

2014-15

Code No. : 820144.1-SA₁(M)

Mathematics
(Summative Assessment - I)

Maximum Marks : 90

Marks Scheme / Hint to Solutions

(Note: Any other relevant answer, not given herein but given by the candidates be suitably awarded.)

S. No.	Value Points / Key Points	Marks allotted to each value point key point	Total Marks												
SECTION - A															
1.	(c) 10	1	1												
2.	(d) 10%	1	1												
3.	(b) Rs. 1000	1	1												
4.	(a) $y^2 + 4y + 45$	1	1												
5.	(d) 120°	1	1												
6.	(a) 0	1	1												
7.	(a) 3	1	1												
8.	(d) 1/13	1	1												
SECTION - B															
9.	$\sqrt{99} \times \sqrt{396}$ $= \sqrt{3 \times 3 \times 11} \times \sqrt{3 \times 3 \times 2 \times 2 \times 11}$ $= \sqrt{3 \times 3 \times 3 \times 3 \times 2 \times 2 \times 11 \times 11}$ $= 3 \times 3 \times 2 \times 11$ $= 198$	2 1 1 1 1	2												
OR															
	<table><tr><td>2</td><td>1100</td></tr><tr><td>2</td><td>5508</td></tr><tr><td>5</td><td>2754</td></tr><tr><td>5</td><td>1377</td></tr><tr><td>11</td><td>110</td></tr><tr><td></td><td>1</td></tr></table>	2	1100	2	5508	5	2754	5	1377	11	110		1	1	
2	1100														
2	5508														
5	2754														
5	1377														
11	110														
	1														
	$1100 = 2 \times 2 \times 5 \times 5 \times 11$ 11 is smallest number by which 1100 must be multiplied	1	2												

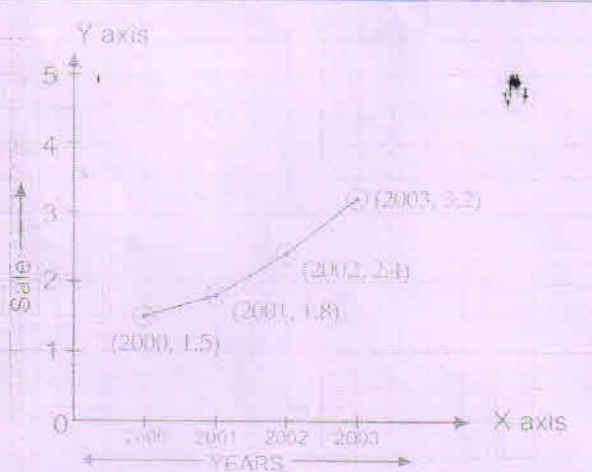
S. No.	Value Points / Key Points	Marks allotted to each value point key point	Total Marks																												
10.	$\sqrt{3375 \times (-729)}$ <table><tr><td>3</td><td>3375</td><td>3</td><td>729</td></tr><tr><td>3</td><td>1125</td><td>3</td><td>243</td></tr><tr><td>3</td><td>375</td><td>3</td><td>81</td></tr><tr><td>5</td><td>125</td><td>3</td><td>27</td></tr><tr><td>5</td><td>25</td><td>3</td><td>9</td></tr><tr><td>5</td><td>5</td><td>3</td><td>3</td></tr><tr><td></td><td>1</td><td></td><td>1</td></tr></table> $= \sqrt{3 \times 3 \times 3 \times 5 \times 5 \times 5 \times (-3 \times 3 \times 3 \times 3 \times 3 \times 3)}$ $= -3 \times 5 \times 3 \times 3$ $= -135$	3	3375	3	729	3	1125	3	243	3	375	3	81	5	125	3	27	5	25	3	9	5	5	3	3		1		1	1 1	2
3	3375	3	729																												
3	1125	3	243																												
3	375	3	81																												
5	125	3	27																												
5	25	3	9																												
5	5	3	3																												
	1		1																												
11.	<table><tr><td>2</td><td>8192</td></tr><tr><td>2</td><td>4096</td></tr><tr><td>2</td><td>2048</td></tr><tr><td>2</td><td>1024</td></tr><tr><td>2</td><td>512</td></tr><tr><td>2</td><td>256</td></tr><tr><td>2</td><td>128</td></tr><tr><td>2</td><td>64</td></tr><tr><td>2</td><td>32</td></tr><tr><td>2</td><td>16</td></tr><tr><td>2</td><td>8</td></tr><tr><td>2</td><td>4</td></tr><tr><td>2</td><td>2</td></tr><tr><td></td><td>1</td></tr></table> $8192 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2$ So, 2 is the smallest number by which 8192 must be divided.	2	8192	2	4096	2	2048	2	1024	2	512	2	256	2	128	2	64	2	32	2	16	2	8	2	4	2	2		1	1	2
2	8192																														
2	4096																														
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2	128																														
2	64																														
2	32																														
2	16																														
2	8																														
2	4																														
2	2																														
	1																														
12.	In the given fig. $l \parallel m$ so, $\angle 2 = \angle 3$ [corresponding angles] so, $\angle 3 = 2x - 5$ Now, $\angle 1 + \angle 3 = 180^\circ$ (forming linear pair) $3x + 5 + 2x - 5 = 180^\circ$ $5x = 180^\circ$ $x = 180 / 5$ So, $x = 36^\circ$	$\frac{1}{2}$ $\frac{1}{2}$ 1	2																												

