High School Mathematics Test 2014

Year 8

Area

Non Calculator Section

Skills and Knowledge Assessed:

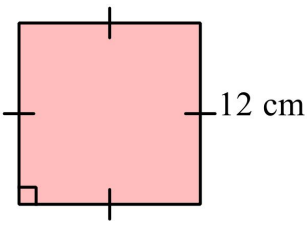
- Find ~~perimeters and~~ areas of parallelograms, trapeziums, rhombuses and kites (ACMMG196)
- Investigate the relationship between features of circles such as ~~circumference,~~ area, radius and diameter. Use formulas to solve problems involving ~~circumference and~~ area (ACMMG197)
- Choose appropriate units of measurement for area ~~and volume~~ and convert from one unit to another (ACMMG195)
- Establish the formulas for areas of rectangles, triangles and parallelograms and use these in problem solving (ACMMG159)

Name_____

Answer all questions in the spaces provided on this test paper by:
Writing the answer in the box provided.
or
Shading in the bubble for the correct answer from the four choices provided.
*Show any working out on the test paper. Calculators are **not** allowed.*

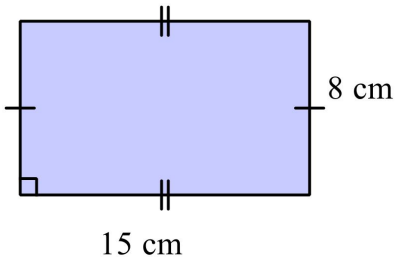
1. What is the area of the square shown?

Area = ☐ cm^2.



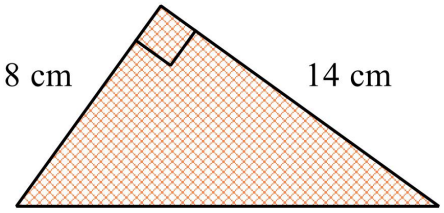
2. Find the area of this rectangle.

- ☐ 46 cm^2
- ☐ 60 cm^2
- ☐ 90 cm^2
- ☐ 120 cm^2



3. What is the area of the triangle?

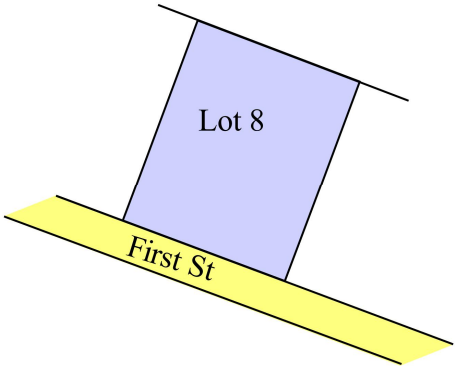
Area = ☐ cm^2.



4. **Questions 4 and 5 refer to the following:**
A rectangular block of land measures 100 m by 250 m.

What is its area in square metres?

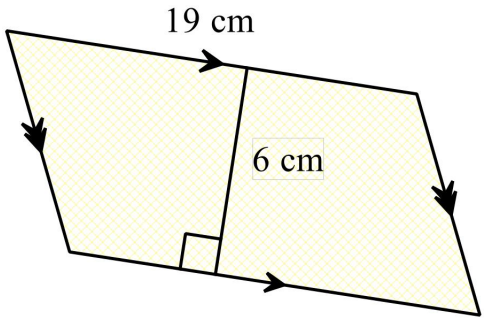
- ☐ 7 000 m^2
- ☐ 25 000 m^2
- ☐ 50 000 m^2
- ☐ 250 000 m^2



5. What is the area of the block of land in hectares?

Area = ☐ hA.

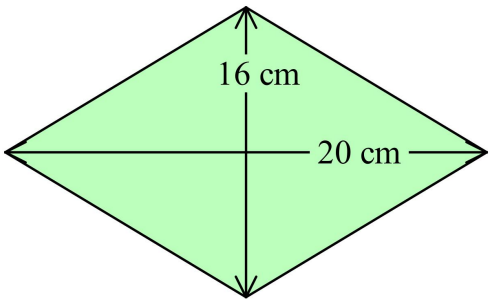
6. What is the area of the parallelogram shown?



Area = ☐ cm^2.

7. What is the area or the rhombus?

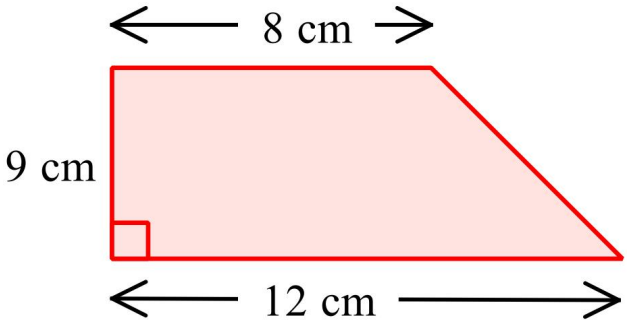
- ☐ 80 cm^2
- ☐ 160 cm^2
- ☐ 320 cm^2
- ☐ 480 cm^2



8. A trapezium has the dimensions shown.

What is its area?

