

M1.

- (a)
- $360 \div 8$
- or 135 seen

oe

$$180 - [(8 - 2) \times 180] \div 8]$$

M1

45

A1**Additional Guidance**90 \div 2 = 45 is a valid method using symmetry**M1A1**

- (b) Angle ABD is 90
 or angle $ADB = w$ seen or implied
 or angle $ADB =$ angle CBD seen or implied
 or angle BCD is 65
 or angle ABC is 180 - 65 or 115
 or angle ADC is 180 - 65 or 115
 or 155 seen

oe

$$(360 - 65 - 65 - 90 - 90)$$

or 50

*May be on diagram***M1**

- 180 - 65 - 90
 or 180 - 155
 or 115 - 90
 or angle ADB is 25

oe

$$(360 - 65 - 65 - 90 - 90) \div 2$$

or $50 \div 2$

or 90 - 65

M1dep

25

A1**Additional Guidance**

For the first M1 angles must be clearly identified either in the diagram or in the working

Use of the right angle symbol is acceptable for 90

May extend side to obtain a valid angle

Working space takes precedence over diagram

[5]

M2.

Alternative method 1

$$x + 2x + 3x + 60 = 360$$

$$360 - 60 \text{ or } 300$$

M1

$$6x + 60 = 360$$

$$\text{or } 6x = 300$$

$$\frac{360 - 60}{6}$$

M1dep

$$50$$

A1

States that $120 + 50 \neq 180$

or

$$120 + 50 = 170$$

Strand (ii)

oe

e.g. $180 - 120 = 60$ and $60 \neq 50$

$x = 60$ and 50 seen

50 and $130 \neq 120$ seen

Q1

Alternative method 2

$$x = 180 - 120$$

$$\text{or } x = 60$$

May be on diagram in the correct position

M1

$$60 + 2 \times 60 + 3 \times 60 + 60$$

$$\text{or } 60 + 120 + 180 + 60$$

M1dep

$$420$$

$3x = 180$ means a straight line

A1

States that $420 \neq 360$

or

States 420 so cannot be a quadrilateral

Strand (ii)

oe

Left hand shape is a triangle

or

Left hand shape is not a quadrilateral

Q1

[4]

M3.(a) $360 - 108 - 90$

oe

M1

162

A1

(b) Correct reason

eg $137 + 43 = 180$

$180 - 137 = 43$

$180 - 43 = 137$

or Angles (on a straight line) add up to 180

or Supplementary

B1

[3]

M4.(a) $x + y = 180$

oe

$y = 180 - x$

or $x = 180 - y$

or $2x + 2y = 360$

B1

(b) $y = 1.5x$

oe

$$2y = 3x$$

$$\text{or } y = \frac{3}{2}x$$

$$\text{or } x = \frac{2}{3}y$$

$$\text{or } \frac{x}{y} = \frac{2}{3}$$

$$\text{or } \frac{y}{x} = \frac{3}{2}$$

B1

[2]

M5.(a) 180

Exact answer

B1

(b) 6

B1

(c) 135

Exact answer

B1

[3]

M6.(180 - 40) ÷ 2

or 180 - (40 × 2)

M1

(40 and) 40 and 100

Either order

A1

(40 and) 70 and 70

SC1 Two pairs of angles totalling 140

A1 [3]

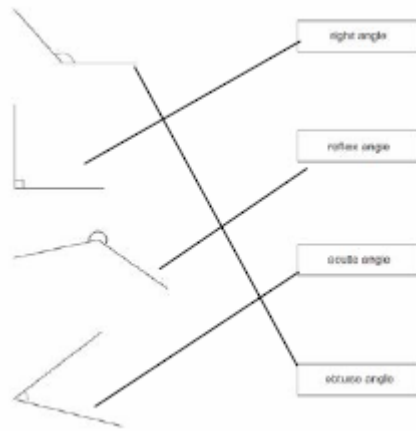
M7. Angles joined with

obtuse

right – angle

reflex

acute in this order



B1 for two or three correct

B2 [2]

M8.

(a) 55°

B1

(b) $360 - (150 + 70)$

Allow invisible brackets

M1

140

A1 [3]

M9.

(a) 60

B1

(b) 55

B1

(c) No
and
Valid explanation. Eg
(Because) the angle should be 45
Other angle is 48 so there are no equal angles (which means it is not
isosceles)
(Because) $42 + 42 + 90 = 174$ (not 180)
oe

B1

[3]