S. No.	Value Points / Key Points	Marks allotted to each value point key point	Total Marks																		
17.	$\sqrt[3]{\frac{0.512}{0.343}} \div \sqrt[3]{\frac{0.64}{0.49}} + 1$ $= \sqrt[3]{\frac{512/1000}{343/1000}} \div \sqrt[3]{\frac{64 \cdot 100}{49 \cdot 100}} + 1$ $= \sqrt[3]{\frac{512}{343}} \div \sqrt[3]{\frac{64}{49}}$ $= \sqrt[3]{\frac{8 \times 8 \times 8}{7 \times 7 \times 7}} \div \sqrt[3]{\frac{8 \times 8 \cdot 1}{7 \times 7}}$ $= \frac{8}{7} \div \frac{8}{7} + 1$ $= 1 + 1$ $= 2$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	3																		
18.	<table><tr><td>3</td><td>5400</td></tr><tr><td>3</td><td>1800</td></tr><tr><td>3</td><td>600</td></tr><tr><td>5</td><td>200</td></tr><tr><td>5</td><td>40</td></tr><tr><td>2</td><td>8</td></tr><tr><td>2</td><td>4</td></tr><tr><td>2</td><td>2</td></tr><tr><td></td><td>1</td></tr></table> $\therefore 5400 = 3 \times 3 \times 3 \times 2 \times 2 \times 2 \times 5 \times 5$ $\therefore$ Smallest number to be multiplied = 5	3	5400	3	1800	3	600	5	200	5	40	2	8	2	4	2	2		1	2 1 $\frac{1}{2}$ 1 $\frac{1}{2}$	3
3	5400																				
3	1800																				
3	600																				
5	200																				
5	40																				
2	8																				
2	4																				
2	2																				
	1																				
19.	Let distance covered in 75 minutes = x km <table><tr><td>Distance</td><td>14</td><td>x</td></tr><tr><td>Time (min)</td><td>25</td><td>75</td></tr></table> this is the case of direct variation. $\frac{14}{25} = \frac{x}{75}$ $\frac{14 \times 75}{25} = x$ $x = 42 \text{ km}$	Distance	14	x	Time (min)	25	75	$\frac{1}{2}$ 1 $\frac{1}{2}$ 1	3												
Distance	14	x																			
Time (min)	25	75																			

OR

(4)