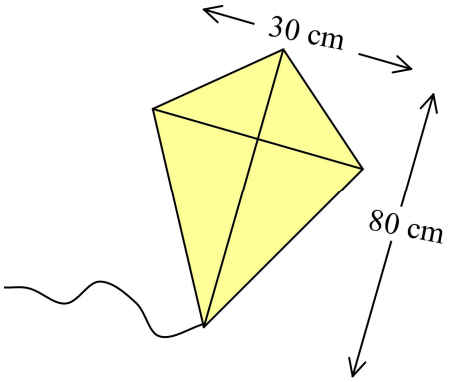
- ☐ 45 cm^2
- ☐ 90 cm^2
- ☐ 180 cm^2
- ☐ 360 cm^2



9. Tempe builds a kite from sticks and fabric in the dimensions shown.

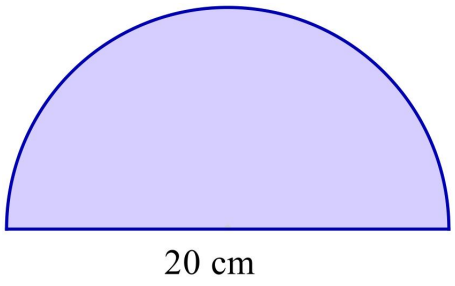
What area of fabric is needed?

Area = ☐ cm^2.



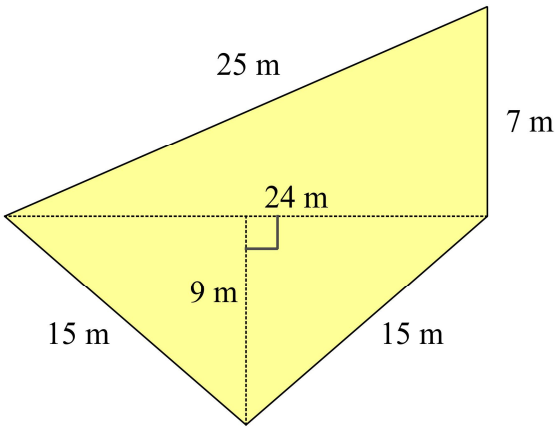
10. Find the area of this semicircle in terms of π.

- ☐ 25π cm^2
- ☐ 50π cm^2
- ☐ 100π cm^2
- ☐ 120π cm^2



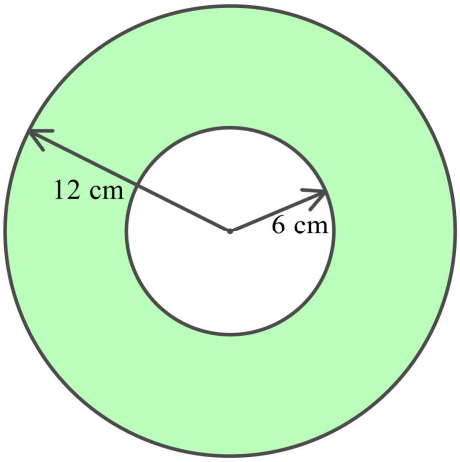
11. What is the area of the quadrilateral?

- ☐ 150 m^2
- ☐ 192 m^2
- ☐ 264 m^2
- ☐ 384 m^2



12. What is the area between the two circles?

- ☐ 36π cm^2
- ☐ 72π cm^2
- ☐ 108π cm^2
- ☐ 180π cm^2

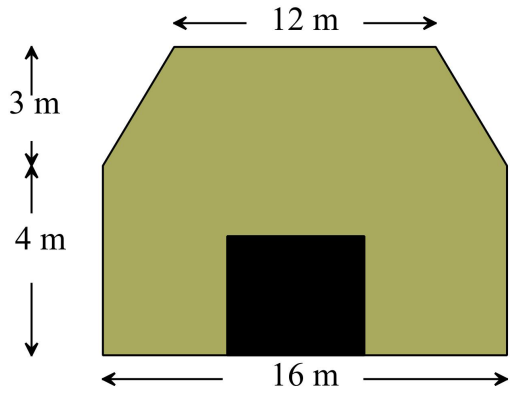


13. The front of a barn is in the shape shown.

The door measures 2m by 2.5 m and is not to be painted.

What is the area to be painted?

Area = ☐ m^2.

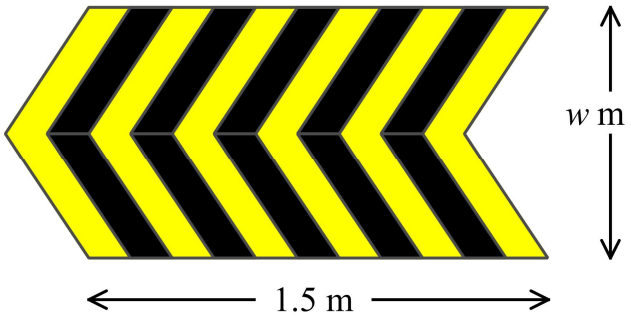


14. A warning sign is in the shape of an arrow made up of two parallelograms, as shown.

The length of one edge of the sign is 1.5 m and it has an area of 1.8 m^2.

What is the width of the sign (marked *w*)?

