

Name _____

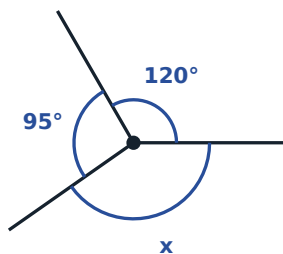
Date _____

5.1 A sum of 360° — worked answers

Know that the angles around a point total 360° , derive that the angles of a quadrilateral also total 360° , and use both to calculate missing angles. · 116 questions

A · Fluency — Find the missing angle in each diagram.

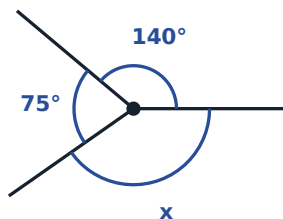
- 1 Work out the size of angle x , in degrees.



Answer: 145

Angles round a point add to 360° . $120^\circ + 95^\circ = 215^\circ$, so $x = 360^\circ - 215^\circ = 145^\circ$.

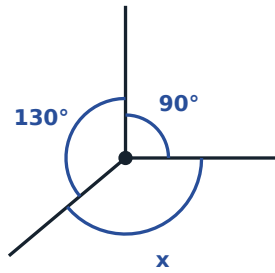
- 2 Work out the size of angle x , in degrees.



Answer: 145

Angles round a point add to 360° . $140^\circ + 75^\circ = 215^\circ$, so $x = 360^\circ - 215^\circ = 145^\circ$.

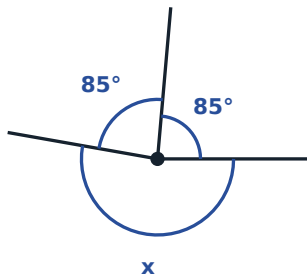
- 3 Work out the size of angle x , in degrees.



Answer: 140

Angles round a point add to 360° . $90^\circ + 130^\circ = 220^\circ$, so $x = 360^\circ - 220^\circ = 140^\circ$.

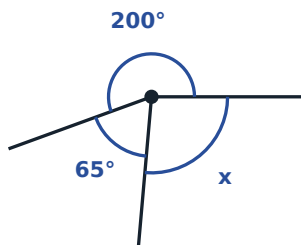
- 4 Work out the size of angle x , in degrees.



Answer: 190

Angles round a point add to 360° . $85^\circ + 85^\circ = 170^\circ$, so $x = 360^\circ - 170^\circ = 190^\circ$.

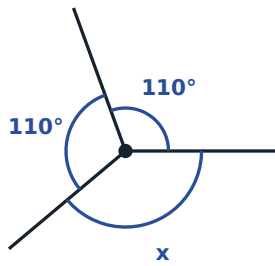
- 5 Work out the size of angle x , in degrees.



Answer: 95

Angles round a point add to 360° . $200^\circ + 65^\circ = 265^\circ$, so $x = 360^\circ - 265^\circ = 95^\circ$.

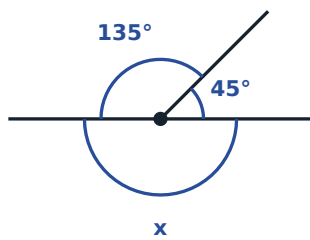
- 6 Work out the size of angle x , in degrees.



Answer: 140

Angles round a point add to 360° . $110^\circ + 110^\circ = 220^\circ$, so $x = 360^\circ - 220^\circ = 140^\circ$.

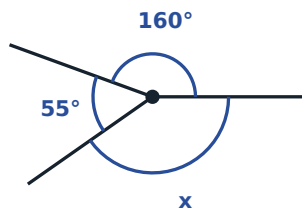
- 7 Work out the size of angle x , in degrees.



Answer: 180

Angles round a point add to 360° . $45^\circ + 135^\circ = 180^\circ$, so $x = 360^\circ - 180^\circ = 180^\circ$.

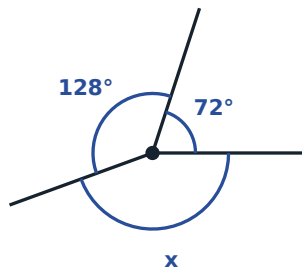
- 8 Work out the size of angle x , in degrees.



Answer: 145

Angles round a point add to 360° . $160^\circ + 55^\circ = 215^\circ$, so $x = 360^\circ - 215^\circ = 145^\circ$.

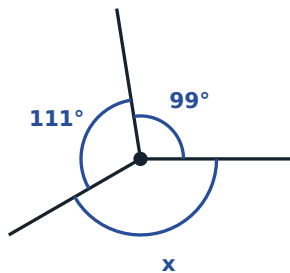
- 9 Work out the size of angle x , in degrees.



Answer: 160

Angles round a point add to 360° . $72^\circ + 128^\circ = 200^\circ$, so $x = 360^\circ - 200^\circ = 160^\circ$.

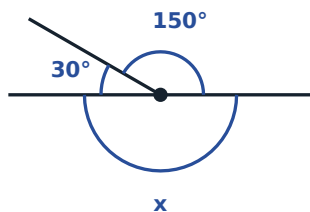
- 10 Work out the size of angle x , in degrees.



Answer: 150

Angles round a point add to 360° . $99^\circ + 111^\circ = 210^\circ$, so $x = 360^\circ - 210^\circ = 150^\circ$.

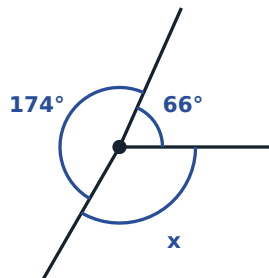
- 11 Work out the size of angle x , in degrees.