S. No.	Value Points / Key Points	Marks allotted to each value point key point	Total Marks						
	Let the provision will last for = x days	$\frac{1}{2}$							
	<table border="1"> <tr> <td>Days</td> <td>30</td> <td>x</td> </tr> <tr> <td>No. of men</td> <td>500</td> <td>500, 100, 600</td> </tr> </table>	Days	30	x	No. of men	500	500, 100, 600	1	
Days	30	x							
No. of men	500	500, 100, 600							
	This is case of inverse variation	$\frac{1}{2}$							
	$30 \times 500 = x \times 600$								
	$\frac{30 \times 500}{600} = x$								
	x = 25 days.	1	3						
20.	Cost price = 250×8 ₹ 2000								
	70% of 250 = 175	1							
	S.P.								
	$= 175 \times 11 + 75 \times 9$								
	$= 1925 + 675 = ₹ 2600$	1							
	$P\% = \frac{600}{2000} \times 100 = 30\%$	1	3						
21.	$p^2 - 3pq + 2q^2$								
	$= p^2 - 2pq - pq + 2q^2$	1							
	$= p(p - 2q) - q(p - 2q)$	1							
	$= (p - 2q)(p - q)$	1	3						
	$AB \parallel CD$								
	So, $\angle 1 = 75^\circ$ (alternative angles)	1							
	Also, $\angle 2 = 40^\circ$ (Corresponding angles)	1							
	No $\angle 1 + \angle 3 + 40^\circ = 180^\circ$ (straight angle)								
	$75^\circ + \angle 3 + 40^\circ = 180^\circ$								
	$\angle 3 = 180^\circ - 115^\circ$ $= 65^\circ$	1	3						
	OR								
	(i) In the given fig. $\angle PBA = \angle BAD = 45^\circ$								
	But these are alternate angles.								
	So, $PB \parallel AD$	1							
	(ii) $\angle ADC = \angle QCD = 90^\circ$								
	But these are alternate angles.								
	So, $AD \parallel CQ$	1							
	(iii) from (i) and (ii)								
	$BP \parallel AD \parallel CQ$ $= BP \parallel CQ$	1	3						

S. No.	Value Points / Key Points	Marks allotted to each value point key point	Total Marks																		
23.	 OR Alternate question for visually challenged student in lieu of Q. 23 $(16x^2 - 24xy + 9y^2) - 25z^2$ $= (4x - 3y)^2 - (5z)^2$ $= (4x - 3y + 5z)(4x - 3y - 5z)$	$\frac{1}{2}$ for link and $\frac{1}{2}$ marks for each points $\frac{1}{2}$ for joining the points. $1\frac{1}{2}$ $1\frac{1}{2}$																			
24.	(i) <table border="1"> <thead> <tr> <th>Class Interval</th><th>tally Marks</th><th>Frequency</th></tr> </thead> <tbody> <tr> <td>5 - 10</td><td> </td><td>18</td></tr> <tr> <td>10 - 15</td><td> </td><td>14</td></tr> <tr> <td>15 - 20</td><td> </td><td>7</td></tr> <tr> <td>20 - 25</td><td> </td><td>1</td></tr> <tr> <td>Total</td><td></td><td>40</td></tr> </tbody> </table> (ii) 5 - 10, (20 - 25) OR Total outcomes = 1, 2, 3, 4, 5, 6 (a) $P(\text{Multiple of 2}) = \frac{3}{6} = \frac{1}{2}$ (b) $P(\text{number more than or equal to 4})$ $= \frac{3}{6} = \frac{1}{2}$ (c) $P(\text{number less than 4})$ $= \frac{3}{6} = \frac{1}{2}$	Class Interval	tally Marks	Frequency	5 - 10		18	10 - 15		14	15 - 20		7	20 - 25		1	Total		40	2 $\frac{1}{2} + \frac{1}{2}$ 1 1 1	3
Class Interval	tally Marks	Frequency																			
5 - 10		18																			
10 - 15		14																			
15 - 20		7																			
20 - 25		1																			
Total		40																			

