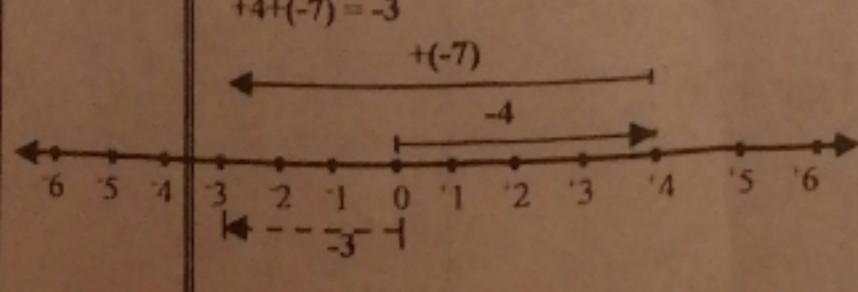


**THE SIPRO PRE-PLE SET IV MATHEMATICS MARKING GUIDE 2023**

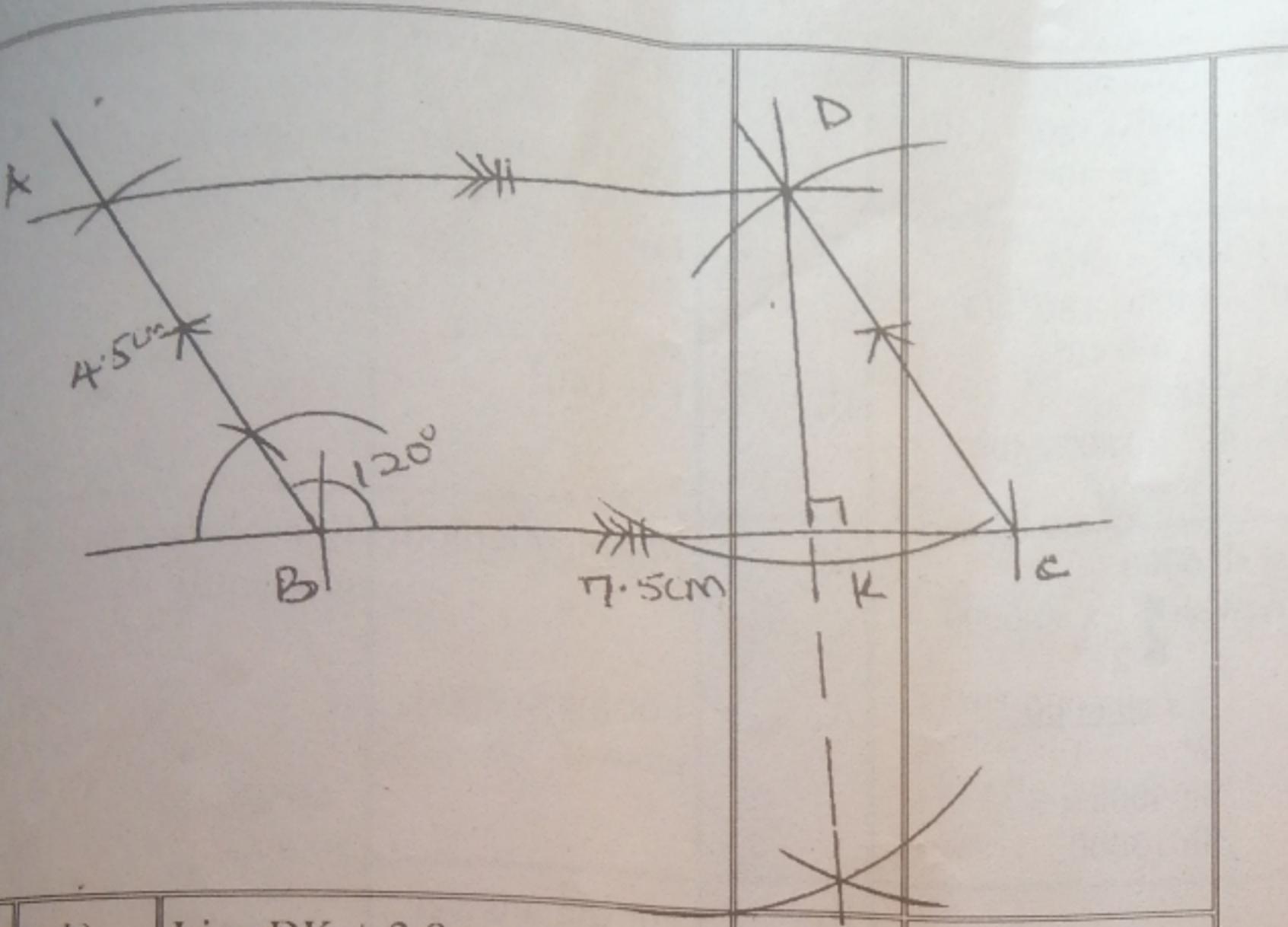
NO	LEVEL	SOLUTION	AWARD	REASON	COMMENT
1	P.2	$  \begin{array}{r}  8 & 5 \\  -5 & 2 \\  \hline  3 & 3  \end{array}  $	B <sub>2</sub>	For 33	Operate and involve word statement.
