High School
Mathematics Test 2014

Area of Plane Shapes

Non Calculator

Skills and Knowledge Assessed:
- Find perimeters and areas of parallelograms, trapeziums, rhombuses and kites (ACMMG196)
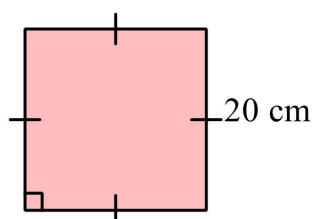- Calculate the areas of composite shapes (ACMMG216)

Name_____

Section 1   Short Answer Section

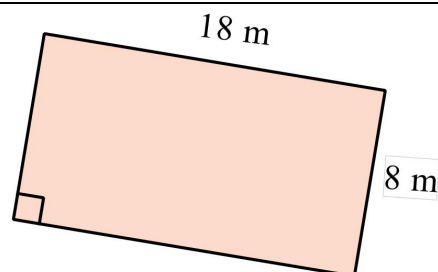Write all working and answers in the spaces provided on this test paper.

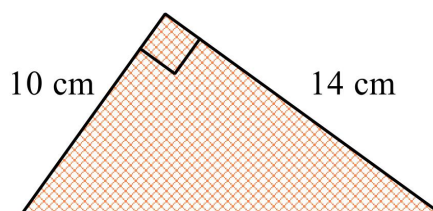|	
1.	What is the area of the square shown?

…………………………………………………..

…………………………………………………

20 cm

2.	What is the area of this rectangle?

…………………………………………………..

…………………………………………………

18 m

8 m

3.	What is the area of the triangle?

…………………………………………………..

…………………………………………………

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10 cm   14 cm

4.	What is the area of the rhombus?

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12 cm

18 cm
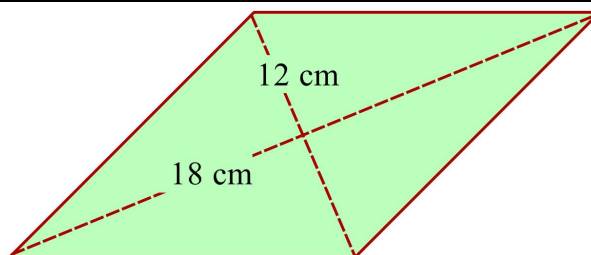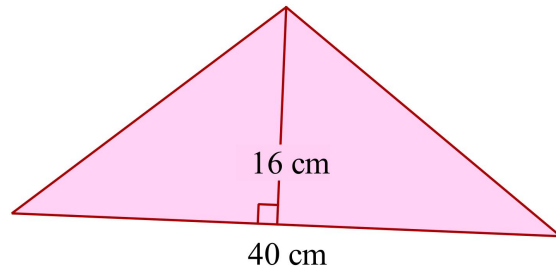
5.	What is the area of the triangle? …………………………………….. …………………………………… ……………………………………..	16 cm 40 cm
6.	What is the area of the trapezium? …………………………………….. …………………………………… …………………………………….. ……………………………………..	12 cm 12 cm 15 cm
7.	What is the area of the parallelogram shown? …………………………………….. …………………………………… …………………………………….. ……………………………………..	19 cm 6 cm
8.	Andrew builds a kite from sticks and fabric in the dimensions shown. What area of fabric is needed? …………………………………….. …………………………………… …………………………………….. ……………………………………..	30 cm 80 cm
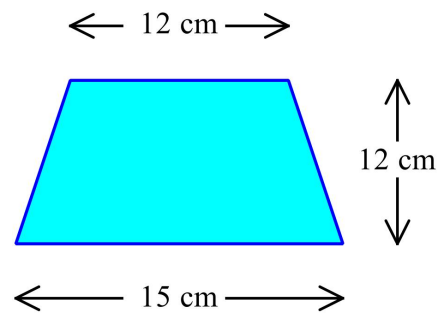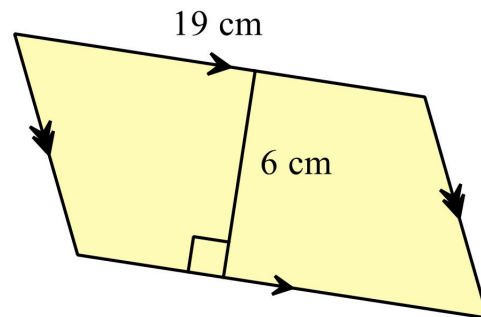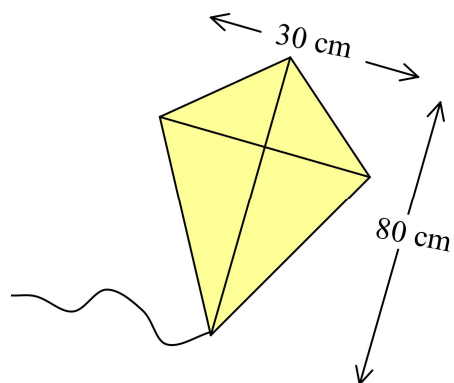
9.	What is the area of the shape shown?