Answer: 180

Angles round a point add to 360° . $150^\circ + 30^\circ = 180^\circ$, so $x = 360^\circ - 180^\circ = 180^\circ$.

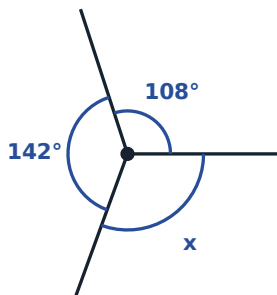
- 12** Work out the size of angle x , in degrees.



Answer: 120

Angles round a point add to 360° . $66^\circ + 174^\circ = 240^\circ$, so $x = 360^\circ - 240^\circ = 120^\circ$.

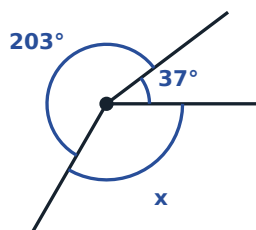
- 13** Work out the size of angle x , in degrees.



Answer: 110

Angles round a point add to 360° . $108^\circ + 142^\circ = 250^\circ$, so $x = 360^\circ - 250^\circ = 110^\circ$.

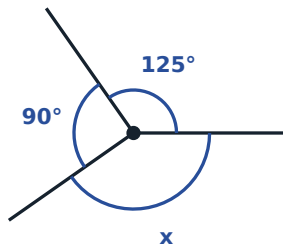
- 14** Work out the size of angle x , in degrees.



Answer: 120

Angles round a point add to 360° . $37^\circ + 203^\circ = 240^\circ$, so $x = 360^\circ - 240^\circ = 120^\circ$.

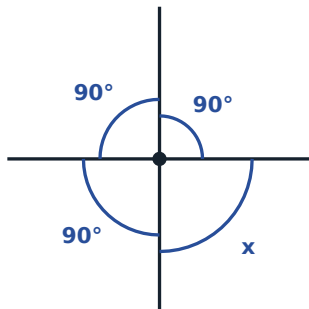
- 15** Work out the size of angle x , in degrees.



Answer: 145

Angles round a point add to 360° . $125^\circ + 90^\circ = 215^\circ$, so $x = 360^\circ - 215^\circ = 145^\circ$.

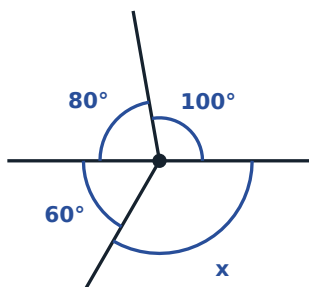
- 16** Work out the size of angle x , in degrees.



Answer: 90

Angles round a point add to 360° . $90^\circ + 90^\circ + 90^\circ = 270^\circ$, so $x = 360^\circ - 270^\circ = 90^\circ$.

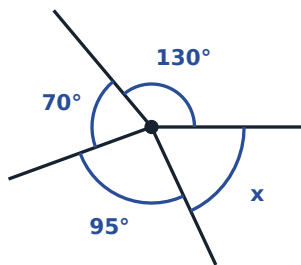
- 17** Work out the size of angle x , in degrees.



Answer: 120

Angles round a point add to 360° . $100^\circ + 80^\circ + 60^\circ = 240^\circ$, so $x = 360^\circ - 240^\circ = 120^\circ$.

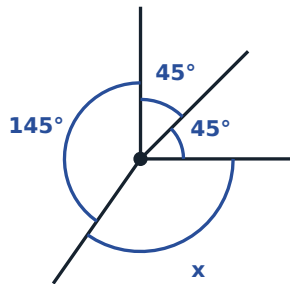
- 18** Work out the size of angle x , in degrees.



Answer: 65

Angles round a point add to 360° . $130^\circ + 70^\circ + 95^\circ = 295^\circ$, so $x = 360^\circ - 295^\circ = 65^\circ$.

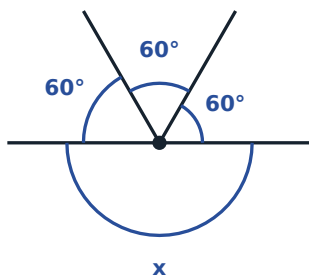
- 19** Work out the size of angle x , in degrees.



Answer: 125

Angles round a point add to 360° . $45^\circ + 45^\circ + 145^\circ = 235^\circ$, so $x = 360^\circ - 235^\circ = 125^\circ$.

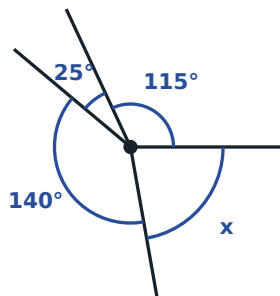
- 20** Work out the size of angle x , in degrees.



Answer: 180

Angles round a point add to 360° . $60^\circ + 60^\circ + 60^\circ = 180^\circ$, so $x = 360^\circ - 180^\circ = 180^\circ$.

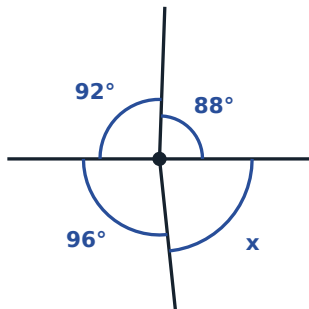
- 21 Work out the size of angle x , in degrees.



Answer: 80

Angles round a point add to 360° . $115^\circ + 25^\circ + 140^\circ = 280^\circ$, so $x = 360^\circ - 280^\circ = 80^\circ$.

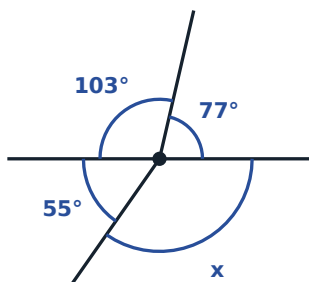
- 22 Work out the size of angle x , in degrees.