2	P.3	$  \begin{array}{r}  4,099 \\  \text{Thousand} \quad \text{units} \\  \hline  4 & 099  \end{array}  $ Four thousand, ninety-nine.	M <sub>1</sub> A <sub>1</sub>	For the method. For the answer	Accept $4,099 = 4000 + 99$ For thousand, ninety-nine
3	P.6	Set P complement Accept P <sup>1</sup>	B <sub>2</sub>	For the answer.	Expose candidates to a variety of shaded and unshaded regions to be described.
4	P.7	$  \begin{array}{l}  3 \div 4 = \underline{\quad} \text{(finites 5)} \\  3, 8, 13, 18, 23 \\  8 \div 4 = 2 \\  \therefore 2 \text{(finite 5)}  \end{array}  $	M <sub>1</sub> A <sub>1</sub>	For the method. For the answer	Also use a dial to work out $3 \div 4 = \underline{\quad}$ (finite 5)
5	P.5	$  \begin{array}{cccccc}  8, & 27, & 64, & 125, & 216 \\  2^3 & 3^3 & 4^3 & 4^5 & 6^3 \\  (6 \times 6) \times 6 \\  \hline  3 & 3 & 6 \\  \times & 6 \\  \hline  216  \end{array}  $	M <sub>1</sub> A <sub>1</sub>	For the method. For the answer	Revisit types of numbers and apply them correctly.
6	P.6	$  \begin{array}{l}  849 + 0.8 \\  \text{sum} \\  \begin{array}{r}  8 \quad 4 \quad 9 \\  + \quad \quad 1 \\  \hline  8 \quad 5 \quad 0  \end{array}  \end{array}  $	M <sub>1</sub> A <sub>1</sub>	For the method. For the answer.	Make a review on writing in words decimal numbers and their values.
7	P.7		B <sub>2</sub>	For the answer	Emphasise neatness and accuracy.
8	P.7	$  \begin{array}{l}  p^{-3} \div p^{-2} \\  p^{-3-(-2)} \\  p^{-3+2} \\  p^{-1}  \end{array}  $	M <sub>1</sub> A <sub>1</sub>	For the method. For the answer	Make a review in operation of indices.

9	P.6	$L \times L = \text{area}$ $L^2 = 196 \text{ m}^2$ $\sqrt{L^2} = \sqrt{196 \text{ m}^2}$ $L = \sqrt{2^2 \times 7^2 \text{ m}^2}$ $L = 14\text{m}$ <p>perimeter = 4 sides  <math>= 4 \times 14\text{m}</math>  <math>= 56\text{m}</math></p>	B <sub>1</sub>	For 14m	Expose candidates to finding area, volume and perimeter of plane and solid shapes
10	P.6	$SI = P \times R \times T$ $SI = Sh 480,000 \times 2\frac{1}{2} \% \times 3$ $SI = sh 480,000 \frac{25}{2} \times 3$ $200$ $SI = sh 2400 \times 15$ $SI = sh 36000$	M <sub>1</sub>	For the method.	Revisit and apply all terms used in simple interest. Eg principal, rate, and amount.