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....

....

9 cm

14 cm

16 cm

12 cm
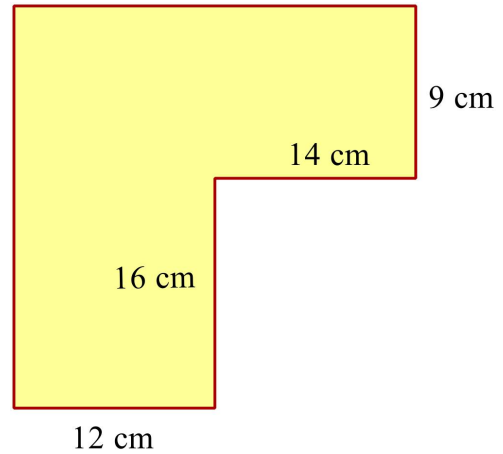
10.	A circle has an area of 48 m². Give an approximation for its radius.

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

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20 cm
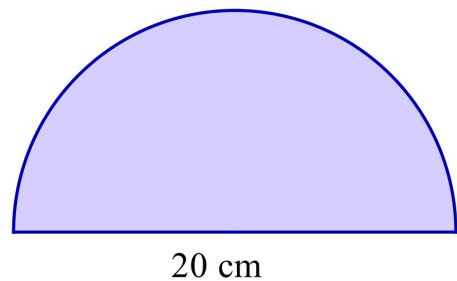
12.	A warning sign is in the shape of an arrow made up of two parallelograms, as shown. The length of one edge of the sign is 2.4 m and it has an area of 3.6 m². What is the width of the sign (marked *w*)?

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....

w m

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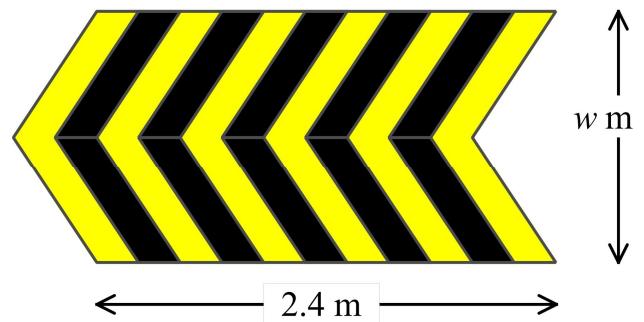
13.	A rectangular garden which measures 20 m by 30 m has flower beds which surround a diamond shaped lawn.

What is the area of flower beds?

…………………………………………………..
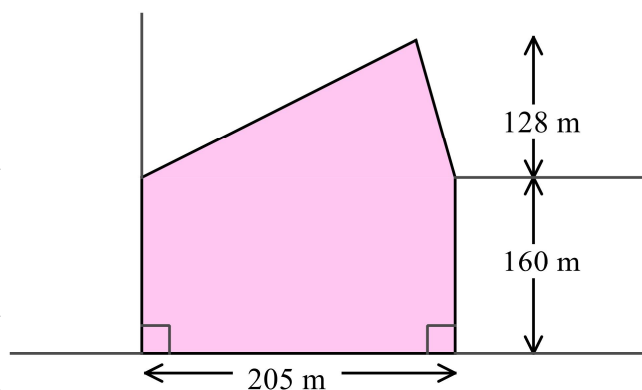
…………………………………………………

…………………………………………………..

