



## Free-Standing Mathematics Qualifications

# Working in 2 and 3 Dimensions *6982/2*

## Mark Scheme

### *2006 examination - June series*

Mark schemes are prepared by the Principal Examiner and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation meeting attended by all examiners and is the scheme which was used by them in this examination. The standardisation meeting ensures that the mark scheme covers the candidates' responses to questions and that every examiner understands and applies it in the same correct way. As preparation for the standardisation meeting each examiner analyses a number of candidates' scripts: alternative answers not already covered by the mark scheme are discussed at the meeting and legislated for. If, after this meeting, examiners encounter unusual answers which have not been discussed at the meeting they are required to refer these to the Principal Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of candidates' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

## Key to mark scheme and abbreviations used in marking

M	mark is for method		
m or dM	mark is dependent on one or more M marks and is for method		
A	mark is dependent on M or m marks and is for accuracy		
B	mark is independent of M or m marks and is for method and accuracy		
E	mark is for explanation		
√ or ft or F	follow through from previous		
	incorrect result	MC	mis-copy
CAO	correct answer only	MR	mis-read
CSO	correct solution only	RA	required accuracy
AWFW	anything which falls within	FW	further work
AWRT	anything which rounds to	ISW	ignore subsequent work
ACF	any correct form	FIW	from incorrect work
AG	answer given	BOD	given benefit of doubt
SC	special case	WR	work replaced by candidate
OE	OE	FB	formulae book
A2,1	2 or 1 (or 0) accuracy marks	NOS	not on scheme
-x EE	deduct x marks for each error	G	graph
NMS	no method shown	c	candidate
PI	possibly implied	sf	significant figure(s)
SCA	substantially correct approach	dp	decimal place(s)

### Application of Mark Scheme

**No method shown:**

Correct answer without working  
 Incorrect answer without working

mark as in scheme  
 zero marks unless specified otherwise

**More than one method / choice of solution:**

2 or more complete attempts, neither/none crossed out

mark both/all fully and award the mean  
 mark rounded down

1 complete and 1 partial attempt, neither crossed out

award credit for the complete solution only

**Crossed out work**

do not mark unless it has not been replaced

**Alternative solution** using a correct or partially correct method

award method and accuracy marks as  
 appropriate

**Free-Standing Mathematics Qualification****Foundation Level – Working in 2 and 3 dimensions (6982/2)****Answers and Marking Scheme****Question 1**

<b>(a)</b>	Legs of Man: 3	<b>B1</b>	
	Millennium Stone: 4	<b>B1</b>	
<b>(b)</b>	Legs of Man: 0	<b>B1</b>	
	Millennium Stone: 4	<b>B1</b>	
<b>(c)</b>	Octagon	<b>B1</b>	Allow regular octagon
	<b>TOTAL</b>	<b>5</b>	

**Question 2**

<b>(a)</b>	Circumference = $\pi d$ or $2\pi r$	<b>M1</b>	Allow values from use of alternative values for $\pi$ eg 3.142, 3.14 or $\frac{22}{7}$
	= $\pi \times 22$ or $2\pi \times 11$	<b>A1</b>	
	= 69.1....	<b>B1</b> ✓	
	= 69 (m)		Rounded correctly. Allow omission of units, but not incorrect units.
<b>(b)</b>	Diameter of model = $\frac{22 \times 100}{50}$	<b>M1</b>	Multiplying by 100
	= 44 (cm)	<b>M1</b>	Dividing by 50
		<b>A1</b>	
	<b>TOTAL</b>	<b>6</b>	

