Topic Test: OxfordAQA International GCSE Mathematics Core

Geometry and Measures

Name: _____

Class: _____

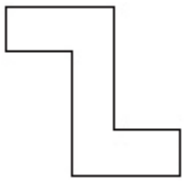
Date: _____

Time: **70 minutes**

Marks: **65 marks**

Comments:

1 Here is a shape.



(a) Circle the number of lines of symmetry of the shape.

0 1 2 4

(1)

(b) Circle the order of rotational symmetry of the shape.

0 1 2 4

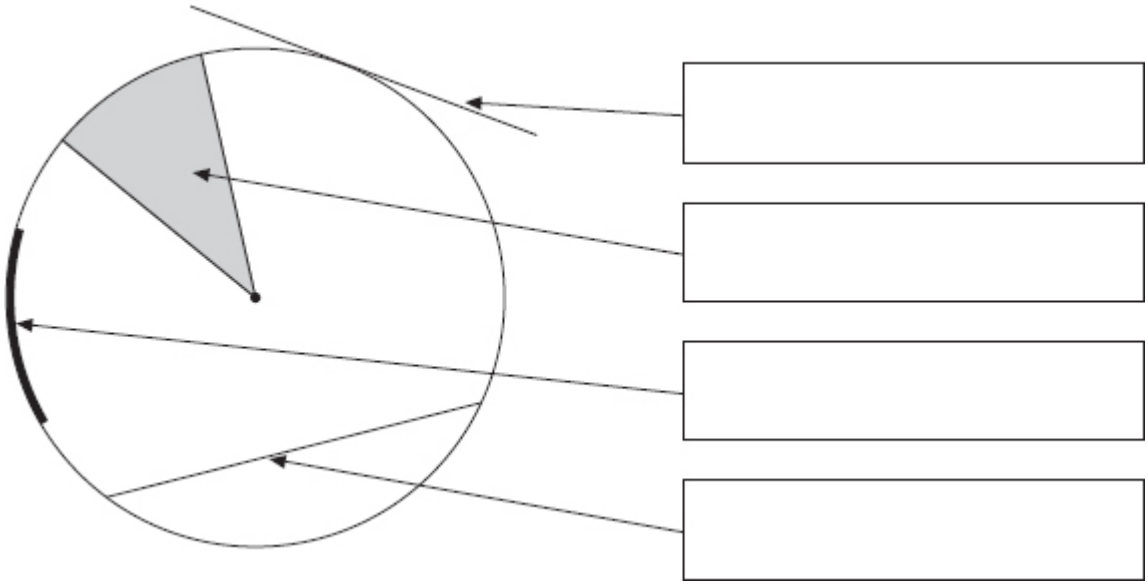
(1)

(Total 2 marks)

2 Here are six words that are used with circles.

arc chord diameter sector segment tangent

Put the correct word from the list in each box.



(Total 4 marks)

3 (a) How many **faces** does a triangular prism have?

Circle your answer.

4 5 6 9

(1)

(b) Add together:

the number of **edges** of a cube

and

the number of **edges** of a square-based pyramid.

_____

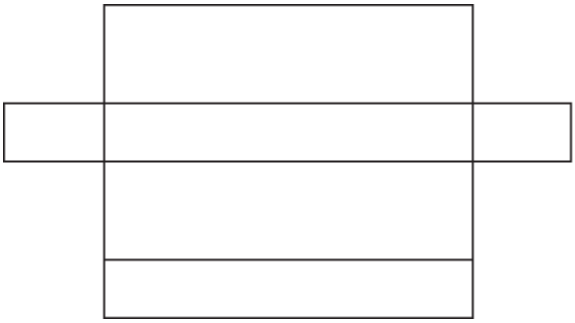
_____

Answer _____

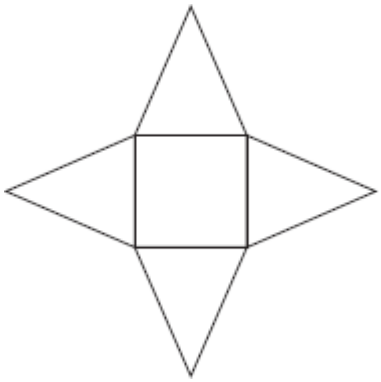
(2)

(Total 3 marks)