………………………………………………….. |

2 m

Flower Beds   Flower Beds

2 m   2 m

Lawn   20 m

Flower Beds

Flower Beds

2 m

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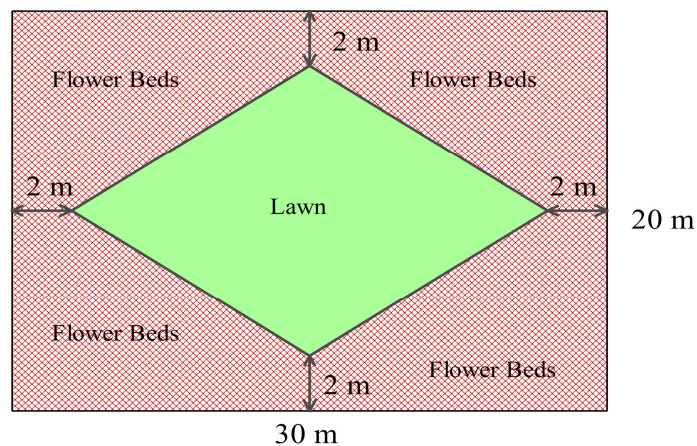
14.	Find the area of the plot of land which is shaded (to the nearest tenth of a hectare).

…………………………………………………..

…………………………………………………

…………………………………………………..

………………………………………………….. |

128 m

160 m

205 m

15.	What is the area of this shape?
Use $3\frac{1}{7}$ as an approximation for π

…………………………………………………..

…………………………………………………

…………………………………………………..

………………………………………………….. |

14 m

8 m

26 m

4
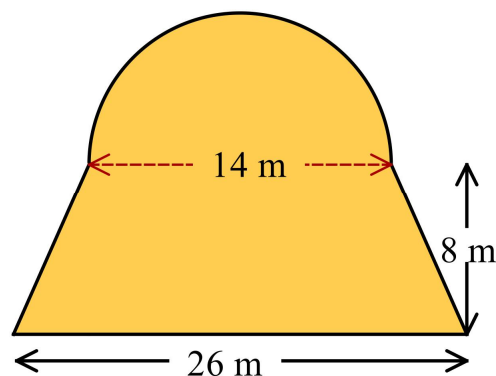
High School
Mathematics Test 2014

Year 9	*Area of Plane Shapes*	**Calculator Allowed**
		Name_____

Section 2   Multiple Choice Section

Mark all your answers on the accompanying multiple choice answer sheet, not on this test paper. You may do any working out on this test paper. Calculators are allowed for this section.

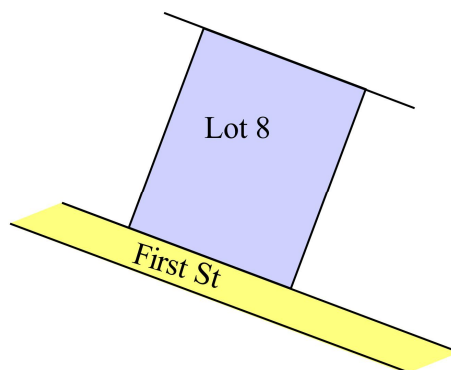---

1. Find the area of this rectangle.

    A.   46 cm^2

    B.   60 cm^2

    C.   90 cm^2

    D.   120 cm^2

8 cm

15 cm
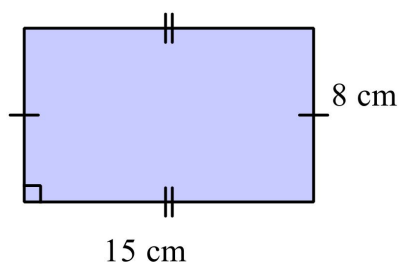
Questions 2 and 3 refer to the following:
A rectangular block of land measures 200 m by 250 m.

