



KS3.M-G4 Angles: Lines, Points and Triangles

AQA KS3.M-G4 · Calculators not allowed · about 60 minutes

Name: _____ Date: ____ / ____ / ____

Answer ALL questions. Show all your working.

- 1** A straight line has one angle of 110 degrees on one side. Write down the angle on the other side of the straight line.

(1)

- 2** At a point, three angles are 120 degrees, 90 degrees and x degrees. Work out x .

(1)

- 3** Two straight lines cross. One angle is 37 degrees. State the vertically opposite angle.

(1)

- 4** In triangle ABC, angle A = 50 degrees and angle B = 60 degrees. Work out angle C.

(2)

- 5** On a straight line two adjacent angles are $2x$ degrees and 40 degrees. These two angles form the straight line. Solve for x .

(2)

6 The angles in a triangle are x degrees, $x + 20$ degrees and 40 degrees. Find x .

(2)

7 Two straight lines cross. One angle is $2x$ degrees. The angle vertically opposite to it is 50 degrees. Work out x .

(2)

8 At a point three adjacent angles are $3x$ degrees, $x + 40$ degrees and $2x + 20$ degrees. Find x .

(3)

9 The three interior angles of a triangle are x degrees, $2x$ degrees and $3x$ degrees. Find x .

(2)

10 An exterior angle of a triangle is 110 degrees. This exterior angle equals the sum of the two opposite interior angles. One of the opposite interior angles is 30 degrees. Find the other opposite interior angle.

(2)

- 11** On a straight line three adjacent angles are x degrees, $x + 20$ degrees and $2x$ degrees. The three add to 180 degrees. Find x .

(2)

- 12** In triangle PQR the angles are $(x + 10)$ degrees, $(2x - 20)$ degrees and 40 degrees. Work out x and then find the angle $(2x - 20)$ degrees.

(3)

- 13** Two straight lines cross and one small angle is 15 degrees. State the size of the adjacent angle that shares the straight line with the 15 degree angle.

(1)

- 14** A triangle has angles 40 degrees and 80 degrees. The third angle is split by a line from the opposite vertex into two angles which are equal. Find the size of each of the two equal angles.

(3)

- 15** At a point a straight line and another line form four angles. Two adjacent angles are 70 degrees and $3x$ degrees and together they make a straight line. Find x .

(2)

16 A triangle has angles $(2x)$ degrees, $(3x - 10)$ degrees and $(x + 20)$ degrees. Work out x .

(3)

17 Stretch question. A large triangle has angles 50 degrees and 60 degrees. On the side between these angles a smaller triangle is attached sharing that side so that the two triangles together form a quadrilateral. The angle at the shared vertex in the smaller triangle next to the 60 degree angle is 40 degrees and the angle at the shared vertex next to the 50 degree angle is 20 degrees. Find the remaining interior angle of the smaller triangle.

(4)

18 Stretch question. A point has four angles around it made by two crossing lines. The four angles are a , b , c and d in order. Given that $a = 2b$, and that opposite angles are equal, find b and d .

(4)

Mark scheme · KS3.M-G4 Angles: Lines, Points and Triangles

Question 1

- **B1** 70 degrees cao
- Answer: **70 degrees**

Question 2

- **B1** $x = 150$ degrees cao
- Answer: **150 degrees**

Question 3

- **B1** 37 degrees cao
- Answer: **37 degrees**

Question 4

- **M1** uses sum of angles in a triangle = 180 oe
- **A1** angle C = 70 degrees cao
- Answer: **70 degrees**

Question 5

- **M1** sets up equation $2x + 40 = 180$ or equivalent method
- **A1** $x = 70$ cao
- Answer: **70**

Question 6

- **M1** forms equation $x + x + 20 + 40 = 180$ or equivalent
- **A1** $x = 60$ cao
- Answer: **60**

Question 7

- **M1** uses vertically opposite angles equal so $2x = 50$
- **A1** $x = 25$ cao
- Answer: **25**

Question 8

- **M1** forms equation $3x + (x + 40) + (2x + 20) = 360$ or equivalent
- **M1** correctly simplifies to $6x + 60 = 360$ and obtains $6x = 300$
- **A1** $x = 50$ cao
- Answer: **50**

Question 9

- **M1** uses $x + 2x + 3x = 180$ to form $6x = 180$
- **A1** $x = 30$ cao
- Answer: **30**

Question 10

- **M1** uses exterior angle = sum of two opposite interior angles: missing = $110 - 30$
- **A1** 80 degrees cao
- Answer: **80 degrees**

Question 11

- **M1** forms equation $x + (x + 20) + 2x = 180$
- **A1** $x = 40$ cao
- Answer: **40**

Question 12

- M1 forms equation $(x+10) + (2x-20) + 40 = 180$
- M1 solves to give $x = 50$ (shows $3x + 30 = 180$, $3x = 150$)
- A1 $2x - 20 = 80$ degrees cao
- Answer: **$2x - 20 = 80$ degrees**

Question 13

- B1 165 degrees cao
- Answer: **165 degrees**

Question 14

- M1 finds third angle by $180 - (40 + 80) = 60$ or equivalent
- M1 recognises third angle is split into two equal parts so divides by 2
- A1 each angle = 30 degrees cao
- Answer: **30 degrees**

Question 15

- M1 sets up $70 + 3x = 180$ or equivalent
- A1 $x = 36.666...$ so $x = 36 \frac{2}{3}$ or $x = 110/3$ degrees cao
- Answer: **$110/3$**

Question 16

- M1 forms equation $2x + (3x-10) + (x+20) = 180$ or equivalent
- M1 simplifies to $6x + 10 = 180$ and finds $6x = 170$
- A1 $x = 170/6 = 85/3$ cao
- Answer: **$85/3$**

Question 17

- M1 recognises angles around the shared side add and uses triangle sum for large triangle to find third angle = 70
- M1 uses fact that quadrilateral interior angles sum to 360 or alternative method to relate angles
- M1 forms equation for smaller triangle angles: $\text{unknown} + 40 + 20 = 180$ or uses subtraction from 360 with other angles
- A1 remaining angle = 120 degrees cao
- Answer: **120 degrees**

Question 18

- M1 uses opposite angles equal to get $a = c$ and $b = d$
- M1 uses angles on a straight line (a linear pair) to get $a + b = 180$
- M1 substitutes $a = 2b$ to solve $2b + b = 180$ to get $b = 60$
- A1 $b = 60$ degrees and $d = 60$ degrees cao
- Answer: **$b = 60$ degrees, $d = 60$ degrees**