4 Write down the mathematical name of the shape made by each net.



_____

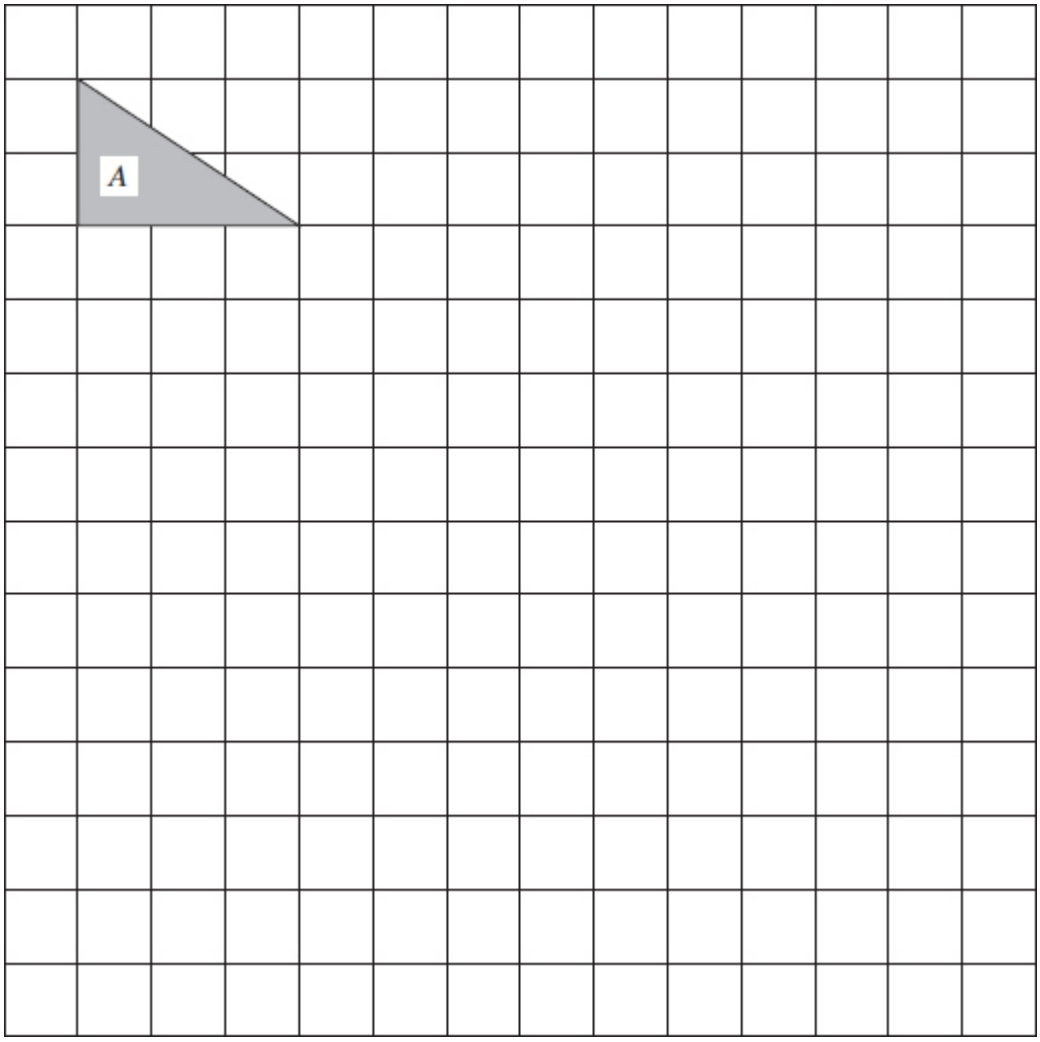


_____

_____

(Total 3 marks)

5 Shape *A* on the centimetre grid is enlarged by scale factor 3.



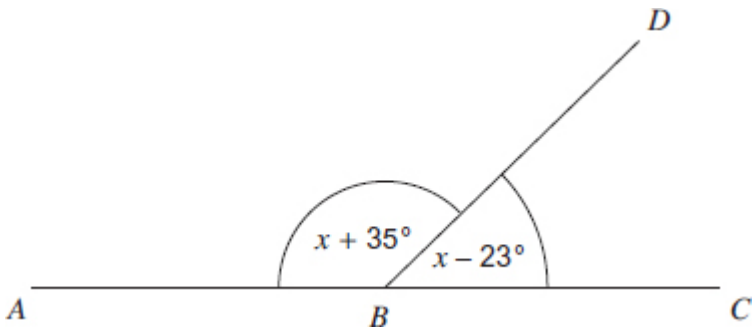
Work out the area of the enlargement.

Answer _____ cm^2

(Total 3 marks)

6 *ABC* is a straight line.

Not drawn accurately



(a) How much bigger is angle *ABD* than angle *CBD*?

Answer _____ degrees

(2)

(b) Set up and solve an equation to work out the size of angle *ABD*.

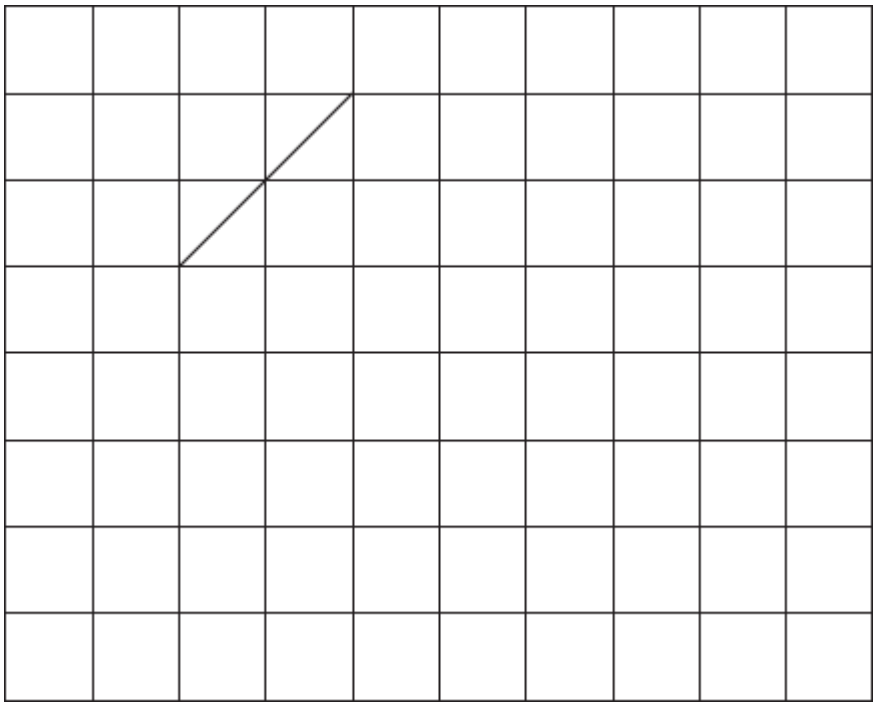
Answer _____ degrees

(4)