M10.**Alternative method 1**angle $ACD = 180 - 78$ or 102

M1

angle $ECD = 360 - 115 -$ their 102 or 143*angle $ECD = 143$ implies M1 M1*

M1

(143 + 32 =) 175 and No

or

143 + 32 \neq 180 (and No)

oe

*SC3 32 + 78 = 110 and No**or 32 + 78 \neq 115 (and No)*

A1

Alternative method 2angle $ACD = 180 - 78$ or 102

M1

(Assumes CD is parallel to EF) angle $DCE = 180 - 32$ or 148

M1

(102 + 148 + 115 =) 365 and No

or

$$102 + 148 + 115 \neq 360 \text{ (and No)}$$

oe

$$\text{SC3 } 32 + 78 = 110 \text{ and No}$$

$$\text{or } 32 + 78 \neq 115 \text{ (and No)}$$

A1

Alternative method 3

Extends DC to X

$$\text{angle } XCA = 78$$

X may be a different letter or not labelled

M1

$$\text{angle } XCE = 115 - \text{their } 78 \text{ or } 37$$

$$\text{angle } XCE = 37 \text{ implies M1 M1}$$

M1

37 and No

oe

$$\text{SC3 } 32 + 78 = 110 \text{ and No}$$

$$\text{or } 32 + 78 \neq 115 \text{ (and No)}$$

A1

Alternative method 4

Extends DC to X

$$\text{angle } XCA = 78$$

X may be a different letter or not labelled

M1

(Assumes CD is parallel to EF)

$$\text{angle } XCE = 32$$

M1

$$(32 + 78 =) 110 \text{ and No}$$

or

$$32 + 78 \neq 115 \text{ (and No)}$$

oe

$$\text{SC3 } 32 + 78 = 110 \text{ and No}$$

$$\text{or } 32 + 78 \neq 115 \text{ (and No)}$$

A1

Alternative method 5

Extends AC to meet EF at Y

$$\text{angle } ECY = 180 - 115 \text{ or } 65$$

Y may be a different letter or not labelled

M1

$$\text{angle } EYC = 180 - \text{their } 65 - 32$$

or 83

$$\text{angle } EYC = 83 \text{ implies } M1 \ M1$$

M1

83 and No

oe

$$SC3 \ 32 + 78 = 110 \text{ and No}$$

$$\text{or } 32 + 78 \neq 115 \text{ (and No)}$$

A1

Alternative method 6

Extends AC to meet EF at Y

$$\text{angle } ECY = 180 - 115 \text{ or } 65$$

Y may be a different letter or not labelled

M1

(Assumes AB is parallel EF)

$$\text{angle } EYC = 78$$

M1

$$(32 + 78 + 65 =) 175 \text{ and No}$$

or

$$32 + 78 + 65 \neq 180 \text{ (and No)}$$

oe

$$SC3 \ 32 + 78 = 110 \text{ and No}$$

$$\text{or } 32 + 78 \neq 115 \text{ (and No)}$$

A1

Alternative method 7

Draws a line from X on AB to Y on EF passing through C with right angles marked at AXC and CYE (Assumes CD is parallel to EF)

$$\text{angle } ACX = 180 - 90 - 78 \text{ or } 12$$

X and Y may be different letters or not labelled

M1

$$\text{angle } ECY = 180 - 90 - 32 \text{ or } 58$$

M1

$$(12 + 115 + 58 =) 185 \text{ and No}$$

or

$$12 + 115 + 58 \neq 180 \text{ (and No)}$$

oe

$$SC3 \ 32 + 78 = 110 \text{ and No}$$

$$\text{or } 32 + 78 \neq 115 \text{ (and No)}$$

A1

M11.(a) 40

B1

(b) $360 \div$ their 40

M1

9

A1ft

[3]

M12.(a) (3, 5)

B1

(b) (1, 3), (3, 3) and (5, 3)
In any order
B1 for each

B3

[4]

M13. $360 \div 4$ or 90 seen

Right angle symbol may be on diagram
May be implied from symmetry line and 45

M1

$360 - 90 - 36 (= 234)$

If symmetry used $90 \div 2$ or 45 and $36 \div 2$ or 18 seen
or 63 seen

If isosceles triangles used $(180 - 90) \div 2$ or 45 and $(180 - 36) \div 2$ or 72 seen

M1dep

their $234 \div 2$
 or $180 - 45 - 18$
 or $45 + 72$

Dependent on 1st two Method marks

M1dep

117

A1

Alternative Method

$360 \times 4 - 360$

or 6×180

or 1080

oe

M1

their $1080 - 36 \times 4 (= 936)$

M1dep

their $936 \div 8$

M1dep

117

A1

[4]

M14.

(a) $180 - 75 (=105)$
oe

M1

$3a = \text{their } 105$

Their $105 \div 3$

		M1dep	
	35		A1
	(b) $(180 - 40) \div 2$ <i>Allow invisible brackets</i>		M1
	70		A1
			[5]
M15.			
	65°		B1
	Corresponding		
	<i>Strand (i)</i>		
	<i>If other explanations involving angles on a straight line, interior, opposite, alternate angles etc. must be complete eg 65 marked opposite 65 given and 'Alternate, opposite' is Q1</i>		
			Q1
			[2]
M16.			
	(a) 33		B1
	(b) $180 - 90 - 23$		M1
	67		A1
	(c) $180 - 68 - 30 (= 82)$ <i>or $90 - 23 - 30 (= 37)$</i>		M1

$$360 - 125 - 46 - \text{their } 82$$

$$180 - 46 - 57 (= 77)$$

and

$$180 - \text{their } 77 - \text{their } 67 (= 36)$$

M1

$$107$$

A1

(d) $\sqrt{4900}$ (= 70)
 oe e.g. $70 \times 70 = 4900$

M1

$$4 \times \text{their } 70$$

oe

M1

$$280$$

A1

[9]