11	P.7	$9y - (4 + y)$ $9y - 4 - y$ $9y - y - 4$ $8y - 4$	B <sub>1</sub>	For opening the brackets	Make a review on related questions and expose them to word statements.
12	P.6	$\text{Speed} = 96\text{km/h}$ $\text{Time} = 3\frac{1}{4} \text{ hours}$ $\text{Distance} = S \times T$ $D = \underline{96\text{km}} \times 3\frac{1}{4} \text{ hours}$ $1\text{hour } 3\frac{1}{4}$ $= \underline{96^2} \text{ km} \times \underline{13} \text{ hours}$ $1\text{hour } 4_1$ $= 24\text{km} \times 13$ $= 312\text{km}$	M <sub>1</sub>	For the method	Help candidates to identify distance, speed and time.
13	P.6	$\text{Range} = H - L$ $= \underline{8}^7 \underline{1}^3$ $- \underline{2}^5$ $\underline{\underline{5}}^8$	M <sub>1</sub>	For the method	Expose candidates to all terms used in statistics and apply them.
14	P.7	$\% \text{ decrease} = \frac{\text{decrease}}{\text{Original price}} \times 100\%$ $\text{Sh } 36000$ $-\text{sh } 30000$ $\underline{\underline{\text{Sh } 6000}}$	M <sub>1</sub>	For the method	Make a review on %loss, % profit and % increase.
			A <sub>1</sub>	For the answer	
			A <sub>1</sub>	For 16 $\frac{2}{3}\%$	

		$\begin{aligned} \text{Sh } 6000^{100} \times 100\% \\ \text{Sh } 3600^6 & \quad 1 \\ 100 \% \\ 6 \\ \underline{16} & \quad 2 \% \\ 3 \end{aligned}$			
15	P.7	$\begin{aligned} 0.089 \times 10 = 0.89 \\ 0.89 \times 10 = 8.9 \\ 8.9 \times 10^{-2} \end{aligned}$	M <sub>1</sub> A <sub>1</sub>	For the method For the answer	Emphasise detailed methods and avoid short cuts.
16	P.6	$\begin{aligned} 1:40\text{pm} = & \quad 1 : 40 \text{ pm} \\ & + 12 : 00 \text{ hr} \\ \hline & \quad 13 : 40 \text{ hr} \end{aligned}$ <p>Duration  Hr Min  13 : 40  -11 : 10  \underline{\quad\quad\quad}\br/&gt; 2 : 30</p> <p>The bus took <math>2\frac{1}{2}</math> hours.</p>	B <sub>1</sub> B <sub>1</sub>	For 13: 40 hours  For $2\frac{1}{2}$ hours	Make enough practice on duration of time and revisit the timetables in 12 and 24 hour clock.
17	P.7	$\begin{aligned} y + 57^\circ + 57^\circ &= 180^\circ \\ y + 114^\circ - 114^\circ &= 180^\circ - 114^\circ \\ y &= 66^\circ \end{aligned}$	M <sub>1</sub> A <sub>1</sub>	For arrangement For the answer	Expose all sorts of polygons with properties.
18	P.6	$\begin{aligned} 1l &= 1000\text{cm}^3 \\ 0.72l &= 72 \times 1000 \text{ cm}^3 \\ 100 \\ &= 720\text{cm}^3 \end{aligned}$	M <sub>1</sub> A <sub>1</sub>	For the methods For the answer	Make a review on metric conversion.
19	P.6	$\begin{aligned} \text{Sh } 350 \text{ rep } 15\text{units} \\ \text{Sh } 87500 \text{ rep } (\underline{87500}) \times 15 \\ 350 \\ 250 \times 15 \text{ units} \\ 3750 \text{ units} \end{aligned}$	M <sub>1</sub> A <sub>1</sub>	For the method For the answer	Revisit the use of long division
20	P.3	$\begin{aligned} +4 + (-7) &= -3 \\ +(-7) \\ \hline -4 \end{aligned}$ 	B <sub>2</sub> B <sub>2</sub>	For the arrows $+(-7)$ For -3	Use a number line to operate correctly and emphasise counting of gaps.