(Total 6 marks)

7 This is a centimetre grid.

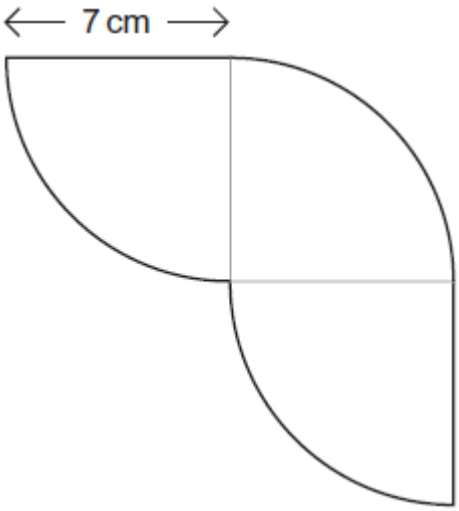
Draw a kite with an area of 12 cm^2.
One side has been drawn for you.



(Total 2 marks)

8 This shape is made from identical quarter circles.

Not drawn accurately



Work out the perimeter of the shape.

Answer _____ cm

(Total 4 marks)

9 The scale of a map is 1 : 50 000

(a) Show that 1 cm on the map represents 0.5 km

(1)

(b) Towns A, B and C lie in a straight line.

B lies between A and C.

A and B are 5 cm apart on the map.

The actual distance from A to C is 8 km

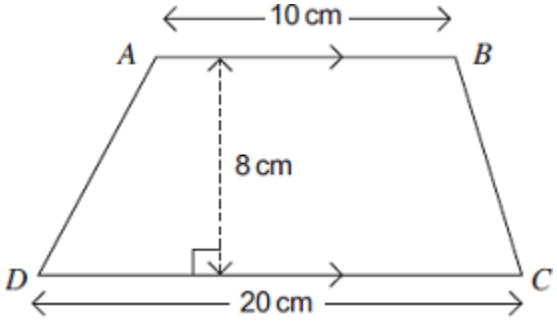
Show that B and C are **less than** 12 cm apart on the map.

(3)

(Total 4 marks)

10 $ABCD$ is a trapezium.

Not drawn accurately



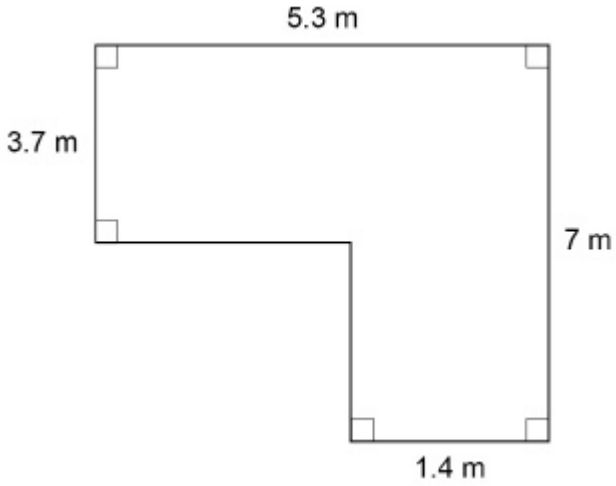
Calculate the area of $ABCD$.
State the units of your answer.

Answer _____

(Total 3 marks)

11 Suzy is going to paint this floor.

Not drawn accurately



1 litre of paint will cover 10 m^2

Each 1-litre tin costs $17.50

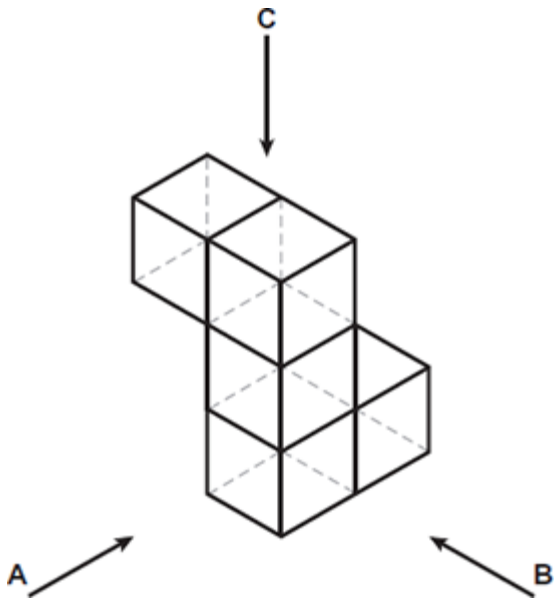
How much will it cost Suzy to buy the tins she needs?

You **must** show your working.