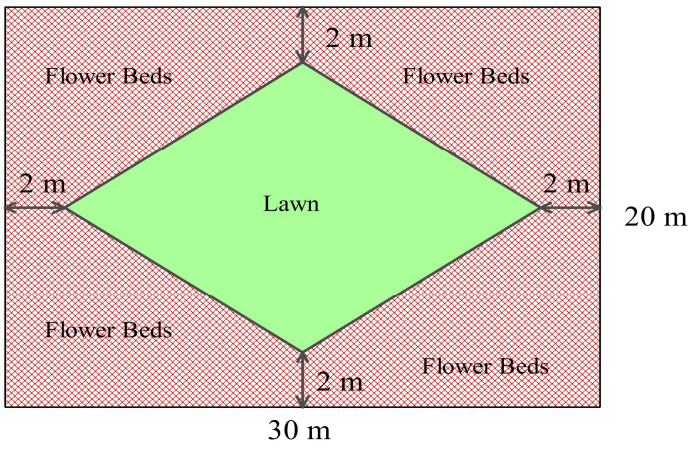
Width = ☐ m



15. A rectangular garden which measures 20 m by 30 m has flower beds which surround a diamond shaped lawn.

What is the area of flower beds?

Area = ☐ m^2.



High School Mathematics Test 2014

Year 8

Area

Calculator Allowed Short Answer Section

Name_____

Answer all questions in the spaces provided on this test paper by:
Writing the answer in the box provided.
or
Shading in the bubble for the correct answer from the four choices provided.
Show any working out on the test paper. Calculators are allowed.

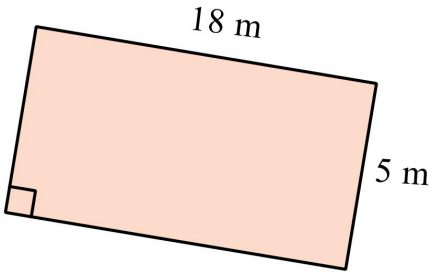
1. A square field has an area of 2 304 m^2.

   What is the length of the sides of the field?

   - ☐ 48 m
   - ☐ 96 m
   - ☐ 288 m
   - ☐ 576 m

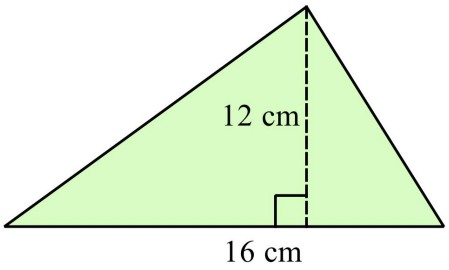
2. What is the area of this rectangle?

   ☐ m^2.



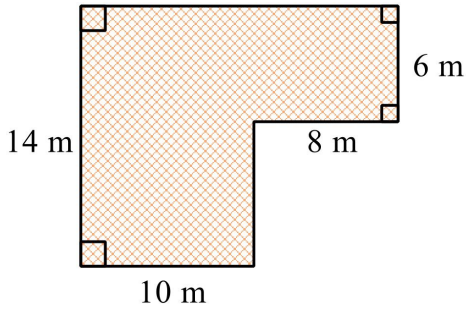
3. Find the area of this triangle.

   - ☐ 28 cm^2
   - ☐ 36 cm^2
   - ☐ 96 cm^2
   - ☐ 192 cm^2



4. What is the area of this shape?

- ☐ 38 m^2
- ☐ 172 m^2
- ☐ 188 m^2
- ☐ 252 m^2

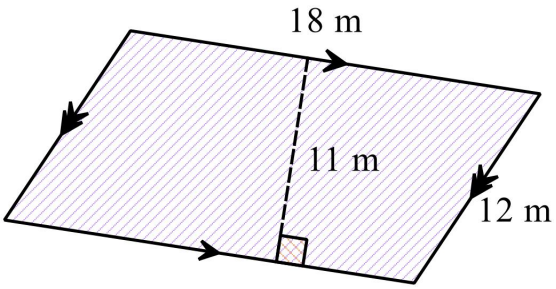


5. How many square metres are there in a square kilometre?

- ☐ 1 000 m^2
- ☐ 10 000 m^2
- ☐ 100 000 m^2
- ☐ 1000 000 m^2

6. What is the area of the parallelogram shown?

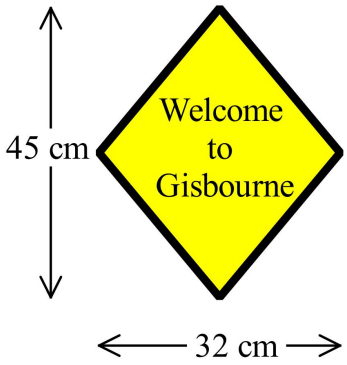
- ☐ 198 m^2
- ☐ 216 m^2
- ☐ 414 m^2
- ☐ 2 376 m^2



7. A sign is in the shape of a rhombus.

What is its area?

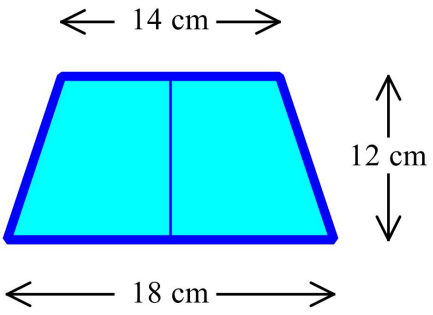
- ☐ 240 cm^2
- ☐ 480 cm^2
- ☐ 720 cm^2
- ☐ 1 440 cm^2



8. The window shown is in the shape of a trapezium

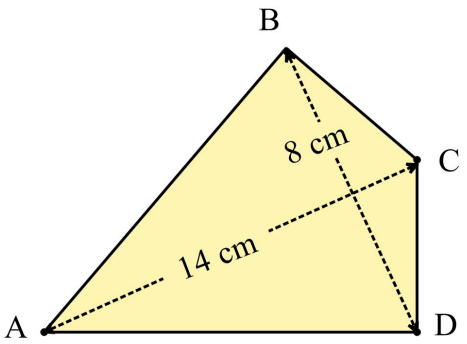
What is its area?