Lot 8

First St

2. What is its area in square metres?

    A.   900 m^2

    B.   5 000 m^2

    C.   50 000 m^2

    D.   500 000 m^2

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

    A.   0.5 ha

    B.   5 ha

    C.   50 ha

    D.   90 ha

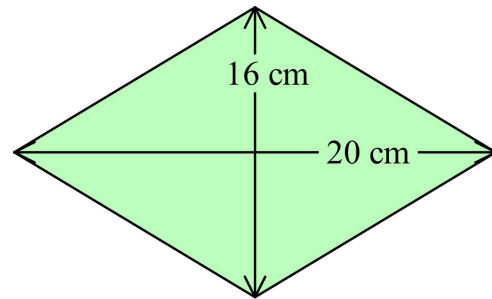|	

4.	A square field has an area of 3 136 m^2.
	
	What is the length of the sides of the field?
	
	   A. 56 m
	   B. 84 m
	   C. 112 m
	   D. 784 m
		3 136 m^2
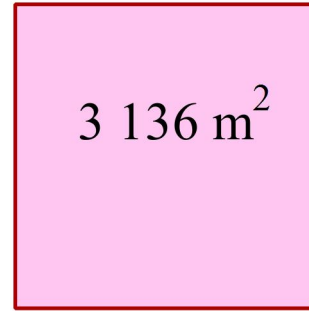
5.	Find the area of this triangle.
	
	   A. 28 cm^2
	   B. 36 cm^2
	   C. 96 cm^2
	   D. 192 cm^2
		12 cm
		16 cm
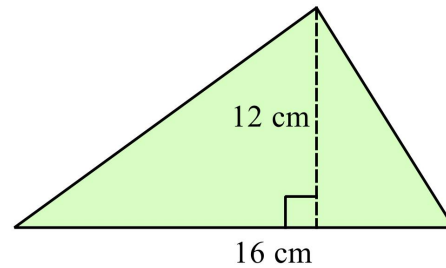
6.	What is the area or the rhombus?
	
	   A. 80 cm^2
	   B. 160 cm^2
	   C. 320 cm^2
	   D. 480 cm^2
		16 cm
		20 cm

7.	A trapezium has the dimensions shown.
	
	What is its area?
	
	   A. 45 cm^2
	   B. 90 cm^2
	   C. 180 cm^2
	   D. 360 cm^2
		8 cm
		9 cm
		12 cm
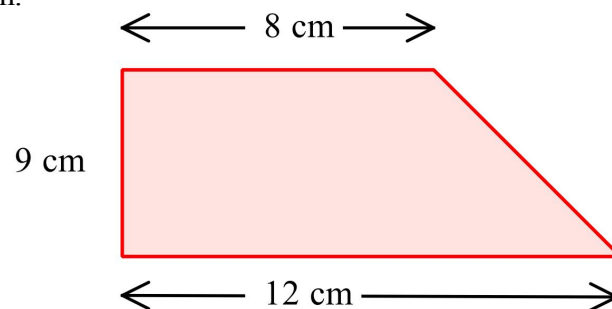
| 8. | The circular plate has a diameter of 18 cm.

What is its area?

   A.   254 cm^2
   B.   381 cm^2
   C.   509 cm^2
   D.   1 018 cm^2 | |

| 9. | What is the area of this shape?
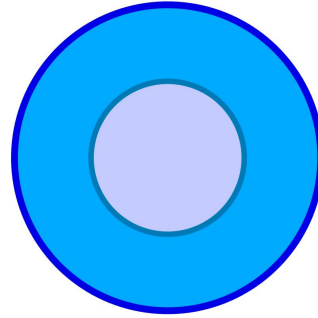
   A.   38 m^2
   B.   172 m^2
   C.   188 m^2
   D.   252 m^2 | |

| 10. | How many square metres are there in a square kilometre?
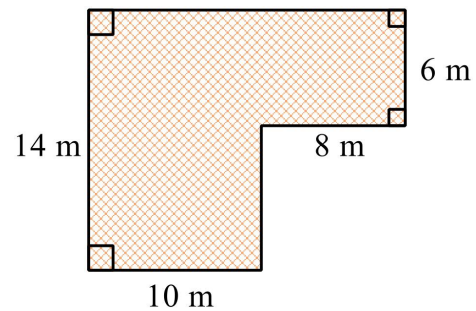
   A.   1 000 m^2
   B.   10 000 m^2
   C.   100 000 m^2
   D.   1000 000 m^2 | |

| 11. | What is the area of the quadrilateral?