Answer $ _____

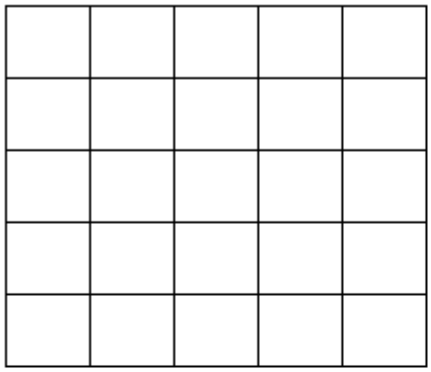
(Total 4 marks)

12 This shape is made from **five** cubes.

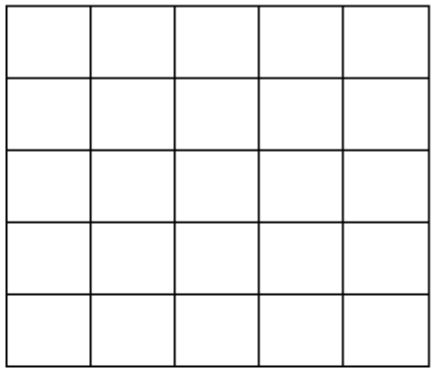


Draw what the shape looks like when seen from A, B and C.

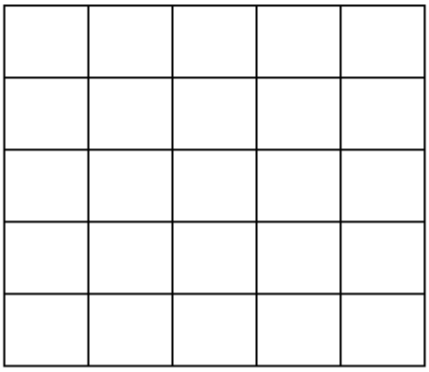
From A



From B

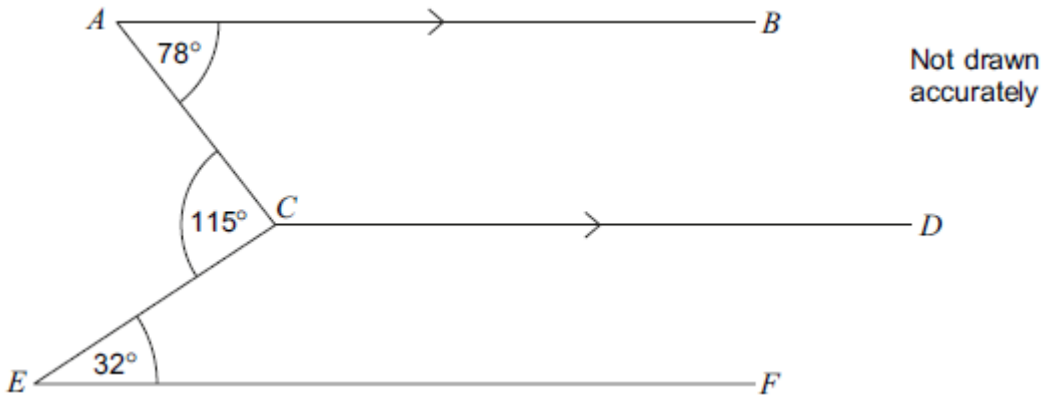


From C



(Total 3 marks)

13



Not drawn accurately

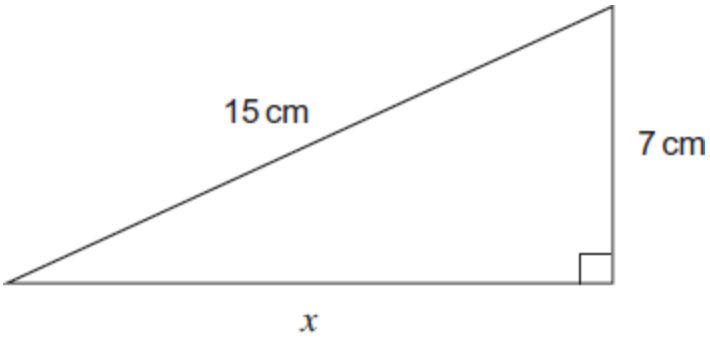
AB is parallel to CD.

Is EF parallel to CD?
You **must** show your working.

(Total 3 marks)

14 Work out length x.

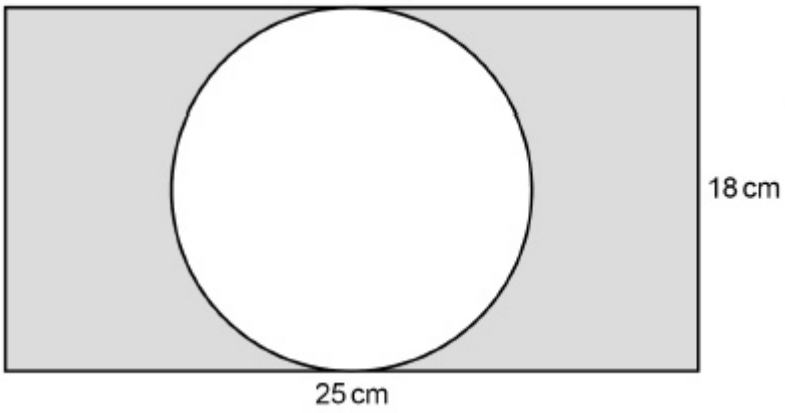
Not drawn accurately



Answer _____ cm

(Total 3 marks)

15 A circle is cut out of a rectangular piece of card as shown.



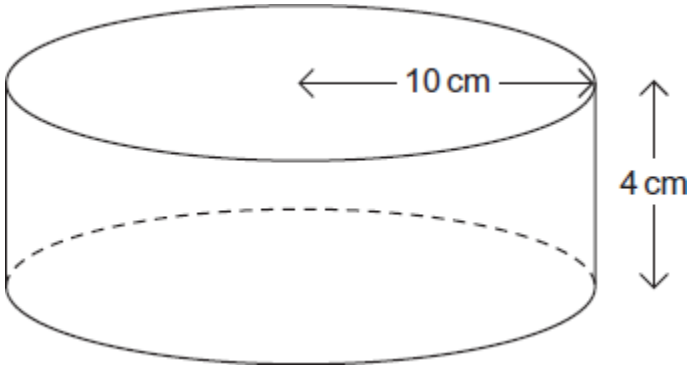
Work out the shaded area.

