

1 Map scales: measuring

On a 1 : 20 000 map a field is a rectangle 3.5 cm by 2.4 cm.

- Work out the real area of the field in km^2 .
- On another map the field covers 2.1 cm^2 . Work out the scale of that map.

$$a) 700 \text{ m by } 480 \text{ m} = 336\,000 \text{ m}^2 = 0.336 \text{ km}^2$$

$$b) 336\,000 \text{ m}^2 = 3\,360\,000\,000 \text{ cm}^2$$

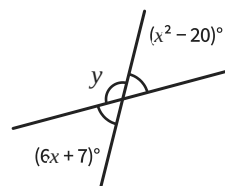
$$\div 2.1 = 1\,600\,000\,000 = 40\,000^2$$

$$1 : 40\,000$$

2 Angle facts

Two straight lines cross.

- Find x . Explain why it has only one value.
- Work out angle y .



Not drawn accurately

$$a) x^2 - 6x - 27 = 0, (x - 9)(x + 3) = 0$$

$$x = -3 \text{ gives an angle of } -11^\circ, \text{ so } x = 9$$

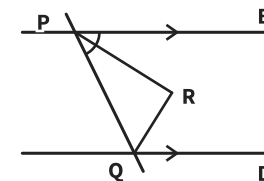
$$b) \text{ angle } 61^\circ, y = 180 - 61 = 119^\circ$$

3 Angles on parallel lines

PB is parallel to QD.

Angle BPQ = $2y^\circ$. PR and QR cut angles BPQ and DQP in half.

- Write angle DQP in terms of y .
- Prove that angle PRQ = 90° .



Not drawn accurately

$$a) 180 - 2y \text{ (co-interior angles)}$$

$$b) \text{ angle } RPQ = y, \text{ angle } RQP = 90 - y$$

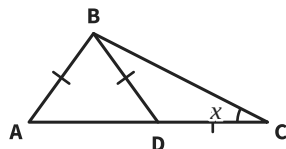
$$PRQ = 180 - y - (90 - y) = 90^\circ$$

4 Angles in isosceles triangles

D is on AC. AB = BD = DC.

Angle ACB = x .

- Show that angle BAC = $2x$.
- Angle ABC = 99° . Find x .



Not drawn accurately

$$a) \text{ angle } DBC = x, \text{ so angle } BDA = 2x \text{ (exterior angle)}$$

$$AB = BD, \text{ so angle } BAD = \text{angle } BDA = 2x$$

$$b) 2x + 99 + x = 180, x = 27^\circ$$

Angles and polygons

revision mat answers

5 Angles in regular polygons

Regular polygon A has n sides. Regular polygon B has $2n$ sides. Each interior angle of B is 15° more than each interior angle of A.

- Find n .
- Work out the sum of the interior angles of B.

$$a) \text{ exterior angles: } \frac{360}{n} - \frac{360}{2n} = 15$$

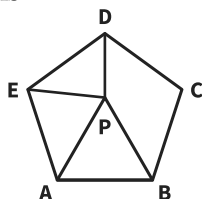
$$\frac{180}{n} = 15, n = 12$$

$$b) (24 - 2) \times 180 = 3960^\circ$$

6 Angles in regular polygons

ABP is an equilateral triangle inside the regular pentagon ABCDE.

- Work out angle AEP.
- Work out angle DPE.



Not drawn accurately

$$a) \text{ angle } PAE = 108 - 60 = 48^\circ, AP = AE$$

$$(180 - 48) \div 2 = 66^\circ$$

$$b) \text{ angle } PED = 108 - 66 = 42^\circ, \text{ angle } PDE = 54^\circ$$

$$180 - 42 - 54 = 84^\circ$$

7 Bearings

The bearing of B from A is x° , where x is more than 180.

- Write the bearing of A from B in terms of x .
- The bearing of B from A is 4 times the bearing of A from B. Find both bearings.

$$a) (x - 180)^\circ$$

$$b) x = 4(x - 180), 3x = 720, x = 240$$

$$B \text{ from A: } 240^\circ, A \text{ from B: } 060^\circ$$

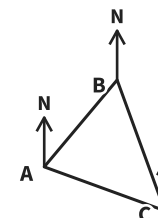
8 Bearings

The bearing of B from A is 040° .

The bearing of C from A is 110° .

The bearing of C from B is 160° .

- Work out angle ABC.
- Work out the bearing of B from C.



Not drawn accurately

$$a) A \text{ from B: } 220^\circ, 220 - 160 = 60^\circ$$

$$b) \text{ angle } BAC = 70^\circ, \text{ angle } ACB = 50^\circ$$

$$160 + 180 = 340^\circ$$