Answer: 84

Angles round a point add to 360° . $88^\circ + 92^\circ + 96^\circ = 276^\circ$, so $x = 360^\circ - 276^\circ = 84^\circ$.

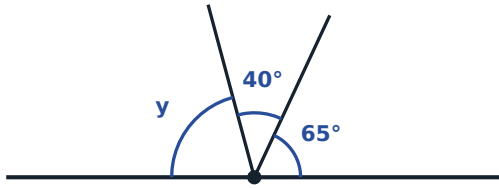
- 23 Work out the size of angle x , in degrees.



Answer: 125

Angles round a point add to 360° . $77^\circ + 103^\circ + 55^\circ = 235^\circ$, so $x = 360^\circ - 235^\circ = 125^\circ$.

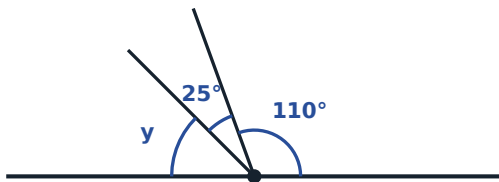
- 24 Work out the size of angle y , in degrees.



Answer: 75

Angles on a straight line add to 180° . $65^\circ + 40^\circ = 105^\circ$, so $y = 180^\circ - 105^\circ = 75^\circ$.

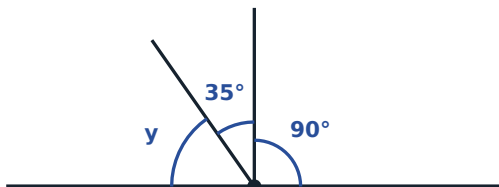
- 25 Work out the size of angle y , in degrees.



Answer: 45

Angles on a straight line add to 180° . $110^\circ + 25^\circ = 135^\circ$, so $y = 180^\circ - 135^\circ = 45^\circ$.

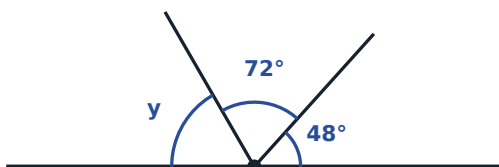
- 26 Work out the size of angle y , in degrees.



Answer: 55

Angles on a straight line add to 180° . $90^\circ + 35^\circ = 125^\circ$, so $y = 180^\circ - 125^\circ = 55^\circ$.

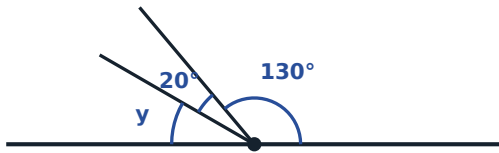
- 27 Work out the size of angle y , in degrees.



Answer: 60

Angles on a straight line add to 180° . $48^\circ + 72^\circ = 120^\circ$, so $y = 180^\circ - 120^\circ = 60^\circ$.

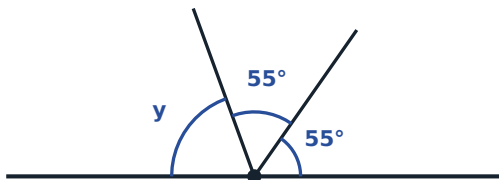
- 28 Work out the size of angle y , in degrees.



Answer: 30

Angles on a straight line add to 180° . $130^\circ + 20^\circ = 150^\circ$, so $y = 180^\circ - 150^\circ = 30^\circ$.

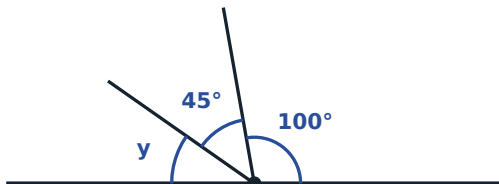
- 29 Work out the size of angle y , in degrees.



Answer: 70

Angles on a straight line add to 180° . $55^\circ + 55^\circ = 110^\circ$, so $y = 180^\circ - 110^\circ = 70^\circ$.

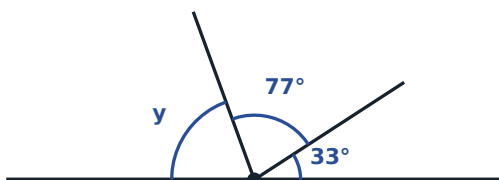
- 30 Work out the size of angle y , in degrees.



Answer: 35

Angles on a straight line add to 180° . $100^\circ + 45^\circ = 145^\circ$, so $y = 180^\circ - 145^\circ = 35^\circ$.

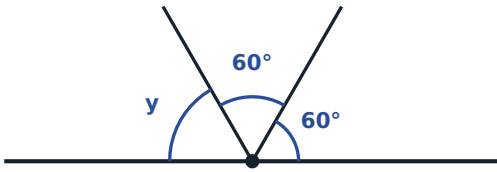
- 31 Work out the size of angle y , in degrees.



Answer: 70

Angles on a straight line add to 180° . $33^\circ + 77^\circ = 110^\circ$, so $y = 180^\circ - 110^\circ = 70^\circ$.

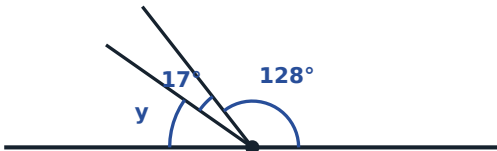
- 32 Work out the size of angle y , in degrees.



Answer: 60

Angles on a straight line add to 180° . $60^\circ + 60^\circ = 120^\circ$, so $y = 180^\circ - 120^\circ = 60^\circ$.