Answer _____ cm^2

(Total 3 marks)

16 The radius, r, of the cylinder is 10 cm.
The height, h, is 4 cm.

The volume, V, of a cylinder is $V = \pi r^2 h$



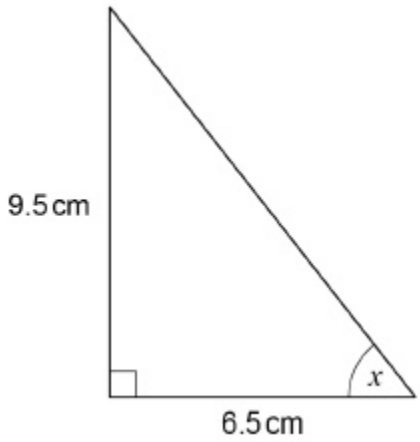
Work out the volume of the cylinder.
Use $\pi = 3.1$

Answer _____ cm^3

(Total 3 marks)

17 Use trigonometry to work out the size of angle x.

Not drawn accurately



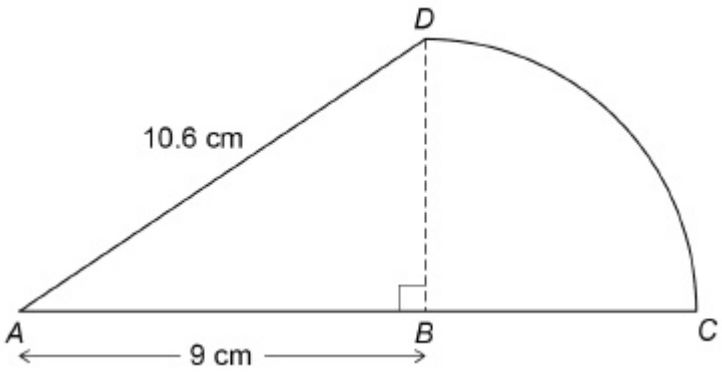
Answer _____ °

(Total 2 marks)

18 *ABD* is a right-angled triangle.

BCD is a quarter circle, radius *BD*.

Not drawn accurately



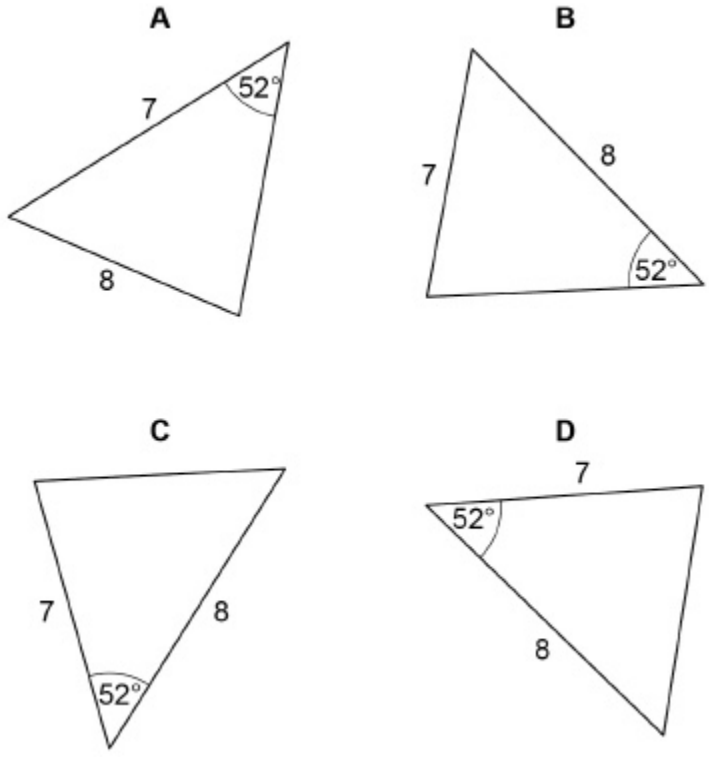
Work out the area of *ABCD*.

Answer _____ cm^2

(Total 5 marks)

19 Which **two** of these triangles are congruent?

Not drawn accurately



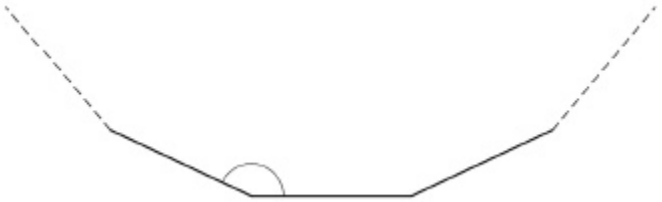
Circle your answer.

