

# Mixed SSM 2 ms

0 min  
0 marks

1. Sight of sine M1  
125 ÷ sin 33 DM1  
*Accept 125 ÷ 33sin*  
229(.5.....) A1  
230 or 229 B1  
*Follow through any value  $\geq 4$  s.f. or calculation seen,  
e.g.  $125 \times \sin 33 = 68$  or  $68.1$*

[4]

2. AB = DC B1  
Angle EAB = Angle ECD B1,B1  
*Alternate angles or Z angles must be stated*  
Angle EBA = angle EDC  
*Alternate angles or Z angles must be stated*  
Angle AEB = Angle DEC  
*Opposite must be stated  
NB only maximum of two can be scored here.*  
Therefore congruent because ASA, AAS etc DB1  
*Dependent on first B1(AB=DC) but can be awarded if angles  
stated as equal but not justified.  
This final step is needed for full marks. Can be given in words  
e.g.  
Angle, Side, Angle*

*This is a proof and the explanation must be rigid.  
Other versions of the proof are (for example)*

Stating that ABCD a parallelogram	B1
AE = EC	B2
DE = EB	
AB = CD	
Any angles as above (with justification)	
<i>NB B marks for length are dependent on the first B1 but angles are not.</i>	
<i>NB 3 statements need to be made here to get both marks. Sides equal do not need justifying but angles do.</i>	
<i>NB if only 2 length statements are made and no other statements then give DB1</i>	
Conclusion SAS or SSS.	DB1
<i>Dependent on first B1</i>	

[4]

3. $HF^2 = 5^2 + 12^2$	M1
$DF^2 = 5^2 + 5^2 + 12^2 = 194$	
$DF = 13.9(2....)$ gets M1,A1.	
HF = 13	A1
<i>B2 if HF = 13 stated</i>	
Correct Right angled triangle DFH	M1
<i>Follow through their HF if first M1 awarded</i>	
<i>Do not accept lines on diagram joining DF and FH as evidence unless right angled marked or something done with lengths</i>	
$\tan^{-1}(5/13)$	DM1
<i>DM1 if both previous M's awarded.</i>	
<i>DM1 for appropriate ratio if other lengths used.</i>	
$=21(.0...)^{\circ}$	A1ft
<i>Ft on HF or DF only.</i>	

[5]

4. Angle APB = $82^{\circ}$	B1
$x^2 = 18^2 + 25^2 - 2 \times 18 \times 25 \times \cos 82$	M1
<i>Use of cosine rule <math>324 + 625 - 900 \cos</math> (their angle)</i>	
<i>( = <math>949 - 125.25 = 823.7....</math>)</i>	
<i>f.t their angle for M1.</i>	

$x^2 = 823.7(\dots\dots\dots)$  A1ft  
 $x = 49 \cos 82$  or  $6.81948\dots$  gets M1, A0, A0  
 $x = 28.7(\dots)$  A1ft  
*Follow through on an incorrect angle only*

[4]

**5. volume cylinder = 113.(...) cm<sup>3</sup>** **B1**  
*Accept 36π*

volume cone = 18.8(...)cm<sup>3</sup> B1  
*Accept 6π*

Volume (their cylinder – their cone) ÷ 9π M1  
*Accept 30π ÷ 9π*

3.3(3) A1  
 = 5.3(3...) A1ft

*Accept fraction. (5 1/3)*  
*f.t. iff M1 awarded.*  
*Consistent use of diameter for radius gives 144π (= 452.39) for cylinder and 24π (=75.40) for cone.*  
*Volume = 120π (376.99). Volume ÷ 36π = 3.333.. + 2 = 5.333*  
*Give B0, B1, M1, A1, A1 f.t.*  
***Hence do not give full marks if answer seen on answer line.***  
***Check working before awarding full marks.***  
***Do not accept 5 as a answer.***

[5]

**6. 1.5<sup>3</sup> (× 480)** M1

*M1 for s.f.<sup>3</sup> e.g. (1.5)<sup>3</sup> or (0.666)<sup>3</sup>*  
 $\frac{8}{27} \quad \frac{27}{8}$

= 1620 A1

ml or cm<sup>3</sup> B1

*NB 1.62 l gets M1, A1, B1.*  
*This is an independent units mark.*  
*So 720 ml gets M0, A0, B1*  
***cl and I are acceptable iff an attempt made to convert answer.***

[3]

7.  $(\pi) \times \text{radius}^2 \times 3.2 = (320 \times (\pi))$  M1  
 $\text{radius}^2 = 100$  M1  
*oe*  
 10 A1 [3]
8. (a) 100 B1  
 (b) 130 B1  
 (c) 70 seen B1  
 Full explanation. E.g  $180 - (90 + 20)$  B1  
*Minimum requirement 90 - 20* [4]
9. (a)  $BD/15 = 2/3$  M1  
 $BD = 10$  A1  
*Or equivalent eg.  $BD = 2/3 \times 15$*   
 (b) Correct use of Pythagoras M1  
 $BC = 8$  A1 f.t.  
 $\sin y = 8/10$  A1 f.t.  
*f.t. with their BD iff  $BD > 6$  for this M mark* [5]
10. (a) (i)  $OP^2 = 3^2 + 1^2$  M1  
 $OP = \sqrt{10}$  A1  
 (ii)  $x^2 + y^2 = 10$  B1 f.t.

- |     |       |   |                     |
|-----|-------|---|---------------------|
| (b) | (i)   | $90^\circ$  | B1                  |
|     | (ii)  | $1\frac{1}{3}$  | B1 f.t.             |
|     | (iii) | $-3$<br><i>f.t. from their gradient for OP</i>  | B1 f.t.             |
|     | (iv)  | $T = (0,10)$<br>$y = -3x + (\text{their 'T'})$<br>$y = -3x + 10$<br><i>f.t. from their gradient for PT (accept <math>T = 10</math>)</i><br><i>f.t. iff gradient <math>PT \neq</math> gradient <math>OP</math></i><br><i>Or equivalent</i> | B1 f.t.<br>M1<br>A1 |

[9]