☐ cm^2.



9. What is the area of the kite ABCD?

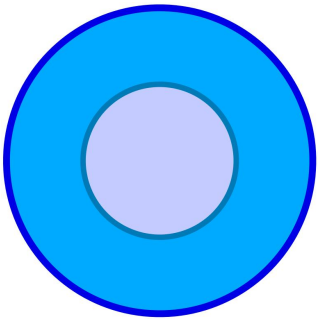
Area = ☐ cm^2.



10. The circular plate has a diameter of 18 cm.

What is its area?

- ☐ 127 cm^2
- ☐ 254 cm^2
- ☐ 509 cm^2
- ☐ 1 018 cm^2

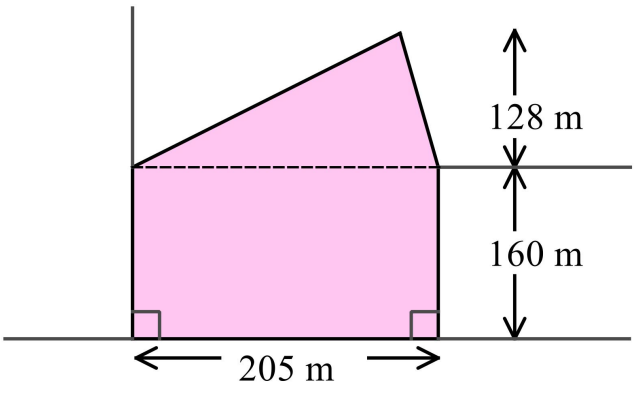


11. A circle has an area of 18 m^2.
What is its radius, correct to the nearest half centimetre?

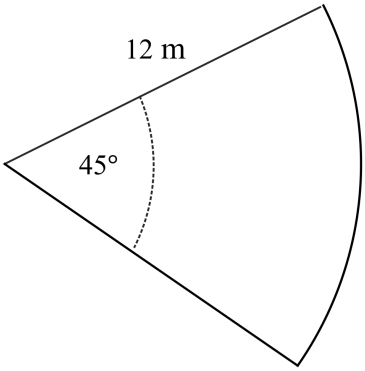
Radius = ☐ cm

12. Find the area of the plot of land which is shaded (to the nearest tenth of a hectare).

Area = ☐ ha



13. What is the area of this sector of a circle (correct to one decimal place)?



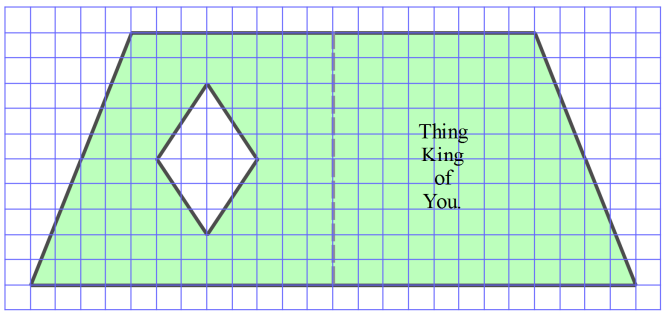
- ☐ 56.5 cm^2
- ☐ 113.1 cm^2
- ☐ 226.2 cm^2
- ☐ 453.4 cm^2

14. A greeting card is moulded in the shape of a trapezium with a rhomboid window in it.

The card is shown as it is produced, before folding along the line indicated.

It is shown overlaid by a 1 cm grid.

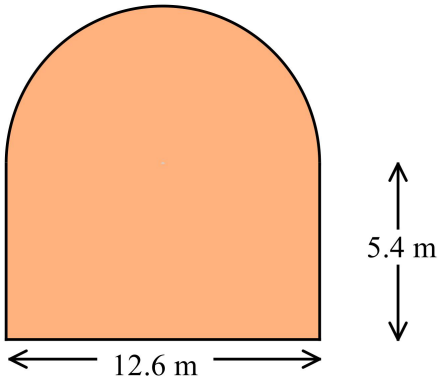
What is the area of the card?



Area = ☐ cm^2.

15. The rear wall of a chapel is in the shape shown.

What is the area of the wall (correct to two decimal places)?



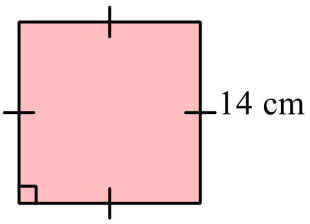
- ☐ 62.34 m^2
- ☐ 68.04 m^2
- ☐ 124.69 m^2
- ☐ 130.38 m^2

High School
Mathematics Test 2014

Area
ANSWERS

Non Calculator Section (1 mark each)

1. What is the area of the square shown?

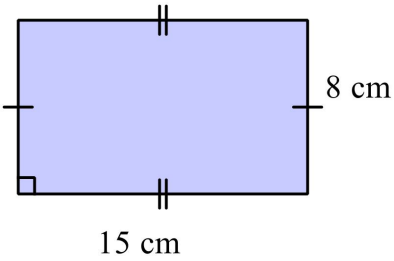


$A = 112 \times 12 = 144 \text{ cm}^2$

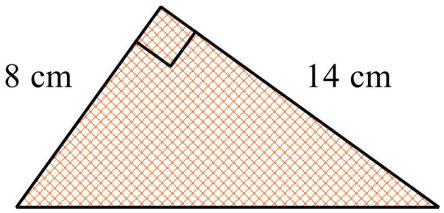
144 cm^2.