A and B B and C C and D A and D

(Total 1 mark)

20 A regular polygon has 12 sides.

Not drawn accurately

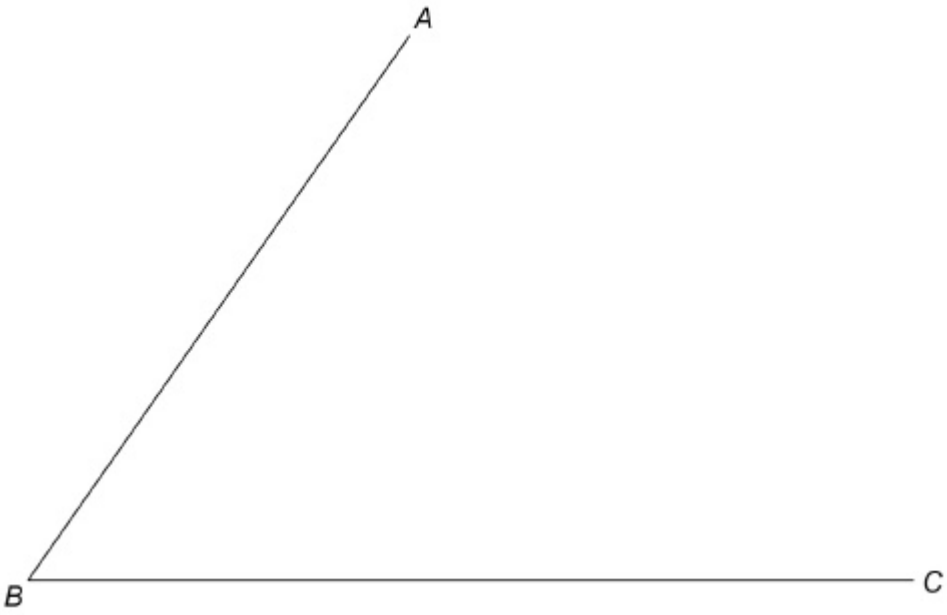


Work out the size of an interior angle.

Answer _____ °

(Total 2 marks)

21 Use a ruler and compasses to construct the bisector of angle *ABC*.



(Total 2 marks)

1 (a) 0

B1

(b) 2

B1

[2]

2 tangent

B1

sector

B1

arc

B1

chord

B1

[4]

3 (a) 5

B1

(b) 20

B1 (cube =) 12
or (square-based pyramid =) 8

B2

[3]

4 Cuboid

Do not accept: Cube

B1

(Square based) Pyramid

B1

(Triangular) Prism

B1

[3]

5 Correct enlargement

Seen or implied

or $\frac{1}{2} \times 3 \times 2$ *oe*

or Area factor 9

or 9 and 6 seen

B1

$\frac{1}{2}$ × 9 × 6 *oe*

or $\frac{1}{2}$ × 3 × 2 × 3^2

M1

27

ft their triangle

A1ft

[3]

6 (a) 35 − − 23 or 35 + 23

x + 35 − (x − 23)

or 119 − 61

M1

58

A1

(b) *x* + 35 + *x* − 23 = 180

oe 2x + 12 = 180

M1

2*x* = 180 − 12

(180 − 12) ÷ 2 or 84

or 2*x* = 168

Terms collected

M1dep

119

A1

x = 84 and

Strand (ii)

an algebraic equation with both method marks awarded for correct algebra

Q1ft

[6]

7 Kite either horizontal or vertical with long diagonal 6 cm and short diagonal 4 cm

B1 for any kite

Condone a square using the given side or an arrowhead for B1

B2

[2]

8 2 × π × 7 *oe*

or [43.9, 44]

14π

M1

$2 \times \pi \times 7 \div 4$ *oe*

or [10.9, 11]

7 π / 2

or $2 \times \pi \times 7 \times 3$ *oe*

or [131.9, 132]

42 π

M1dep

$2 \times \pi \times 7 \div 4 \times 3$ *oe*

or [32.9, 33]

21 π / 2

M1dep

[46.9, 47]

10.5 π + 14 oe

SC2 for [23.4, 23.5] or [30.4, 30.5]

SC1 for [16.4, 16.5]

A1

[4]

9 (a) 50 000 ÷ 100 ÷ 1000 = 0.5

or

0.5 × 1000 × 100 = 500 000

B1

(b) **Alternative method 1**

8 − 0.5 × 5 or 5.5

oe

M1

their 5.5 × 100 000 ÷ 50 000

M1dep

11

A1

Alternative method 2

8 × 100 000 ÷ 50 000 or 16

M1

their 16 − 5

M1 dep

11

A1

Alternative method 3

12 + 5 or 17

M1

17 × 0.5

M1 dep

8.5

A1

[4]

10 0.5 × 8 × (10 + 20)

oe Condone missing brackets

M1

120

A1

cm^2

B1

[3]

11 **Alternative method 1**

(1.4 × 7) or 9.8

or (5.3 − 1.4) × 3.7

or 3.9 × 3.7 or 14.43

oe

M1

24.23

A1

their 24.23 ÷ 10 or 2.423

or 42.4(025)

M1

52.5(0)

ft their 24.23 ÷ 10, rounded up then × 17.5(0)

A1ft

Alternative method 2

5.3 × 3.7 or 19.61

or (7 − 3.7) × 1.4

or 3.3 × 1.4 or 4.62

M1

24.23

A1

their 24.23 ÷ 10 or 2.423

or 42.4(025)