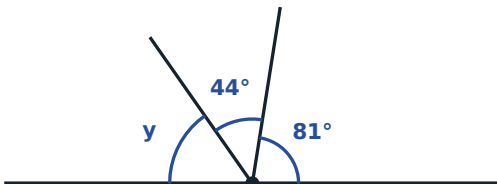
- 33 Work out the size of angle y , in degrees.



Answer: 35

Angles on a straight line add to 180° . $128^\circ + 17^\circ = 145^\circ$, so $y = 180^\circ - 145^\circ = 35^\circ$.

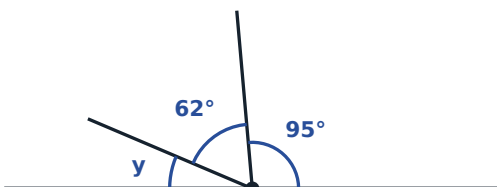
- 34 Work out the size of angle y , in degrees.



Answer: 55

Angles on a straight line add to 180° . $81^\circ + 44^\circ = 125^\circ$, so $y = 180^\circ - 125^\circ = 55^\circ$.

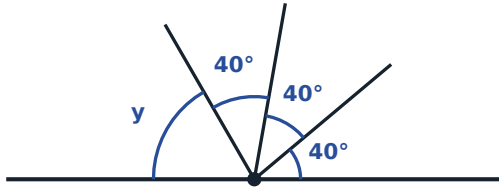
- 35 Work out the size of angle y , in degrees.



Answer: 23

Angles on a straight line add to 180° . $95^\circ + 62^\circ = 157^\circ$, so $y = 180^\circ - 157^\circ = 23^\circ$.

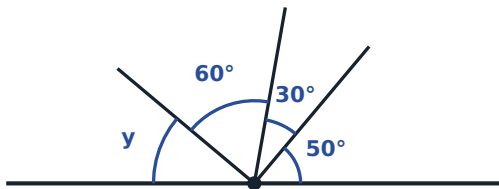
- 36** Work out the size of angle y , in degrees.



Answer: 60

Angles on a straight line add to 180° . $40^\circ + 40^\circ + 40^\circ = 120^\circ$, so $y = 180^\circ - 120^\circ = 60^\circ$.

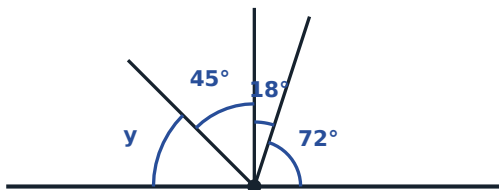
- 37** Work out the size of angle y , in degrees.



Answer: 40

Angles on a straight line add to 180° . $50^\circ + 30^\circ + 60^\circ = 140^\circ$, so $y = 180^\circ - 140^\circ = 40^\circ$.

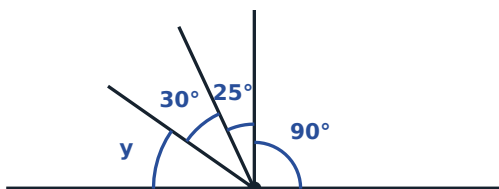
- 38** Work out the size of angle y , in degrees.



Answer: 45

Angles on a straight line add to 180° . $72^\circ + 18^\circ + 45^\circ = 135^\circ$, so $y = 180^\circ - 135^\circ = 45^\circ$.

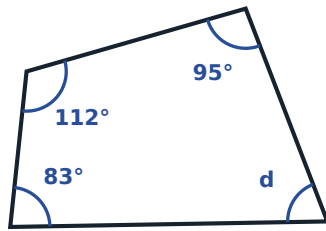
- 39** Work out the size of angle y , in degrees.



Answer: 35

Angles on a straight line add to 180° . $90^\circ + 25^\circ + 30^\circ = 145^\circ$, so $y = 180^\circ - 145^\circ = 35^\circ$.

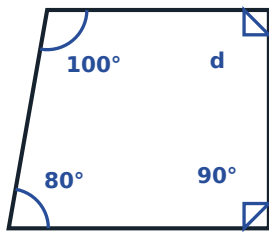
- 40 The four angles of this quadrilateral are shown. Work out angle **d**, in degrees.



Answer: 70

The angles of a quadrilateral add to 360° . $95^\circ + 112^\circ + 83^\circ = 290^\circ$, so $d = 360^\circ - 290^\circ = 70^\circ$.

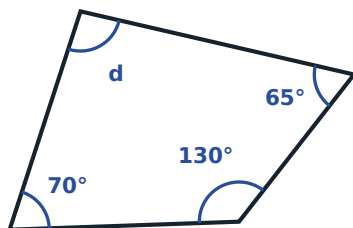
- 41 The four angles of this quadrilateral are shown. Work out angle **d**, in degrees.



Answer: 90

The angles of a quadrilateral add to 360° . $100^\circ + 80^\circ + 90^\circ = 270^\circ$, so $d = 360^\circ - 270^\circ = 90^\circ$.

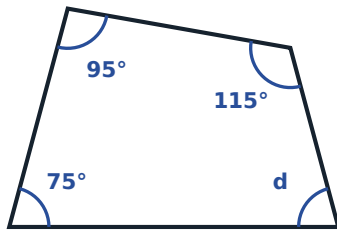
- 42 The four angles of this quadrilateral are shown. Work out angle **d**, in degrees.



Answer: 95

The angles of a quadrilateral add to 360° . $70^\circ + 130^\circ + 65^\circ = 265^\circ$, so $d = 360^\circ - 265^\circ = 95^\circ$.

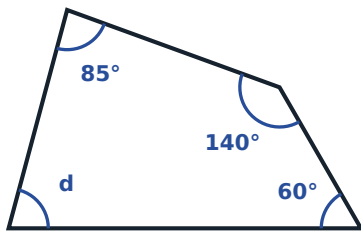
- 43 The four angles of this quadrilateral are shown. Work out angle **d**, in degrees.