**Section B**

21	P.6a)	 $n(A) = 40$ $n(B) = 28$ $n(C) = K$ $n(A \cap B) = 12$ $n(A \cap C) = 4$ $n(B \cap C) = K - 12$ $n(A \cup B \cup C) = 70$ $40 + 28 + K - 12 = 70$ $40 + K - 12 = 70$ $40 + K = 70$ $K = 30$ $\begin{array}{r} 40 \\ - 12 \\ \hline 28 \end{array}$	B <sub>1</sub> B <sub>1</sub>	For each correct answer.	Expose candidates to a variety of terms used like only, less, more, greater etc.
	b)	$28 + 12 + 4 + k - 12 = 70$ $44 + k - 12 = 70$ $44 - 12 + k = 70$ $32 + k = 70$ $32 - 32 + k = 70 - 32$ $k = 38$ <b>Coke only</b> $k - 12$ $38 - 12 = 26$ <b>Probability</b> = $\frac{n(L)}{n(s.s)}$ $n(s.s) = 26$ $n(c) = 26$ $n(s.s) = 70$ <b>Probability</b> = $\frac{26}{70}$	B <sub>1</sub> B <sub>1</sub>	For the equation.  For $\frac{26}{7}$	
22	P.6a)	$4, 0, 5 \rightarrow 504, 540$ $\rightarrow 405, 450$	B <sub>1</sub> B <sub>1</sub> B <sub>1</sub> B <sub>1</sub>	For 405. For 450 For 504 For 540	Hep candidates to organise and form correct numbers from the digits
	b)	$\begin{array}{r} 5 & 4^3 & 10 \\ -4 & 0 & 5 \\ \hline 1 & 3 & 5 \end{array}$	B <sub>1</sub>	For the answer	
23	P.7a)		S <sub>1</sub> L <sub>1</sub> L <sub>1</sub> C <sub>1</sub>	For Sketch For for 7.5cm For 4.5 cm For 120°	Emphasise a labelling points, angles and lines for both accurate and sketch diagram.



	b)	Linc DK + 3.8 cm	B <sub>1</sub>	For the answer																			
24	P.7	<table border="1"> <thead> <tr> <th>Fees</th> <th>remainder</th> <th>saving</th> </tr> </thead> <tbody> <tr> <td><math>\frac{33}{3} \times \frac{1}{100}</math></td> <td><math>1 - \frac{1}{3} = \frac{2}{3}</math></td> <td><math>\frac{2}{3} \times \frac{4}{15} = \frac{8}{45}</math></td> </tr> <tr> <td><math>\frac{100}{3} \times \frac{1}{100}</math></td> <td><math>\frac{3-1}{3} = \frac{2}{3}</math></td> <td><math>= \frac{4}{15}</math></td> </tr> <tr> <td><math>\frac{1}{3}</math></td> <td><math>\frac{2}{3} \text{ of } \frac{2}{5}</math></td> <td><math>= \frac{4}{15}</math></td> </tr> <tr> <td><math>\frac{2}{3} \times \frac{2}{5}</math></td> <td></td> <td></td> </tr> <tr> <td><math>\frac{4}{15}</math></td> <td></td> <td></td> </tr> </tbody> </table> <p>2parts rep sh 300,000 1 part rep sh <math>\frac{300,000}{2}</math> 5parts rep sh <math>\frac{300,000 \times 5}{2}</math> Salary = sh 750,000</p>	Fees	remainder	saving	$\frac{33}{3} \times \frac{1}{100}$	$1 - \frac{1}{3} = \frac{2}{3}$	$\frac{2}{3} \times \frac{4}{15} = \frac{8}{45}$	$\frac{100}{3} \times \frac{1}{100}$	$\frac{3-1}{3} = \frac{2}{3}$	$= \frac{4}{15}$	$\frac{1}{3}$	$\frac{2}{3} \text{ of } \frac{2}{5}$	$= \frac{4}{15}$	$\frac{2}{3} \times \frac{2}{5}$			$\frac{4}{15}$			B <sub>1</sub>	For the $\frac{1}{3}$	Follow through pupils' work and revisit ratios and percentages.