M1

52.5(0)

ft their 24.23 ÷ 10, rounded up
then × 17.5(0)

A1ft

Alternative method 3

5.3 × 7 or 37.1

or (5.3 − 1.4) × (7 − 3.7)

or 3.9 × 3.3 or 12.87

M1

24.23

A1

their 24.23 ÷ 10 or 2.423

or 42.4(025)

M1

52.5(0)

ft their 24.23 ÷ 10, rounded up
then × 17.5(0)

A1ft

Additional Guidance

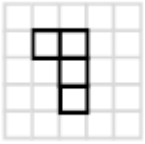
7 + 5.3 + 3.7 + 3.9 + 3.3 + 1.4 = 24.6

3 × 17.5 = 52.5

M0 A0 M1 A1ft

[4]

12 A



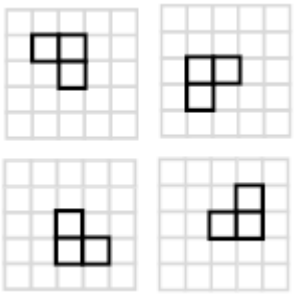
Only outline needed. Can be anywhere on grid
Internal lines not necessary (may be dashed)
Shape may be shaded (even in chequer-board fashion)

B1

Only outline needed. Can be anywhere on grid
Internal lines not necessary (may be dashed)
Shape may be shaded (even in chequer-board fashion)

B1

C



Any orientation (as shown)
Only outline needed. Can be anywhere on grid
Internal lines not necessary (may be dashed)
Shape may be shaded (even in chequer-board fashion)

B1

[3]

13

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 ≠ 180 (and No)

oe
SC3 32 + 78 = 110 and No
or 32 + 78 ≠ 115 (and No)

A1

Alternative method 2

angle 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 ≠ 360 (and No)

oe
SC3 32 + 78 = 110 and No
or 32 + 78 ≠ 115 (and No)

A1

Alternative method 3

Extends DC to X

angle XCA = 78

X may be a different letter or not labelled

M1

angle XCE = 115 − their 78 or 37

angle XCE = 37 implies M1 M1

M1

37 and No

oe

SC3 32 + 78 = 110 and No

or 32 + 78 ≠ 115 (and No)

A1

Alternative method 4

Extends DC to X

angle XCA = 78

X may be a different letter or not labelled

M1

(Assumes *CD* is parallel to *EF*)

angle *XCE* = 32

M1

(32 + 78 =) 110 and No

or

32 + 78 ≠ 115 (and No)

oe

SC3 32 + 78 = 110 and No

or 32 + 78 ≠ 115 (and No)

A1

Alternative method 5

Extends AC to meet EF at Y

angle ECY = 180 − 115 or 65

Y may be a different letter or not labelled

M1

angle EYC = 180 − their 65 − 32

or 83

angle EYC = 83 implies M1 M1

M1

83 and No

oe

SC3 32 + 78 = 110 and No

or 32 + 78 ≠ 115 (and No)

A1

Alternative method 6

Extends AC to meet EF at Y

angle ECY = 180 − 115 or 65

Y may be a different letter or not labelled

M1

(Assumes AB is parallel EF)

angle EYC = 78

M1

(32 + 78 + 65 =) 175 and No

or

32 + 78 + 65 ≠ 180 (and No)

oe

SC3 32 + 78 = 110 and No

or 32 + 78 ≠ 115 (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)

angle ACX = 180 − 90 − 78 or 12

X and Y may be different letters or not labelled

M1

angle ECY = 180 − 90 − 32 or 58

M1

(12 + 115 + 58 =) 185 and No

or

12 + 115 + 58 ≠ 180 (and No)

oe

SC3 32 + 78 = 110 and No

or 32 + 78 ≠ 115 (and No)

A1

[3]

14 $15^2 - 7^2$

or $x^2 + 7^2 = 15^2$

cos 27.(…) = $\frac{x}{15}$ *or cos 28 =* $\frac{x}{15}$

or sin 62.(…) = $\frac{x}{15}$

M1

$\sqrt{15^2 - 7^2}$ or $\sqrt{176}$

15 cos 27(…) or 15 cos 28

or 15 sin 62(…)

M1dep

13.26(…) or 13.3 or 13.27 or 13

or $4\sqrt{11}$

A1

[3]

15

25 × 18 or 450

M1

$\pi \times (18 \div 2)^2$

or [254.3, 254.502]

M1

[195,196] or $450 - 81\pi$

A1

[3]

16

$\pi \times 10^2 \times 4$

M1

$\pi \times 100 \times 4$ or $3.1 \times 100 \times 4$

or 31×40 or 124×10

Any of these products or better

Condone use of 3.14 or 3.142 or $\frac{22}{7}$

A1

1240

Accept 1256 or 1256.8 or 1257.(…) or 1260

A1

[3]

17 $\tan x = \frac{9.5}{6.5}$ or $\tan^{-1}\frac{9.5}{6.5}$

or $\sin x = \frac{9.5(\sin 90)}{\sqrt{6.5^2 + 9.5^2}}$

or $\sin x = \frac{19(\sin 90)}{\sqrt{530}}$

or $\cos x = \frac{6.5}{\sqrt{6.5^2 + 9.5^2}}$

or $\cos x = \frac{13}{\sqrt{530}}$

or $90 - \tan^{-1}\frac{6.5}{9.5}$

or 90 − 34.(…)

oe

eg $\cos x = \frac{6.5^2 + (\sqrt{6.5^2 + 9.5^2})^2 - 9.5^2}{2 \times \sqrt{6.5^2 + 9.5^2} \times 6.5}$

any letter

M1

55.6… or 56

A1

Additional Guidance

tan = $\frac{9.5}{6.5}$ or tan $\frac{9.5}{6.5}$ or $\tan^{-1} = \frac{9.5}{6.5}$ (unless recovered)