Answer: 75

The angles of a quadrilateral add to 360° . $115^\circ + 95^\circ + 75^\circ = 285^\circ$, so $d = 360^\circ - 285^\circ = 75^\circ$.

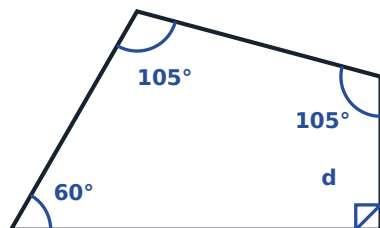
- 44 The four angles of this quadrilateral are shown. Work out angle **d**, in degrees.



Answer: 75

The angles of a quadrilateral add to 360° . $60^\circ + 140^\circ + 85^\circ = 285^\circ$, so $d = 360^\circ - 285^\circ = 75^\circ$.

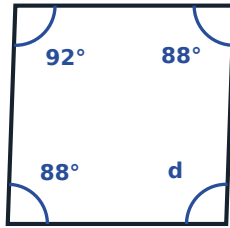
- 45 The four angles of this quadrilateral are shown. Work out angle **d**, in degrees.



Answer: 90

The angles of a quadrilateral add to 360° . $105^\circ + 105^\circ + 60^\circ = 270^\circ$, so $d = 360^\circ - 270^\circ = 90^\circ$.

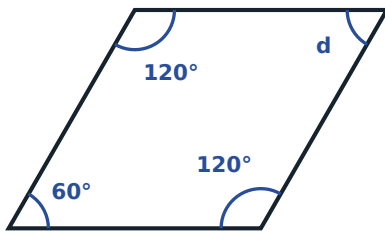
- 46** The four angles of this quadrilateral are shown. Work out angle **d**, in degrees.



Answer: 92

The angles of a quadrilateral add to 360° . $88^\circ + 92^\circ + 88^\circ = 268^\circ$, so $d = 360^\circ - 268^\circ = 92^\circ$.

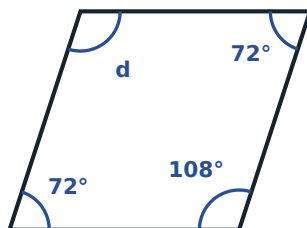
- 47** The four angles of this quadrilateral are shown. Work out angle **d**, in degrees.



Answer: 60

The angles of a quadrilateral add to 360° . $120^\circ + 60^\circ + 120^\circ = 300^\circ$, so $d = 360^\circ - 300^\circ = 60^\circ$.

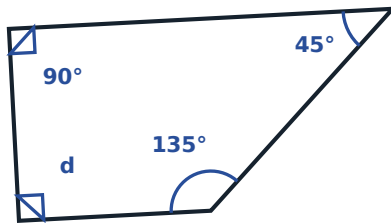
- 48** The four angles of this quadrilateral are shown. Work out angle **d**, in degrees.



Answer: 108

The angles of a quadrilateral add to 360° . $72^\circ + 108^\circ + 72^\circ = 252^\circ$, so $d = 360^\circ - 252^\circ = 108^\circ$.

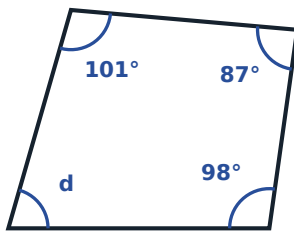
- 49 The four angles of this quadrilateral are shown. Work out angle **d**, in degrees.



Answer: 90

The angles of a quadrilateral add to 360° . $135^\circ + 45^\circ + 90^\circ = 270^\circ$, so $d = 360^\circ - 270^\circ = 90^\circ$.

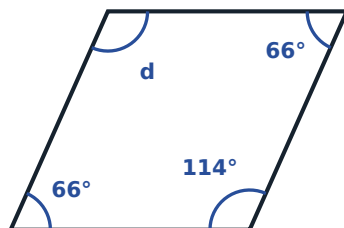
- 50 The four angles of this quadrilateral are shown. Work out angle **d**, in degrees.



Answer: 74

The angles of a quadrilateral add to 360° . $98^\circ + 87^\circ + 101^\circ = 286^\circ$, so $d = 360^\circ - 286^\circ = 74^\circ$.

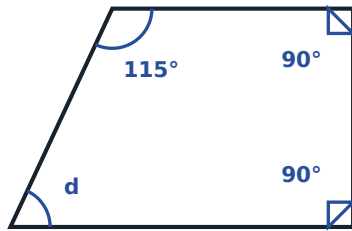
- 51 The four angles of this quadrilateral are shown. Work out angle **d**, in degrees.



Answer: 114

The angles of a quadrilateral add to 360° . $66^\circ + 114^\circ + 66^\circ = 246^\circ$, so $d = 360^\circ - 246^\circ = 114^\circ$.

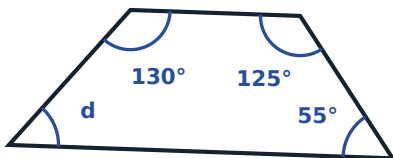
- 52 The four angles of this quadrilateral are shown. Work out angle **d**, in degrees.



Answer: 65

The angles of a quadrilateral add to 360° . $90^\circ + 90^\circ + 115^\circ = 295^\circ$, so $d = 360^\circ - 295^\circ = 65^\circ$.

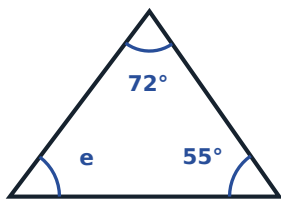
- 53 The four angles of this quadrilateral are shown. Work out angle **d**, in degrees.