   A.   150 m^2
   B.   192 m^2
   C.   264 m^2
   D.   384 m^2 | |
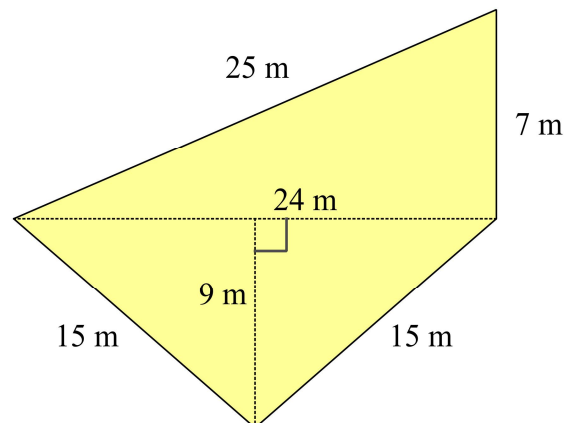
12.	What is the area between the two circles (in terms of π)?

A. $36\pi \ \text{cm}^2$

B. $72\pi \ \text{cm}^2$

C. $108\pi \ \text{cm}^2$

D. $180\pi \ \text{cm}^2$

12 cm   6 cm
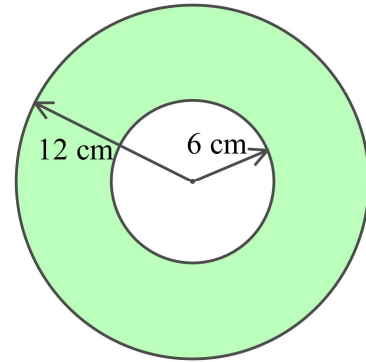
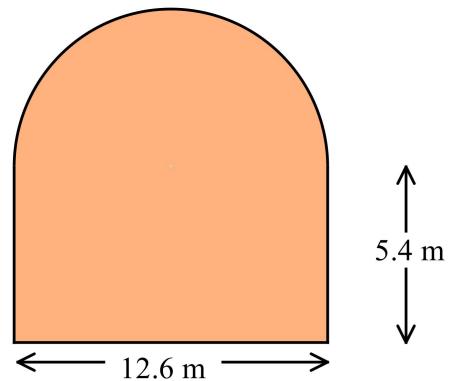| 13.	What is the area of this sector of a circle (correct to one decimal place)?

A. $56.5 \ \text{cm}^2$

B. $113.1 \ \text{cm}^2$

C. $226.2 \ \text{cm}^2$

D. $453.4 \ \text{cm}^2$

12 m

45°
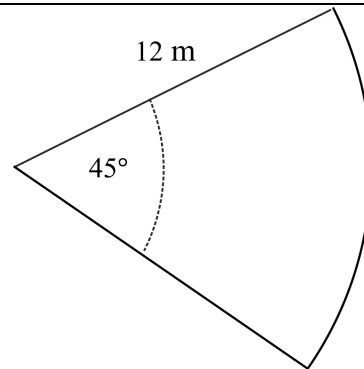
14.	The rear wall of a chapel is in the shape shown.

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

A. $62.34 \ \text{m}^2$

B. $124.69 \ \text{m}^2$

C. $130.38 \ \text{m}^2$

D. $192.73 \ \text{m}^2$

5.4 m

12.6 m

| 15. | Kayleigh designs a shape for part of a sculpture. The shape is a trapezium with a kite cut out of it and is made from plywood.

