(b) 112 cao **A1**

(b) Answer: 112 degrees

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