Fees	remainder	saving																					
$\frac{33}{3} \times \frac{1}{100}$	$1 - \frac{1}{3} = \frac{2}{3}$	$\frac{2}{3} \times \frac{4}{15} = \frac{8}{45}$																					
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25	P.6a)	<table border="1"> <thead> <tr> <th>denominations</th> <th>No of notes</th> <th>Amount</th> </tr> </thead> <tbody> <tr> <td>Sh 10,000</td> <td>4</td> <td>Sh 40,000</td> </tr> <tr> <td>Sh 20,000</td> <td>3</td> <td>Sh 60,000</td> </tr> <tr> <td>Sh 5000</td> <td>5</td> <td>Sh 25,000</td> </tr> <tr> <td>Total</td> <td></td> <td>Sh 125,000</td> </tr> </tbody> </table> <p>Sh 60,000 <math>\frac{3}{5}</math> sh 25000 <math>\frac{5000}{5}</math> Sh 20,000 <math>\frac{5}{5}</math> Sh 5000</p>	denominations	No of notes	Amount	Sh 10,000	4	Sh 40,000	Sh 20,000	3	Sh 60,000	Sh 5000	5	Sh 25,000	Total		Sh 125,000	B <sub>1</sub> B <sub>1</sub> B <sub>1</sub>	For 3 notes For sh 5000 For the total	Help candidates on when to divide and multiply.			
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Sh 10,000	4	Sh 40,000																					
Sh 20,000	3	Sh 60,000																					
Sh 5000	5	Sh 25,000																					
Total		Sh 125,000																					
	b)	$100\% - 90\% = 10\%$ $\frac{10}{100} \times \text{sh } 125000$ $\text{sh } 12500$ $- \text{sh } 4500$ $\text{sh } 8000$	B <sub>1</sub> B <sub>1</sub>	For 10% For sh 800																			

26	P.7 a)	$x + 38^\circ + 102^\circ = 180^\circ$ $x + 140^\circ - 140^\circ = 180^\circ - 140^\circ$ $x = 40^\circ$	M <sub>1</sub> A <sub>1</sub>	For the method. For the answer	Make a review on finding unknown angles on parallel lines and polygons.
	b)	$n + 31^\circ + 109^\circ = 180^\circ$ $n + 140^\circ - 140^\circ = 180^\circ - 140^\circ$ $n = 40^\circ$ $y + 40^\circ = 180^\circ$ $y + 40^\circ - 40^\circ = 180^\circ - 40^\circ$ $y = 140^\circ$	B <sub>1</sub> B <sub>1</sub>	For 40° For 140°	
27	P.6 a)	1kg cost sh 6000 $\frac{2}{2} \text{ kg cost sh } \frac{2}{2} \times \text{sh } 6000$ $\frac{5}{2} \times \text{sh } 6000^{3000}$ $\frac{2^1}{2^1} \quad 1$ $\text{Sh } 3000 \times 5$ $\text{Sh } 15000$	M <sub>1</sub> A <sub>1</sub>	For the method. For the correct answer	Encourage candidates to identify the scale.
		$1\frac{1}{2} \text{ kg}$	B <sub>2</sub>	For the answer	
		4kg of sugar = sh 24000 4kg of salt = sh 14000 $\underline{\text{Sh } 10000}$	B <sub>1</sub>	For the difference.	
28	P.7a)	<u>Circumference</u> $C = \pi d$ $= 22 \times 24^3 \text{ cm}$ $\frac{7}{21}$ $= 66 \text{ cm}$ <u>Length of the string = CR</u> $= 66 \text{ cm} \times 50$ $= 660 \text{ cm}$ $\times 5$ $\underline{\text{3300 cm}}$	B <sub>1</sub> B <sub>1</sub>	For 66cm For 3300cm	Make a review on resolution to circumference. Make a review on algebra and their application
		$1 \text{ km} = 100,000 \text{ cm}$ $1.32 \text{ km} = \frac{132}{100} \times \frac{100,000 \text{ cm}}{1}$ $= 132000 \text{ cm}$ $R = \frac{D}{C}$ $= \frac{132000 \text{ cm}}{66 \text{ cm}}$ $= 2000 \text{ revolutions.}$	B <sub>1</sub> M <sub>1</sub> A <sub>1</sub>	For 132000cm For the method. For the answer.	