M0

Answer from scale drawing

Zero

If using sine rule must rearrange to sin x = for M1

If using cosine rule must rearrange to cos x = for M1

Allow [1.46, 1.462] for $\frac{9.5}{6.5}$

Allow [0.68, 0.685] for $\frac{6.5}{9.5}$

Allow [9.9, 9.925] for $\sqrt{6.5^2 + 9.5^2}$

[2]

18 10.6^2 and 9^2 seen

or 112.36 and 81 seen

or 31.36

M1

$\sqrt{10.6^2 - 9^2}$

or $\sqrt{112.36 - 81}$

or $\sqrt{31.36}$ or 5.6

M1dep

M2 for

$10.6 \sin(\cos^{-1}\left(\frac{9}{10.6}\right))$

or

$9 \tan(\cos^{-1}\left(\frac{9}{10.6}\right))$

or

$10.6 \cos(\sin^{-1}\left(\frac{9}{10.6}\right))$

or

$9 \div (\tan(\sin^{-1}\left(\frac{9}{10.6}\right)))$

$\frac{1}{2}$ × 9 × their 5.6 or 25.2

oe

their 5.6 must not be 10.6 or 9

$\frac{1}{2} \times 9 \times 10.6 \times \sin(\cos^{-1}\left(\frac{9}{10.6}\right))$

or

$\frac{1}{2} \times 9 \times 10.6 \times \sin(\tan^{-1}\left(\frac{\text{their } 5.6}{9}\right))$

or

$\frac{1}{2} \times 9 \times 10.6 \times \sin(\sin^{-1}\left(\frac{\text{their } 5.6}{10.6}\right))$

M1

$\pi \times (\text{their } 5.6)^2 \div 4$

or 31.36π or [98.47, 98.54]

or 7.84π or [24.6, 24.64]

oe eg $\frac{784}{25}\pi$ *or* $\frac{196}{25}\pi$

their 5.6 must not be 10.6 or 9

M1

[49.8, 49.84]

or $7.84\pi + 25.2$ or $\frac{196}{25}\pi + 25.2$

SC4 [123.67, 123.74]

or $31.36\pi + 25.2$ *or* $\frac{784}{25}\pi + 25.2$

A1

[5]

19 C and D

B1

[1]

20 $360 \div 12$ or 30

or

$180 \times (12 - 2)$ or $12 \times 180 - 360$ or 1800

oe

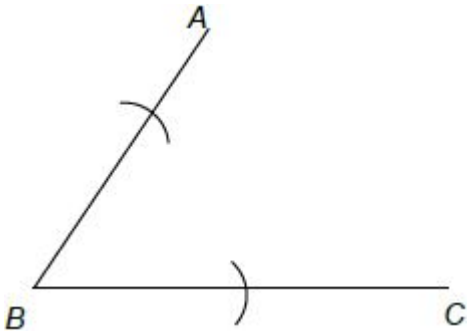
M1

150

A1

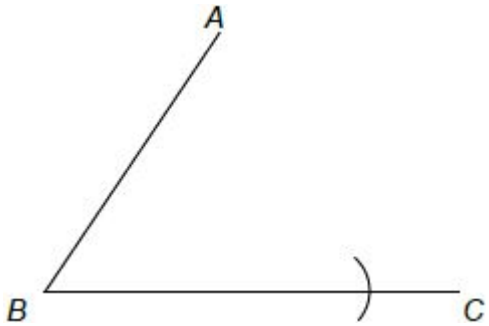
[2]

21 Two arcs with same radius, centred on *B* intersecting *BA* and *BC*



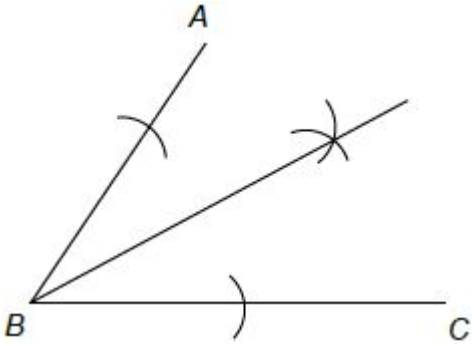
tolerance ± 2 mm

may be seen as one arc on BC of radius 9 cm centred on B



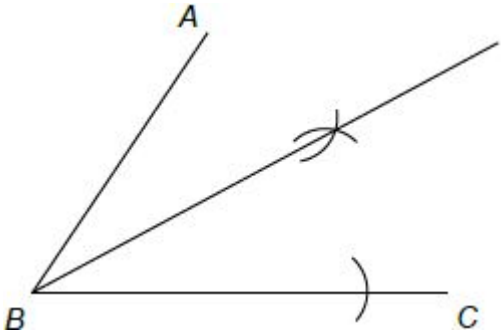
M1

Correct construction with all arcs shown in tolerance



tolerance ± 2 mm

may be seen with one arc on BC of radius 9 cm centred on B



A1

Additional Guidance

BA, *BC* arcs from incorrect method e.g. perpendicular bisector

M0

[2]