Answer: 50

The angles of a quadrilateral add to 360° . $55^\circ + 125^\circ + 130^\circ = 310^\circ$, so $d = 360^\circ - 310^\circ = 50^\circ$.

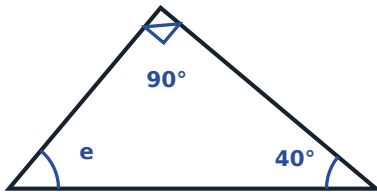
- 54 Work out angle **e** in this triangle, in degrees.



Answer: 53

The angles of a triangle add to 180° . $55^\circ + 72^\circ = 127^\circ$, so $e = 180^\circ - 127^\circ = 53^\circ$.

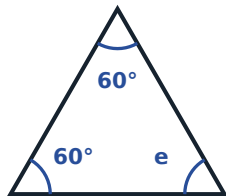
- 55 Work out angle **e** in this triangle, in degrees.



Answer: 50

The angles of a triangle add to 180° . $40^\circ + 90^\circ = 130^\circ$, so $e = 180^\circ - 130^\circ = 50^\circ$.

- 56 Work out angle **e** in this triangle, in degrees.



Answer: 60

The angles of a triangle add to 180° . $60^\circ + 60^\circ = 120^\circ$, so $e = 180^\circ - 120^\circ = 60^\circ$.

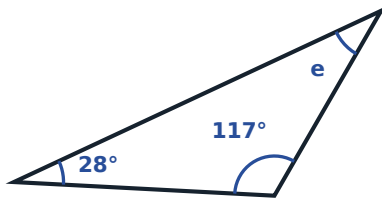
- 57 Work out angle **e** in this triangle, in degrees.



Answer: 40

The angles of a triangle add to 180° . $105^\circ + 35^\circ = 140^\circ$, so $e = 180^\circ - 140^\circ = 40^\circ$.

- 58 Work out angle **e** in this triangle, in degrees.



Answer: 35

The angles of a triangle add to 180° . $28^\circ + 117^\circ = 145^\circ$, so $e = 180^\circ - 145^\circ = 35^\circ$.

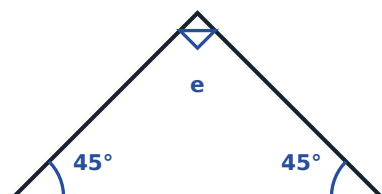
- 59 Work out angle **e** in this triangle, in degrees.



Answer: 30

The angles of a triangle add to 180° . $75^\circ + 75^\circ = 150^\circ$, so $e = 180^\circ - 150^\circ = 30^\circ$.

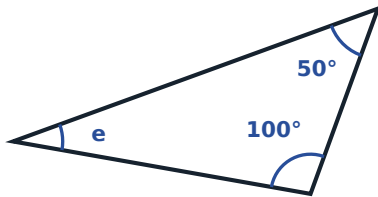
- 60 Work out angle **e** in this triangle, in degrees.



Answer: 90

The angles of a triangle add to 180° . $45^\circ + 45^\circ = 90^\circ$, so $e = 180^\circ - 90^\circ = 90^\circ$.

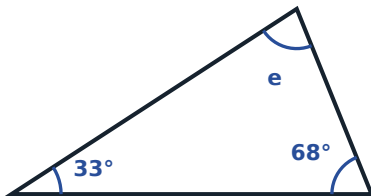
- 61 Work out angle **e** in this triangle, in degrees.



Answer: 30

The angles of a triangle add to 180° . $100^\circ + 50^\circ = 150^\circ$, so $e = 180^\circ - 150^\circ = 30^\circ$.

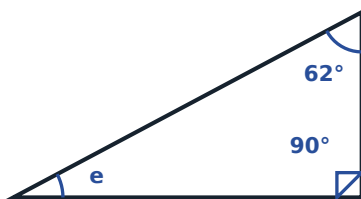
- 62 Work out angle **e** in this triangle, in degrees.



Answer: 79

The angles of a triangle add to 180° . $33^\circ + 68^\circ = 101^\circ$, so $e = 180^\circ - 101^\circ = 79^\circ$.

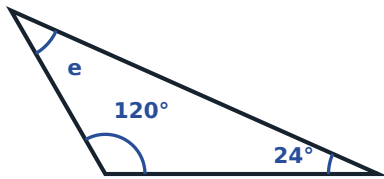
- 63 Work out angle **e** in this triangle, in degrees.



Answer: 28

The angles of a triangle add to 180° . $90^\circ + 62^\circ = 152^\circ$, so $e = 180^\circ - 152^\circ = 28^\circ$.

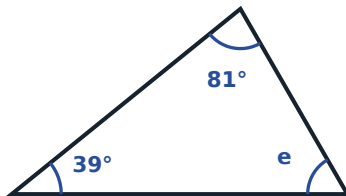
- 64 Work out angle **e** in this triangle, in degrees.



Answer: 36

The angles of a triangle add to 180° . $120^\circ + 24^\circ = 144^\circ$, so $e = 180^\circ - 144^\circ = 36^\circ$.

- 65 Work out angle **e** in this triangle, in degrees.



Answer: 60

The angles of a triangle add to 180° . $81^\circ + 39^\circ = 120^\circ$, so $e = 180^\circ - 120^\circ = 60^\circ$.

B · Reasoning — The totals, and why they are what they are.

- 66 What do the angles around a point add up to, in degrees?

Answer: 360

A full turn is 360° .

- 67 What do the angles on a straight line add up to, in degrees?

Answer: 180

A straight line is half a full turn, so 180° .

- 68 What do the four angles of a quadrilateral add up to, in degrees?

Answer: 360

Split the quadrilateral into two triangles: $2 \times 180^\circ = 360^\circ$.

- 69 What do the three angles of a triangle add up to, in degrees?