29	P.7a)	$3k + 1 - (2k - 5)$ $3k + 1 - 2k + 5$ $3k - 2k + 5 + 1$ $k + 6$	M <sub>1</sub> A <sub>1</sub>	For the method. For the answer.	Make a review on algebra and its application.

	b)	$\begin{aligned} 2(x - 3) &= 6 \\ 4 & \\ 2(x - 3) \times 4 &= 6 \times 4 \\ 4 & \\ 2(x - 3) &= 24 \\ 2x - 6 &= 24 \\ 2x - 6 + 6 &= 24 + 6 \\ 2x &= 30 \\ \underline{2} & \\ 2x &= \underline{\underline{30}} \\ 2 & \\ x &= 15 \end{aligned}$	M <sub>1</sub>  A <sub>1</sub>	For the method.  For the answer.	
30	P.7	<p>a)</p> $\begin{aligned} \text{Average speed} &= \frac{\text{T.D.C}}{\text{T.T.T}} \\ &= \frac{270\text{km} + 270\text{ km}}{5\text{hours}} \\ &= \frac{540\text{km}}{5\text{ hour}} \\ &= 108\text{km/h} \end{aligned}$	M <sub>1</sub>  A <sub>1</sub>	For the method.  For the answer.	Expose candidates to word statements involving distance, time and speed.
	b)	$\begin{aligned} T &= \frac{D}{S} \\ &= \frac{270}{90} \text{ hours} \\ &= 3 \text{ hours} \\ \text{Remaining time } (5 - 3) \text{ hours} &= 2 \text{ hours} \\ S &= \frac{D}{T} \\ &= \frac{270}{2} \text{ km/hour} \\ &= 135 \text{ km/hour} \end{aligned}$	B <sub>1</sub>  B <sub>1</sub>	For 2 hours.  For 135km/h	
31	P.7a)	$\begin{aligned} (3 \times 20\text{cm}) + 2(6\text{cm}) &+ 2(8\text{cm}) + 2(10\text{cm}) \\ (60\text{cm} + 12\text{cm}) + 16\text{cm} + &20\text{cm} \\ 72\text{cm} &+ 36\text{cm} \\ \underline{\underline{108\text{cm}}} & \end{aligned}$	B <sub>1</sub>  B <sub>1</sub>  B <sub>1</sub>	For the interpretation  For the method.  For the answer	Help candidates to identify edges, vertices and faces of solid figures
	b)	$\begin{aligned} \text{Volume} &= \frac{1}{2} bhl \\ &= \frac{1}{2} \times 6\text{cm} \times 8\text{cm} \times 20\text{cm} \\ &= \frac{1}{2} \times 6^3\text{cm} \times 8\text{cm} \times 20\text{cm} \\ &= 24\text{cm}^2 \times 20\text{cm} \\ &\quad \begin{array}{l} 240\text{cm}^2 \\ \times 2\text{cm} \\ \hline 480\text{cm}^3 \end{array} \end{aligned}$	M <sub>1</sub>  A <sub>1</sub>	For the method.  For the answer.	

32	P.7 a)	$\text{Principle} = \text{sh} 10,000 \times \frac{100}{100}$ $= \text{sh} 1,000,000$ $\text{SI} = P \times R \times T$ $\text{SI} = \text{sh} 1000000 \times \frac{10}{100} \times \frac{3}{1}$ $\text{SI} = \text{sh} 1,000,000 \times \frac{10}{100} \times \frac{3}{1}$ $\text{Sh} = 300,000$	B <sub>1</sub>  M <sub>1</sub>  A <sub>1</sub>	For Sh 1,000,000  For the method.  For the answer	Make a review on terms used in simple interest and then apply.
	b)	$\text{Amount} = P + SI$ $\text{Sh} 1000,000$ $+ \text{sh} 300,000$ <hr/> $\text{Sh} 1,300,000$	M <sub>1</sub>  A <sub>1</sub>	For the method.  For the answer	