2. Find the area of this rectangle.

- ☐ 46 cm^2
- ☐ 60 cm^2 $A = 8 \times 15 = 120 \text{ cm}^2$
- ☐ 90 cm^2
- ■ 120 cm^2



3. What is the area of the triangle?



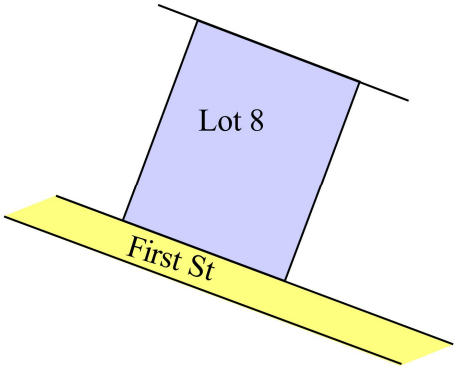
$A = \frac{1}{2} \times 8 \times 14 = 56 \text{ cm}^2$

56 cm^2.

4. **Questions 4 and 5 refer to the following:**
A rectangular block of land measures 100 m by 250 m.

What is its area in square metres?

- ☐ 7 000 m^2
- ■ 25 000 m^2 $A = 100 \times 250 = 25000\ m^2$
- ☐ 50 000 m^2
- ☐ 250 000 m^2



5. What is the area of the block of land in hectares?

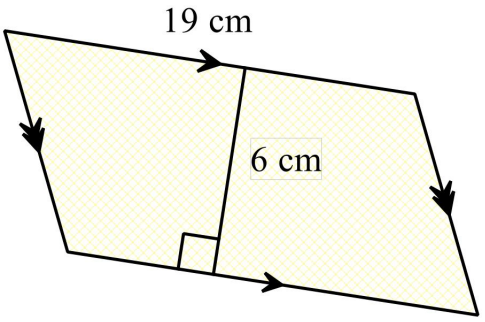
$A = 25000 \div 10\,000 = 2.5$ hA

Area = 2.5 hA.

6. What is the area of the parallelogram shown?

$A = 6 \times 19 = 114$ cm^2

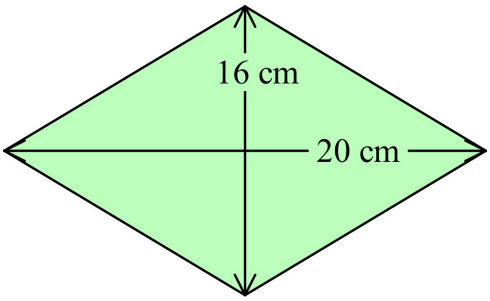
Area = 114 cm^2.



7. What is the area or the rhombus?

- ☐ 80 cm^2
- ■ 160 cm^2
- ☐ 320 cm^2
- ☐ 480 cm^2

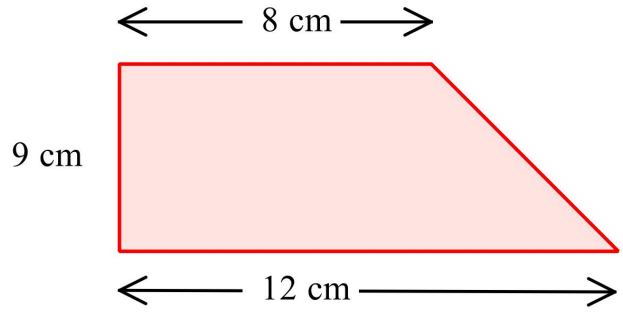
$A = \frac{1}{2} \times 16 \times 20 = 16 \times 10$
$= 160$ cm^2



8. A trapezium has the dimensions shown.

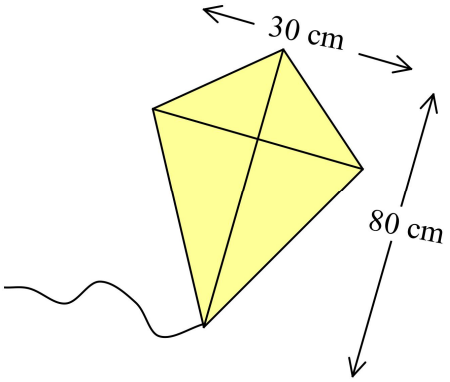
What is its area? $A = \frac{1}{2} \times 9(8 + 12)$

- ☐ 45 cm^2 $= \frac{1}{2} \times 9 \times 20$
- ■ 90 cm^2 $= 10 \times 9$
- ☐ 180 cm^2 $= 90$ cm^2
- ☐ 360 cm^2



9. Tempe builds a kite from sticks and fabric in the dimensions shown.

What area of fabric is needed?



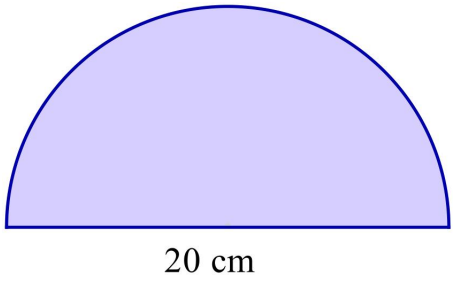
1 200 cm^2.