Answer: 180

The angles of any triangle total 180° .

70 Why do the angles of a quadrilateral add to 360° ?

- ☐ Because it has four sides
- ☐ Because it splits into two triangles, and $2 \times 180^\circ = 360^\circ$
- ☐ Because a full turn is 360°
- ☐ Because all its angles are 90°

Answer: Because it splits into two triangles, and $2 \times 180^\circ = 360^\circ$

Draw one diagonal. The quadrilateral becomes two triangles, each with an angle sum of 180° .

71 Three angles meet at a point. Two of them are 150° and 130° . What type of angle is the third?

- ☐ Acute
- ☐ Right
- ☐ Obtuse
- ☐ Reflex

Answer: Acute

$150^\circ + 130^\circ = 280^\circ$, so the third angle is $360^\circ - 280^\circ = 80^\circ$. That is less than 90° , so it is acute.

72 Three angles meet at a point. Two of them are 100° and 145° . What type of angle is the third?

- ☐ Acute
- ☐ Right
- ☐ Obtuse
- ☐ Reflex

Answer: Obtuse

$360^\circ - 245^\circ = 115^\circ$, which is between 90° and 180° , so it is obtuse.

73 Two angles meet at a point. One of them is 130° . What type of angle is the other?

- ☐ Acute
- ☐ Right
- ☐ Obtuse
- ☐ Reflex

Answer: Reflex

$360^\circ - 130^\circ = 230^\circ$, which is more than 180° , so it is reflex.

74 Four equal angles meet at a point. How big is each one, in degrees?

Answer: 90

$360^\circ \div 4 = 90^\circ$ — they are all right angles.

75 Five equal angles meet at a point. How big is each one, in degrees?

Answer: 72

$360^\circ \div 5 = 72^\circ$.

76 Three equal angles lie on a straight line. How big is each one, in degrees?

Answer: 60

$180^\circ \div 3 = 60^\circ$.

77 A quadrilateral has four equal angles. How big is each one, in degrees?

Answer: 90

$360^\circ \div 4 = 90^\circ$ — it is a rectangle or a square.

78 Can a quadrilateral have three right angles and one angle of 100° ?

☐ Yes

☐ No

Answer: No

$3 \times 90^\circ + 100^\circ = 370^\circ$, which is more than 360° . The fourth angle would have to be 90° .

79 Can two angles at a point both be reflex?

☐ Yes

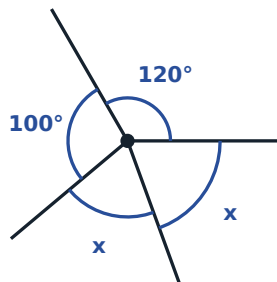
☐ No

Answer: No

A reflex angle is more than 180° , so two of them would total more than 360° .

C · Challenge — Equal angles, ratios and algebra.

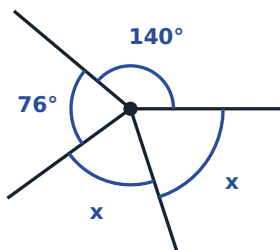
80 The 2 angles marked **x** are equal. Work out **x**, in degrees.



Answer: 70

The known angles total 220° , so the 2 equal angles share $360^\circ - 220^\circ = 140^\circ$. Each is $140 \div 2 = 70^\circ$.

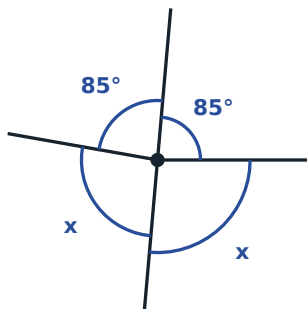
81 The 2 angles marked **x** are equal. Work out **x**, in degrees.



Answer: 72

The known angles total 216° , so the 2 equal angles share $360^\circ - 216^\circ = 144^\circ$. Each is $144 \div 2 = 72^\circ$.

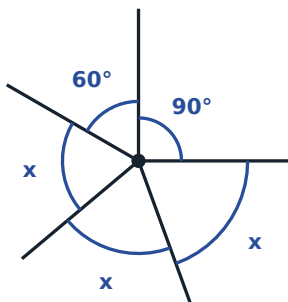
- 82** The 2 angles marked x are equal. Work out x , in degrees.



Answer: 95

The known angles total 170° , so the 2 equal angles share $360^\circ - 170^\circ = 190^\circ$. Each is $190 \div 2 = 95^\circ$.

- 83** The 3 angles marked x are equal. Work out x , in degrees.



Answer: 70

The known angles total 150° , so the 3 equal angles share $360^\circ - 150^\circ = 210^\circ$. Each is $210 \div 3 = 70^\circ$.

- 84** Two angles at a point are equal and the third is 140° . How big is each equal angle, in degrees?

Answer: 110

$360^\circ - 140^\circ = 220^\circ$, shared between two equal angles: $220 \div 2 = 110^\circ$.

- 85** In a quadrilateral, three angles are equal and the fourth is 120° . How big is each equal angle, in degrees?

Answer: 80

$360^\circ - 120^\circ = 240^\circ$, and $240 \div 3 = 80^\circ$.

- 86** The angles at a point are in the ratio $1 : 2 : 3$. What is the largest angle, in degrees?

Answer: 180

The parts total $1 + 2 + 3 = 6$, so one part is $360 \div 6 = 60^\circ$. The largest is $3 \times 60 = 180^\circ$.

- 87** Angles of x° , $(x + 30)^\circ$ and $(x + 60)^\circ$ meet at a point. What is x ?

Answer: 90

$x + (x + 30) + (x + 60) = 360$, so $3x + 90 = 360$, $3x = 270$ and $x = 90$.