**Question 3**

<p><b>(a)</b></p>	<p>Area of rectangle = <math>54 \times 72</math> = <math>3888 \text{ (cm}^2\text{)}</math></p>	<p><b>B1</b></p>	
	<p>Height of triangle = <math>80 - 54 = 26 \text{ (cm)}</math></p>	<p><b>B1</b></p>	
<p>Area of triangle = <math>\frac{72 \times 26}{2}</math> = <math>936 \text{ (cm}^2\text{)}</math></p>	<p><b>M1</b></p>	<p>FT from their height</p>	
<p>Total area = <math>3888 + 936</math></p>	<p><b>A1</b>✓</p>	<p>Using their values.</p>	
<p>= <math>4824 \text{ cm}^2</math></p>	<p><b>B1</b>✓</p>	<p>Must give units Allow correctly rounded values.</p>	
<p><b>Alternative method</b></p> <p>Area of surrounding rectangle = <math>80 \times 72 = 5760</math> Height of triangular cut-offs = <math>26 \text{ cm}</math> Area of cut-offs = <math>2 \times \frac{36 \times 26}{2} = 2 \times 468 = 936</math></p> <p>Area of remainder = <math>5760 - 936 = 4824 \text{ cm}^2</math></p>	<p><b>M1</b></p> <p><b>A1</b>✓</p> <p><b>B1</b>✓</p>	<p>Alternative Method: Trapezium area <math>\frac{36(80 + 54)}{2}</math> M1 formula A1 correct <math>h, a, b</math> = <math>2412 \text{ (cm}^2\text{)}</math> A1 (may be implied) Total area <math>2 \times 2412</math> M1 = <math>4824 \text{ cm}^2</math> A1✓</p>	
<p>Area of surrounding rectangle = <math>80 \times 72 = 5760</math> Height of triangular cut-offs = <math>26 \text{ cm}</math> Area of cut-offs = <math>2 \times \frac{36 \times 26}{2} = 2 \times 468 = 936</math></p> <p>Area of remainder = <math>5760 - 936 = 4824 \text{ cm}^2</math></p>	<p><b>(B1)</b> <b>(B1)</b> <b>(M1)</b> <b>(A1)</b></p> <p><b>(B1)✓</b></p>	<p>M1 for <math>\frac{36 \times 26}{2}</math> A1 for <math>2 \times 468</math></p>	

<p><b>(b)</b></p>		<p><b>B1</b></p> <p><b>B1</b></p> <p><b>B1</b></p> <p><b>B1</b></p> <p><b>B1</b></p> <p><b>B1</b></p>	<p>Accuracy ± 0.1 cm</p> <p>Vertical lines of length 5.4 cm, 7.2 cm apart.</p> <p>Vertical lines of length 3.8 cm, 3.2 cm apart.</p> <p>Base of kennel and door 0.5 cm apart.</p> <p>Vertex 8 cm from base</p> <p>Semicircle, radius 1.6 cm</p> <p>Vertex and door aligned correctly</p> <p>SC1 for 3 or more scaled measurements calculated but not drawn</p>
<p><b>TOTAL</b></p>		<p><b>11</b></p>	



**Question 6**

<b>(a)</b>	Volume= $30 \times 27 \times 36$ $= 29\,160$ $\text{cm}^3$ or ml	<b>M1</b>  <b>A1</b>  <b>B1</b>	Allow M1 for 2916 seen  Units Accept 29(.160) litres
<b>(b)</b>	Area of cross section $= \pi \times 4^2$ $= 50.265\dots$  Volume= $50.265\dots \times 6$ $= 301.59\dots (\text{cm}^3)$	<b>M1</b> <b>A1</b>   <b>M1</b> <b>A1</b> ✓	May be implied by answer for volume. Allow values from use of alternative values for $\pi$ eg 3.142, 3.14 or $\frac{22}{7}$  FT from their area  Allow omission of units and values rounded to any number of sf. Allow 301, 302 (3sf) from different values of $\pi$
<b>(c)</b>	Number of hot drinks $= \frac{29160}{301.59\dots}$ $= 96.6866\dots$ $= 96$	<b>M1</b>   <b>A1</b> ✓	Using their answers to parts (a) and (b)  Must be rounded to nearest whole number below.
	<b>TOTAL</b>	<b>9</b>	
	<b>GRAND TOTAL</b>	<b>40</b>	