$A = \frac{1}{2} \times 30 \times 80$
$= 30 \times 40$
$= 1200 \text{ cm}^2$

10. Find the area of this semicircle in terms of π.

- ☐ 25π cm^2
- ■ 50π cm^2
- ☐ 100π cm^2
- ☐ 120π cm^2

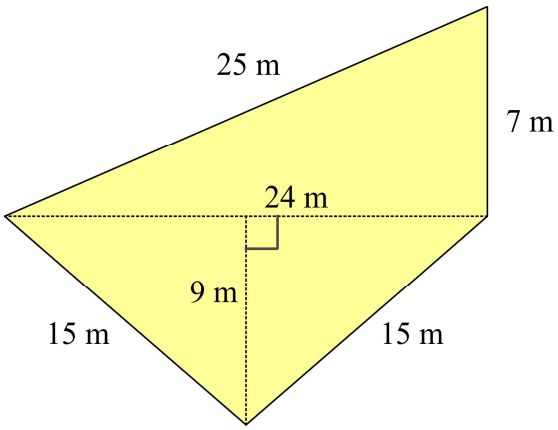
Area $= \frac{\pi r^2}{2}$
$= \frac{\pi \times 10^2}{2}$
$= \frac{100\pi}{2}$
$= 50\pi$



11. What is the area of the quadrilateral?

- ☐ 150 m^2
- ■ 192 m^2
- ☐ 264 m^2
- ☐ 384 m^2

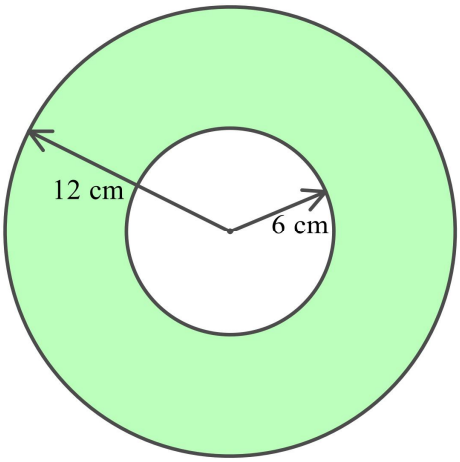
Area $= \frac{1}{2} \times 24 \times 7 + \frac{1}{2} \times 24 \times$
$= 84 + 108$
$= 192 \text{ m}^2$



12. What is the area

- ☐ 36π c...
- ☐ 72π cm^2
- ■ 108π cm^2
- ☐ 180π cm^2

Area $= \pi \times 12^2 - \pi \times 6^2$
$= 144\pi - 36\pi$
$= 108\pi$



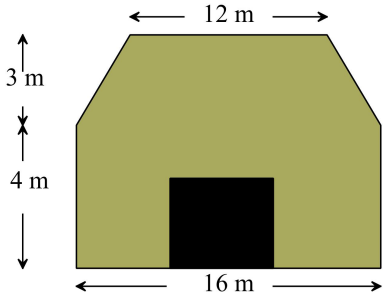
13. The front of a barn is in the shape shown.

The door measures 2m by 2.5 m and is not to be painted.

What is the area to be painted?

$$\text{Area} = 4 \times 16 + \frac{3}{2}(12 + 16) - 2 \times 2.5$$
$$= 64 + 42 - 5$$
$$= 101\ m^2$$

Area = 101

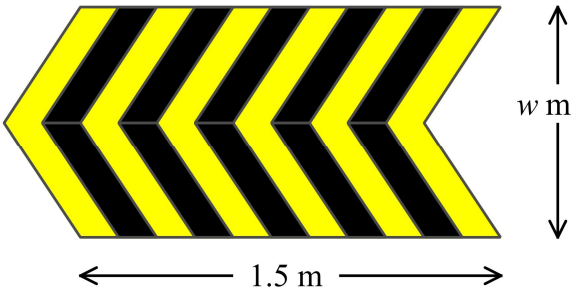


14. A warning sign is in the shape of an arrow made up of two parallelograms, as shown.

The length of one edge of the sign is 1.5 m and it has an area of 1.8 m^2.

What is the width of the sign (marked w)?

Width = 1.2 m



$$\text{Area parallelogram} = \frac{1.8}{2} = 0.9$$

$$0.9 = 1.5 \times x \text{ (where } x \text{ is } \frac{w}{2})$$

$$x = \frac{0.9}{1.5} = \frac{9}{15} = \frac{3}{5} = 0.6$$

$$w = 0.6 \times 2 = 1.2\ m$$

15. A rectangular garden which measures 20 m by 30 m has flower beds which surround a diamond shaped lawn.

What is the area of flower beds?

Lawn $d_1 = 30 - 2 \times 2 = 26$

Lawn $d_2 = 20 - 2 \times 2 = 16$

$$\text{Area Lawn} = \frac{1}{2} \times 16 \times 26$$

$$= 8 \times 26 = 208\ m^2$$

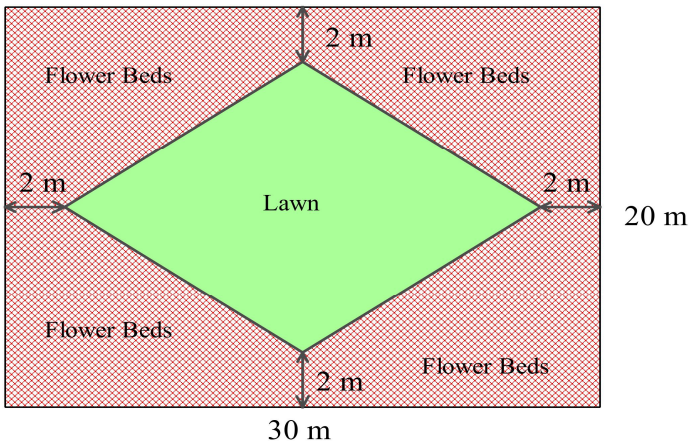
Area whole garden $= 30 \times 20$

$= 600\ m^2$

Area Beds $= 600 - 208$

$= 392\ m^2$

Area = 392 m^2.