She wants to paint the piece using tubes of paint that cover 2 000 cm^2 per tube.

How many tubes will she need to paint the piece of plywood on **both** sides?

    A.   5 tubes

    B.   6 tubes

    C.   10 tubes

    D.   11 tubes |

120 cm

90 cm

70 cm

50 cm

160 cm
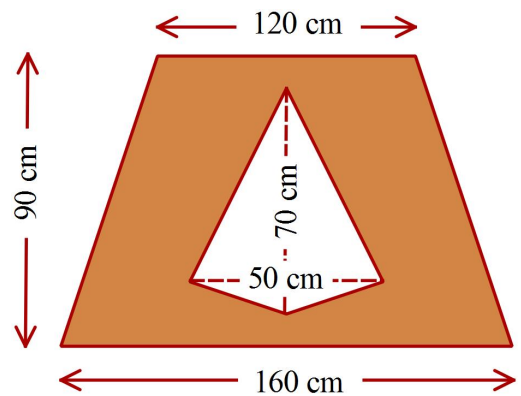
High School
Mathematics Test   2014

Area of Plane Shapes

Multiple Choice Answer Sheet

Name _____

Completely fill the response oval representing the most correct answer.

1. A ◯   B ◯   C ◯   D ◯
2. A ◯   B ◯   C ◯   D ◯
3. A ◯   B ◯   C ◯   D ◯
4. A ◯   B ◯   C ◯   D ◯
5. A ◯   B ◯   C ◯   D ◯
6. A ◯   B ◯   C ◯   D ◯
7. A ◯   B ◯   C ◯   D ◯
8. A ◯   B ◯   C ◯   D ◯
9. A ◯   B ◯   C ◯   D ◯
10. A ◯   B ◯   C ◯   D ◯
11. A ◯   B ◯   C ◯   D ◯
12. A ◯   B ◯   C ◯   D ◯
13. A ◯   B ◯   C ◯   D ◯
14. A ◯   B ◯   C ◯   D ◯
15. A ◯   B ◯   C ◯   D ◯

High School
Mathematics Test 2014
Area of Plane Shapes

ANSWERS

Section 1 (1 mark each)	
	Working and Answers
1.	$A = 20^2 = 400 \text{ cm}^2$
2.	$A = 18 \times 8 = 144 \text{ m}^2$
3.	$A = \frac{1}{2} \times 10 \times 14 = 70 \text{ cm}^2$
4.	$A = \frac{1}{2} \times 12 \times 18 = 12 \times 9 = 108 \text{ cm}^2$
5.	$A = \frac{1}{2} \times 40 \times 16 = 20 \times 16 = 320 \text{ cm}^2$
6.	$A = \frac{12}{2}(12 + 15) = 6 \times 27 = 162 \text{ cm}^2$
7.	Area = 19×6 = 114 m^2
8.	$A = \frac{1}{2} \times 30 \times 80 = 30 \times 40 = 1\,200 \text{ cm}^2$
9.	$A = 9 \times 14 + 12 \times 25$ $= 126 + 300$ $= 426 \text{ cm}^2$
10	$\pi \approx 3$ Area $= \pi \times r^2$ $48 \approx 3 \times r^2$ $r^2 \approx \frac{48}{3} \approx 16$ $r \approx 4 \text{ m}$
11	Area $= \frac{\pi r^2}{2}$ $= \frac{\pi \times 10^2}{2}$ $= \frac{100\pi}{2}$ $= 50\pi$
12	Area of one parallelogram $= \frac{3.6}{2} = 1.8$ $A = 1.8 = 2.4 \times x$ (where x is $\frac{w}{2}$) $x = \frac{1.8}{2.4} = \frac{18}{24} = \frac{3}{4} = 0.75 \text{ m}$ $w = 0.75 \times 2 = 1.5 \text{ m}$