S. No.	Value Points / Key Points	Marks allotted to each value point key point	Total Marks						
SECTION - D									
25.	(i) Let number of students = x Amount collected from each student = x $x \times x = 7056$ $x^2 = 7056$ $x = \sqrt{7056}$ 8 84 7056 64 656 656 x so, number of students = 84 (ii) helpful of kind hearted etc.	$\frac{1}{2}$ 1 1 $\frac{1}{2}$	4						
26.	Let number of books = x <table border="1" style="margin: 10px auto;"><tr><td>No. of books</td><td>40</td><td>x</td></tr><tr><td>Cost of each book (in ₹)</td><td>125</td><td>100</td></tr></table> This is case of inverse variation $40 \times 125 = x \times 100$ $\frac{40 \times 125}{100} = x$ $x = 50 \text{ books}$	No. of books	40	x	Cost of each book (in ₹)	125	100	$\frac{1}{2}$ 1 $\frac{1}{2}$	4
No. of books	40	x							
Cost of each book (in ₹)	125	100							
27.	Speed of train = 80 km/hr $= \frac{80 \times 1000}{3600} \text{ m/sec.}$ $= \frac{200}{9} \text{ m/sec.}$ Let time taken to cross the bridge = x sec. <table border="1" style="margin: 10px auto;"><tr><td>Distance (in m)</td><td>200</td><td>$270 + 130 = 400$</td></tr><tr><td>Time (in sec.)</td><td>9</td><td>x</td></tr></table> There is a direct variation. $\frac{200}{9} = \frac{400}{x}$ $200 \times x = 400 \times 9$ $x = \frac{400 \times 9}{200} = 18 \text{ seconds.}$	Distance (in m)	200	$270 + 130 = 400$	Time (in sec.)	9	x	$\frac{1}{2}$ 1 $\frac{1}{2}$ 1	4
Distance (in m)	200	$270 + 130 = 400$							
Time (in sec.)	9	x							

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26.	Let number of books = x <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"><tr><td style="width: 33%;">No. of books</td><td style="width: 33%;">40</td><td style="width: 33%;">x</td></tr><tr><td>Cost of each book (in ₹)</td><td>125</td><td>100</td></tr></table> This is case of inverse variation $40 \times 125 = x \times 100$ $\frac{40 \times 125}{100} = x$ $x = 50 \text{ books}$	No. of books	40	x	Cost of each book (in ₹)	125	100	$\frac{1}{2}$ 1 $\frac{1}{2}$ 2	4
No. of books	40	x							
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27.	Speed of train = 80 km/hr $= \frac{80 \times 1000}{3600} \text{ m/sec.}$ $= \frac{200}{9} \text{ m/sec.}$ Let time taken to cross the bridge = x sec. <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"><tr><td style="width: 33%;">Distance (in m)</td><td style="width: 33%;">200</td><td style="width: 33%;">270+130=400</td></tr><tr><td>Time (in sec.)</td><td>9</td><td>x</td></tr></table> There is a direct variation. $\frac{200}{9} = \frac{400}{x}$ $200 \times x = 400 \times 9$ $x = \frac{400 \times 9}{200} = 18 \text{ seconds.}$	Distance (in m)	200	270+130=400	Time (in sec.)	9	x	1 $\frac{1}{2}$ 1	4
Distance (in m)	200	270+130=400							
Time (in sec.)	9	x							

S. No.	Value Points / Key Points	Marks allotted to each value point key point	Total Marks
28.	P% = 20% Profit = ₹ 225 $P\% = \frac{P}{C.P.} \times 100\%$ $20 = \frac{225}{C.P.} \times 100$ $C.P. = \frac{225}{20} \times 100$ $= ₹ 1125$ $S.P. = C.P. + P$ $= ₹ 1125 + ₹ 225$ $= ₹ 1350$ $M.P. = \frac{S.P. \times 100}{100 - D\%}$ $= \frac{1350 \times 100}{75}$ $= ₹ 1800$ Hence M.P. = ₹ 1800 OR Let C.P. = Rs. x P% = 25% $S.P. = \frac{x \times 125}{100}$ $= \frac{5x}{4}$ now C.P. = x - 20% of x $= x - \frac{20}{100} \times x$ $= x - \frac{1}{5}x$ $= \frac{5x - x}{5} = \frac{4x}{5}$ P% = 30% $S.P. = \frac{4x}{5} \times \frac{130}{100}$ $= \frac{26x}{25}$	1 1 2 4 1/2 1/2	