High School
Mathematics Test 2014

Calculator Allowed Short Answer Section (1 mark each)

1. A square field has an area of 2 304 m^2.

What is the length of the sides of the field?

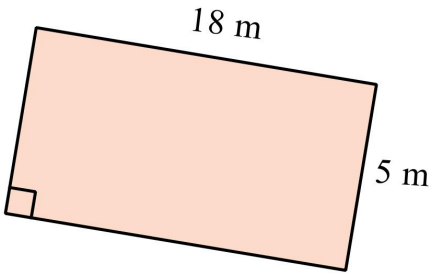
- [x] 48 m
- [ ] 96 m
- [ ] 288 m
- [ ] 576 m

$s = \sqrt{2304} = 48\ m$

2. What is the area of this rectangle?

$A = 18 \times 5 = 90\ m^2$

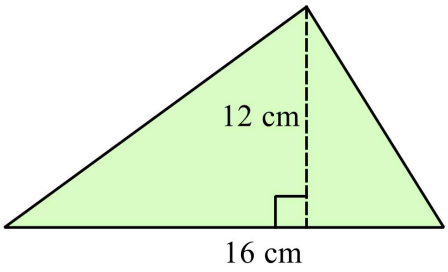
90 m^2.



3. Find the area of this triangle.

- [ ] 28 cm^2
- [ ] 36 cm^2
- [x] 96 cm^2
- [ ] 192 cm^2

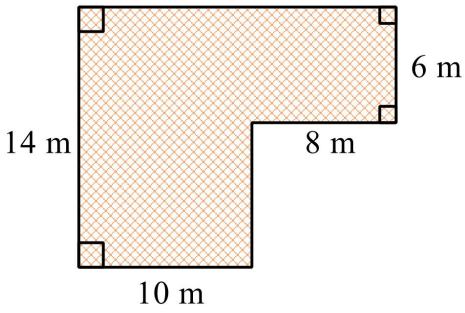
$A = \frac{1}{2} \times \frac{16}{12} = 96\ cm^2$



4. What is the area of this shape?

- [ ] 38 m^2
- [ ] 172 m^2
- [x] 188 m^2
- [ ] 252 m^2

Area = $14 \times 10 + 8 \times 6$
$= 140 + 48$
$= 188\ m^2$



5. How many square metres are there in a square kilometre?

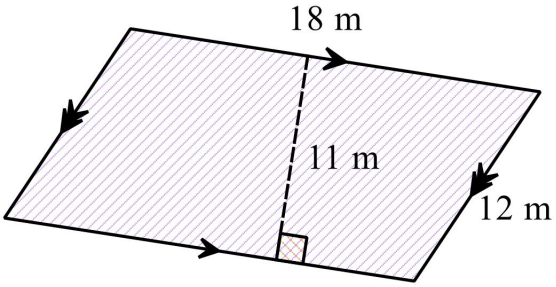
- ☐ 1 000 m^2
- ☐ 10 000 m^2
- ☐ 100 000 m^2
- ■ 1000 000 m^2

$1\ km^2 = 1000m \times 1000m$
$= 1\ 000\ 000\ m^2$

6. What is the area of the parallelogram shown?

- ■ 198 m^2
- ☐ 216 m^2
- ☐ 414 m^2
- ☐ 2 376 m^2

Area = 18×11
$= 198\ m^2$

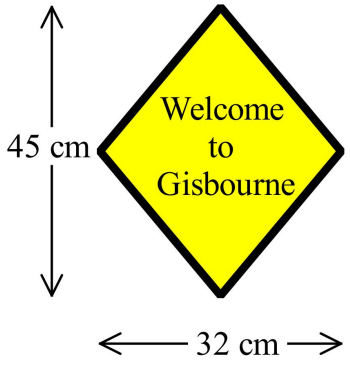


7. A sign is in the shape of a rhombus.

What is its area?

- ☐ 240 cm^2
- ☐ 480 cm^2
- ■ 720 cm^2
- ☐ 1 440 cm^2

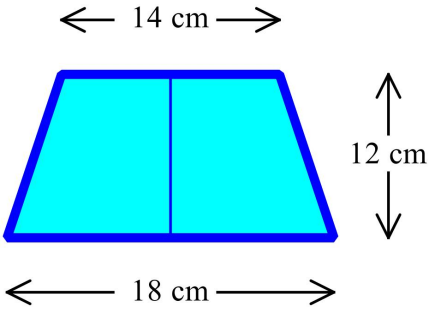
Area = $\frac{1}{2} \times 45 \times 32$
$= 720\ m^2$



8. The window shown is

What is its area?