- 88** A quadrilateral has angles x° , $2x^\circ$, $3x^\circ$ and $4x^\circ$. What is x ?

Answer: 36

$x + 2x + 3x + 4x = 360$, so $10x = 360$ and $x = 36$.

- 89** The angles at a point are in the ratio $2 : 3 : 4 : 6$. What is the smallest angle, in degrees?

Answer: 48

The parts total 15, so one part is $360 \div 15 = 24^\circ$. The smallest is $2 \times 24 = 48^\circ$.

- 90** A quadrilateral has angles in the ratio $1 : 2 : 3 : 3$. What is the largest angle, in degrees?

Answer: 120

The parts total 9, so one part is $360 \div 9 = 40^\circ$. The largest is $3 \times 40 = 120^\circ$.

- 91** Angles of $2x^\circ$, $3x^\circ$ and $4x^\circ$ lie on a straight line. What is x ?

Answer: 20

$9x = 180$, so $x = 20$.

- 92** A triangle has angles x° , $(x + 20)^\circ$ and $(x + 40)^\circ$. What is x ?

Answer: 40

$3x + 60 = 180$, so $3x = 120$ and $x = 40$.

- 93** Three angles at a point are equal, and the fourth is 108° . How big is each equal angle, in degrees?

Answer: 84

$(360 - 108) \div 3 = 252 \div 3 = 84^\circ$.

- 94** A quadrilateral has two right angles and two other equal angles. How big is each of those equal angles, in degrees?

Answer: 90

$360 - 180 = 180^\circ$ shared between two equal angles, so each is 90° . Every angle is a right angle.

- 95** Two angles at a point are in the ratio $5 : 7$. What is the larger, in degrees?

Answer: 210

12 parts make 360° , so one part is 30° and the larger is $7 \times 30 = 210^\circ$.

- 96** A pupil says a quadrilateral can have two reflex angles. Is that possible?

☐ Yes

☐ No

Answer: No

Two reflex angles would already total more than 360° , leaving nothing for the other two.

D · Word problems — Turns, slices and real shapes.

- 97** A pizza is cut into three slices meeting at the centre. Two slices have angles of 150° and 120° . What is the angle of the third slice, in degrees?

Answer: 90

$360^\circ - 150^\circ - 120^\circ = 90^\circ$.

- 98** A fan has 8 equally spaced blades meeting at the centre. What angle is between two neighbouring blades, in degrees?

Answer: 45

$360^\circ \div 8 = 45^\circ$.

- 99** A compass rose is divided into 4 equal directions. What is the angle between north and east, in degrees?
Answer: 90
 $360^\circ \div 4 = 90^\circ$.
- 100** Three roads meet at a roundabout. Two of the angles between them are 115° and 130° . What is the third, in degrees?
Answer: 115
 $360^\circ - 115^\circ - 130^\circ = 115^\circ$.
- 101** A ramp meets the ground at 22° . What is the angle between the ramp and the ground on the other side, in degrees?
Answer: 158
The two angles lie on a straight line: $180^\circ - 22^\circ = 158^\circ$.
- 102** A kite-shaped garden has angles 70° , 110° and 70° . What is the fourth angle, in degrees?
Answer: 110
 $360^\circ - 250^\circ = 110^\circ$.
- 103** A clock hand turns from 12 to 3. Through how many degrees has it turned?
Answer: 90
A quarter of a full turn: $360^\circ \div 4 = 90^\circ$.
- 104** A clock hand turns from 12 to 5. Through how many degrees has it turned?
Answer: 150
Each hour mark is $360^\circ \div 12 = 30^\circ$, so $5 \times 30 = 150^\circ$.
- 105** A cake is cut into 5 equal slices. A slice is removed. What is the angle of the gap left, in degrees?
Answer: 72
 $360^\circ \div 5 = 72^\circ$.
- 106** A window frame is a quadrilateral with angles 88° , 92° and 88° . What is the fourth angle, in degrees?
Answer: 92
 $360^\circ - 268^\circ = 92^\circ$.
- 107** A skateboard ramp turns through 135° , then a further 90° . How much more turning is needed to complete a full turn, in degrees?
Answer: 135
 $360^\circ - 135^\circ - 90^\circ = 135^\circ$.
- 108** A pie chart has three sectors. Two are 90° and 144° . What is the third, in degrees?
Answer: 126
 $360^\circ - 90^\circ - 144^\circ = 126^\circ$.
- 109** A wheel has 12 equally spaced spokes. What is the angle between two neighbouring spokes, in degrees?
Answer: 30
 $360^\circ \div 12 = 30^\circ$.

- 110** A gymnast turns through 540° . How many complete turns is that, plus how many degrees? Give the extra degrees.

Answer: 180

$540 - 360 = 180^\circ$, so one full turn and a further 180° .

- 111** A clock hand turns from 12 to 8. Through how many degrees has it turned?

Answer: 240

$8 \times 30 = 240^\circ$.

- 112** A pie chart shows 4 hobbies. Three sectors are 60° , 100° and 110° . What is the fourth, in degrees?

Answer: 90

$360 - 270 = 90^\circ$.

- 113** A tent door is a quadrilateral with angles 105° , 75° and 105° . What is the fourth, in degrees?

Answer: 75

$360 - 285 = 75^\circ$.

- 114** Four paths meet at a point. Three of the angles between them are 85° , 95° and 100° . What is the fourth, in degrees?

Answer: 80

$360 - 280 = 80^\circ$.

- 115** A sail is a triangle with angles 90° and 34° . What is the third angle, in degrees?

Answer: 56

$180 - 124 = 56^\circ$.

- 116** A skate ramp is a quadrilateral with two right angles and one angle of 145° . What is the fourth, in degrees?

Answer: 35

$360 - 325 = 35^\circ$.