13	Lawn d_1 = 30 − 2 × 2 = 26
	Lawn d_2 = 20 − 2 × 2 = 16
	Area Lawn = $\frac{1}{2}$ × 16 × 26
	= 8 × 26 = 208 m^2
	Area whole garden = 30 × 20
	= 600 m^2
	Area Beds = 600 − 208
	= 392 m^2
14	Area = 205 × 160 + $\frac{1}{2}$ × 205 × 128
	= 32800 + 13120
	= 45920 m^2
	= 4.6 hA
15	Area = $\frac{8}{2}$(14 + 26) + $\frac{1}{2}$ × π × 7^2
	= 4 × 40 + $\frac{1}{2}$ × $\frac{22}{7}$ × 49
	= 160 + 77
	= 237m^2

	Section 2 (1 mark each)	
	Working	Answers
1.	$A = 8 \times 15 = 120 \text{ cm}^2$	D
2.	$A = 200 \times 250 = 50\,000\ m^2$	C
3.	$A = 50000 \div 10\,000 = 5 \text{ hA}$	B
4.	$s = \sqrt{3136} = 56\ m$	A
5.	$A = \dfrac{1}{2} \times \dfrac{10}{12} = 96 \text{ cm}^2$	C
6.	$A = \dfrac{1}{2} \times 16 \times 20 = 16 \times 10$ $= 160 \text{ cm}^2$	B
7.	$A = \dfrac{1}{2} \times 9(8 + 12)$ $= \dfrac{1}{2} \times 9 \times 20$ $= 10 \times 9$ $= 90 \text{ cm}^2$	B
8.	$d = 18$ so $r = 9$ Area $= \pi \times 9^2$ $= 254.46 \text{cm}^2$	A
9.	Area $= 14 \times 10 + 8 \times 6$ $= 140 + 48$ $= 188 \text{ m}^2$	C
10.	$1 \text{ km}^2 = 1000m \times 1000m$ $= 1\,000\,000\ m^2$	D
11.	Area $= \dfrac{1}{2} \times 24 \times 7 + \dfrac{1}{2} \times 24 \times 9$ $= 84 + 108$ $= 192 \text{ m}^2$	B
12.	Area $= \pi \times 12^2 - \pi \times 6^2$ $= 144\pi - 36\pi$ $= 108\pi$	C
13.	Sector of $45° = \dfrac{1}{8}$ of circle Area $= \dfrac{1}{8} \times \pi \times 12^2$ $= 56.548 \text{ m}^2$	A
14.	Area $= 12.6 \times 5.4 + \dfrac{1}{2} \times \pi \times 6.3^2$ $= 68.04 + 62.344$ $= 130.38 \text{ m}^2$	C

15.		D
	Area Trapezium = $\frac{90}{2}$(120 + 160) = 45 × 280 = 12600 cm^2 Area Kite = $\frac{1}{2}$ × 50 × 70 = 25 × 70 = 1750 cm^2 Remaining area = 12600 – 1750 = 10850 cm^2 Area to paint = 10850 × 2 = 21700 cm^2 Number of tubes = 21700 ÷ 2000 = 10.85 = 11 tubes	

High School
Mathematics Test 2014

Area of Plane Shapes

Multiple Choice Answer Sheet

Name __ <u>Marking Sheet</u>

Completely fill the response oval representing the most correct answer.

1.　A ◯　　B ◯　　C ◯　　D ●
2.　A ◯　　B ◯　　C ●　　D ◯
3.　A ◯　　B ●　　C ◯　　D ◯
4.　A ●　　B ◯　　C ◯　　D ◯
5.　A ◯　　B ◯　　C ●　　D ◯
6.　A ◯　　B ●　　C ◯　　D ◯
7.　A ◯　　B ●　　C ◯　　D ◯
8.　A ●　　B ◯　　C ◯　　D ◯
9.　A ◯　　B ◯　　C ●　　D ◯
10.　A ◯　　B ◯　　C ◯　　D ●
11.　A ◯　　B ●　　C ◯　　D ◯
12.　A ◯　　B ◯　　C ●　　D ◯
13.　A ●　　B ◯　　C ◯　　D ◯
14.　A ◯　　B ◯　　C ●　　D ◯
15.　A ◯　　B ◯　　C ◯　　D ●