S. No.	Value Points / Key Points	Marks allotted to each value point key point	Total Marks																																				
33.	Alternative question for visually challenged students $ \begin{array}{r} (x-1) \overline{) x^4 - 1} \quad (x^3 + x^2 + x + 1) \\ \underline{- x^4 + x^3} \\ x^3 - 1 \\ \underline{- x^3 + x^2} \\ x^2 - 1 \\ \underline{- x^2 + x} \\ x - 1 \\ \underline{- x + 1} \\ x \end{array} $ Writing Dividend = $x^4 - 1$ & Division = $x - 1$ Getting quotient <table border="1"> <thead> <tr> <th>Class Interval</th> <th>Tally Marks</th> <th>Frequency</th> </tr> </thead> <tbody> <tr><td>0 - 10</td><td>III</td><td>3</td></tr> <tr><td>10 - 20</td><td>IIII</td><td>4</td></tr> <tr><td>20 - 30</td><td>II</td><td>2</td></tr> <tr><td>30 - 40</td><td>IIII</td><td>4</td></tr> <tr><td>40 - 50</td><td>IIII I</td><td>6</td></tr> <tr><td>50 - 60</td><td>II</td><td>2</td></tr> <tr><td>60 - 70</td><td>IIII</td><td>4</td></tr> <tr><td>70 - 80</td><td>II</td><td>2</td></tr> <tr><td>80 - 90</td><td>I</td><td>1</td></tr> <tr><td>90 - 100</td><td>II</td><td>2</td></tr> <tr><td>Total</td><td></td><td>30</td></tr> </tbody> </table>	Class Interval	Tally Marks	Frequency	0 - 10	III	3	10 - 20	IIII	4	20 - 30	II	2	30 - 40	IIII	4	40 - 50	IIII I	6	50 - 60	II	2	60 - 70	IIII	4	70 - 80	II	2	80 - 90	I	1	90 - 100	II	2	Total		30	1 3	
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0 - 10	III	3																																					
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50 - 60	II	2																																					
60 - 70	IIII	4																																					
70 - 80	II	2																																					
80 - 90	I	1																																					
90 - 100	II	2																																					
Total		30																																					

S. No.	Value Points / Key Points	Marks allotted to each value point key point	Total Marks																								
34.	(OR) Alternative question for visually challenged students Let balls purchased = 20 ∴ cost of 20 balls = 250 × 5 = Rs 1250 SP of 20 balls = 340 × 4 = Rs. 1360 Gain% = $\frac{110}{1250} \times 100 = 8.8\%$	2	1																								
	(i)		1																								
	<table border="1"><thead><tr><th>Items</th><th>Degree of fraction</th><th>Part of circle</th><th>Amount spent</th></tr></thead><tbody><tr><td>Food</td><td>108°</td><td>$\frac{108}{360} = \frac{3}{10}$</td><td>$\frac{3}{10} \times 8250 = 2475$</td></tr><tr><td>Rent</td><td>90°</td><td>$\frac{90}{360} = \frac{1}{4}$</td><td>$\frac{1}{4} \times 8250 = 2062.5$</td></tr><tr><td>Education</td><td>54°</td><td>$\frac{54}{360} = \frac{3}{20}$</td><td>$\frac{3}{20} \times 8250 = 1237.5$</td></tr><tr><td>Clothing</td><td>36°</td><td>$\frac{36}{360} = \frac{1}{10}$</td><td>$\frac{1}{10} \times 8250 = 825$</td></tr><tr><td>Miscellaneous</td><td>72°</td><td>$\frac{72}{360} = \frac{1}{5}$</td><td>$\frac{1}{5} \times 8250 = 1650$</td></tr></tbody></table>		Items	Degree of fraction	Part of circle	Amount spent	Food	108°	$\frac{108}{360} = \frac{3}{10}$	$\frac{3}{10} \times 8250 = 2475$	Rent	90°	$\frac{90}{360} = \frac{1}{4}$	$\frac{1}{4} \times 8250 = 2062.5$	Education	54°	$\frac{54}{360} = \frac{3}{20}$	$\frac{3}{20} \times 8250 = 1237.5$	Clothing	36°	$\frac{36}{360} = \frac{1}{10}$	$\frac{1}{10} \times 8250 = 825$	Miscellaneous	72°	$\frac{72}{360} = \frac{1}{5}$	$\frac{1}{5} \times 8250 = 1650$	2½
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(ii)	Money spent on food = ₹ 2475 Money spent on Education = ₹ 1237.5 Difference = 2475 - 1237.5 = ₹ 1237.5	½	4																								
		½																									