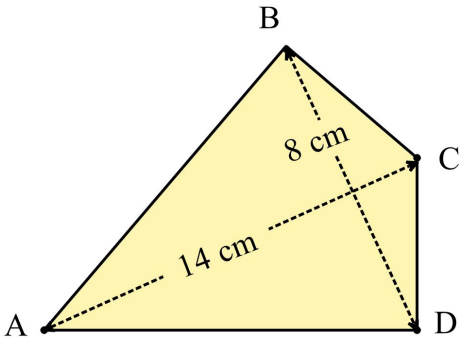
Area = $\frac{12}{2}(14 + 18)$
$= 6(32)$
$= 192\ cm^2$



9. What is the area of the kite ABCD?

Area = [126] cm^2.

Area = $\frac{1}{2} \times 14 \times 8$
$= 56\ cm^2$



10. The circular plate has a diameter of 18 cm.

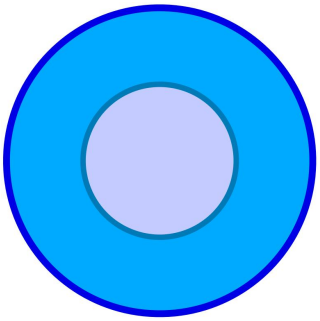
What is its area?

- ☐ 127 cm^2
- ■ 254 cm^2
- ☐ 509 cm^2
- ☐ 1 018 cm^2

$d = 18$ so $r = 9$

Area $= \pi \times 9^2$

$= 254.46\text{cm}^2$



11. A circle has an area of 1. ... .

What is its radius, correct to the nearest half centimetre?

Radius = 2.5 cm

Area $= \pi r^2$

$18 = \pi \times r^2$

$r^2 = \frac{18}{\pi} = 5.729...$

$r = 2.393$

= 2.5 cm (nearest half cm)

12. Find the area of the plot of land which is shaded (to the nearest tenth of a hectare).

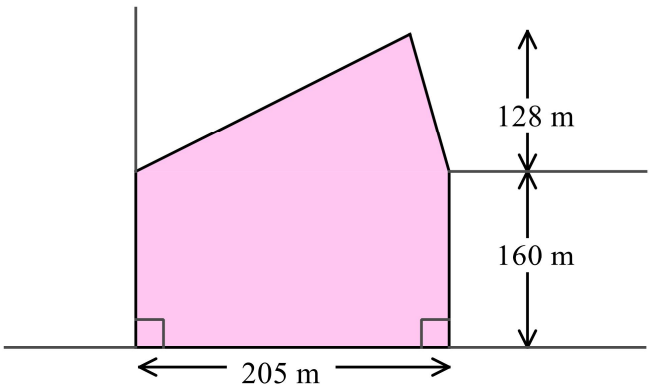
Area $= 205 \times 160 + \frac{1}{2} \times 205 \times 128$

$= 32800 + 13120$

$= 45920\ \text{m}^2$

$= 4.6$ hA

Area = 4.6 ha



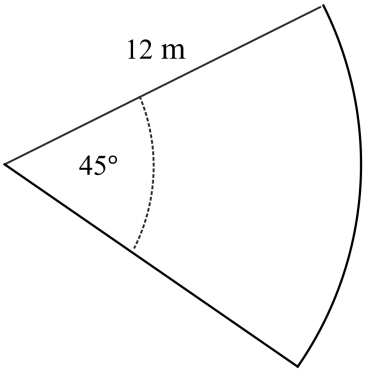
13. What is the area of this sector of a circle (correct to one decimal place)?

- ■ 56.5 cm^2
- ☐ 113.1 cm^2
- ☐ 226.2 cm^2
- ☐ 453.4 cm^2

Sector of $45° = \frac{1}{8}$ of circle

Area $= \frac{1}{8} \times \pi \times 12^2$

$= 56.548\ \text{m}^2$



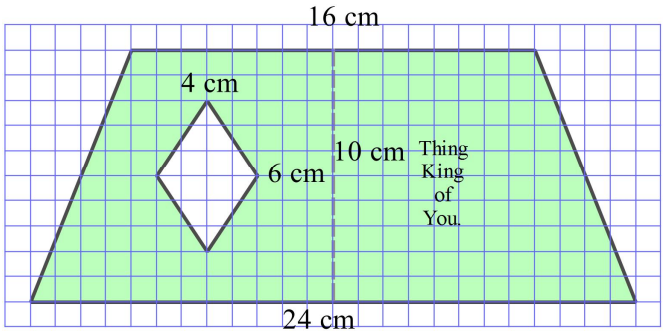
14. A greeting card is moulded in the shape of a trapezium with a rhomboid window in it.

The card is shown as it is produced, before folding along the line indicated.

It is shown overlaid by a 1 cm grid.

What is the area of the card?

Area = 188 cm^2.



Count grid to get dimensions shown.

$$\text{Area} = \frac{10}{2}(16 + 24) - \frac{1}{2} \times 6 \times 4$$
$$= 5(40) - 12$$
$$= 200 - 12$$
$$= 188\text{cm}^2$$

15. The rear wall of a chapel is in the shape shown.

What is the area of the wall (correct to two decimal places)?

- ☐ 62.34 m^2
- ☐ 68.04 m^2
- ☐ 124.69 m^2
- ■ 130.38 m^2

$$\text{Area} = 12.6 \times 5.4 + \frac{1}{2} \times \pi \times 6.3^2$$
$$= 68.04 + 62.344$$
$$= 130.38\ \text{m}^2$$