

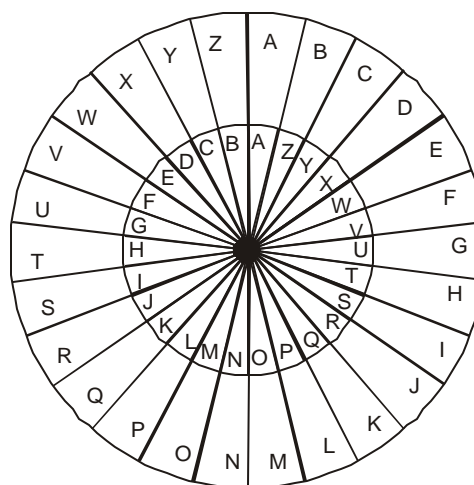
## FMS 2010 – Detailed Solutions (SET 16)

- |  |   |
|--|---|
| <p>1. 2 Only statement 2 is true, it is mentioned in the 6<sup>th</sup> line of the 1<sup>st</sup> paragraph, refer to the lines “Just because an idea....will always work”.</p> <p>2. 1 The author, in the 1<sup>st</sup> paragraph, mentions “chaos of anecdotal memories” which gives us the answer. All then other options are incorrect.</p> <p>3. 3 The first line of the passage mentions ,”Early books.....memoirs of business leaders”. This leads us to option 1.</p> <p>4. 4 In the first paragraph, the author mentions “At the business level....position our thinking”.</p> <p>5. 2 The author, in the 1<sup>st</sup> paragraph, mentions that early books on business strategy contain precious little theory or models drawn from economics or other social sciences. This is contradictory to what is mentioned in option 2.</p> <p>6. 4 In the 1<sup>st</sup> paragraph, the author clearly mentions that “How we think about...and changed as new and better ideas have become more widely known and accepted “, this leads us to option 4.</p> <p>7. 3 In the last 4 lines of the first paragraph, the author mentions that Business strategy has had many definitions.</p> <p>8. 3 The 1<sup>st</sup> line of the 2<sup>nd</sup> paragraph mentions that the changing environment of a business can be understood by assessing the main factors that create change in a market place : political, economic, social and technological trends.</p> <p>9. 3 The 2<sup>nd</sup> paragraph mentions, “PEST and SWOT analysis...to its management to decide.”, which makes option 3 the answer.</p> <p>10. 1 The customer is mentioned as the most important part of an organization’s environment in the third paragraph.</p> <p>11. 2 Option 2 contradicts the line, “ A third definition of strategy.....creating a strategy”.</p> <p>12. 3 The first line of the 4<sup>th</sup> paragraph mentions that SWOT and PEST analysis is still used by companies.</p> <p>13. 3 The 4<sup>th</sup> paragraph mentions that a century ago “most business was small and local”.</p> <p>14. 3 The lines “Gap analysis is still a relevant...business to be in the future” lead us to option 3.</p> | <p>15. 4 The passage clearly mentions that Gap analysis has one key weakness. This nullifies options 2 and 3. Option 1 cannot be inferred from the passage.</p> <p>16. 2 The author in the 4<sup>th</sup> paragraph mentions that specific strategies tend to emerge rather than be created. This makes option 2 the answer.</p> <p>17. 2 In the beginning of the 5<sup>th</sup> paragraph, the author mentions that businesses must formalize their strategies by direction and evolution.</p> <p>18. 1 Option 1 can be inferred from the 1<sup>st</sup> line of the 5<sup>th</sup> paragraph. Options 2 and 3 are incorrect. Option 2 contradicts the line “On the other....somewhere not always regarded as the place where strategy is formed”. In the same paragraph, the author says that managers should set objectives and let the organization get on with meeting those objectives, this is contrary to option 3.</p> <p>19. 2 The author mentions clearly in the 5<sup>th</sup> paragraph, “Our focus is on market strategy”, this makes option 2 the answer.</p> <p>20. 4 In the 6<sup>th</sup> paragraph, the author mentions that financial planning flow and the strategic planning flow often interact and conflict.</p> <p>21. 2 In the last but one paragraph, the author clearly mentions that “Even among....employee turnover can be an issue.” This leads us to option 2.</p> <p>22. 3 In the 8<sup>th</sup> paragraph, the author mentions that “If the organization...the financial flow will dominate management thinking.” This leads us to option 3.</p> <p>23. 2 In the 8<sup>th</sup> paragraph, the author clearly mentions that the senior management’s role is to set targets.</p> <p>24. 3 Option 3 can be inferred from the lines, ”Tactics are the shorter...viability of the plan” in the 7<sup>th</sup> paragraph.</p> <p>25. 4 The comparison of Janet and Freud is done by Mayo and not the author, this makes option 4 the correct answer.</p> <p>26. 3 In the 1<sup>st</sup> paragraph, the author clearly states that he is more interested in epistemology.</p> <p>27. 3 The 5<sup>th</sup> paragraph leads us to option 3.</p> <p>28. 4 “Synthetic propositions” constitute ‘a posteriori’ knowledge, this makes option 4 the answer.</p> |
|--|---|

29. 1 In the 4<sup>th</sup> paragraph the author states that he was a bit of a logician, a positivist and a pragmatist. This leads us to option 1.
30. 4 From the 3<sup>rd</sup> paragraph it can be inferred that the author was neither a follower or a critique of Kant or Hume.
31. 2 The second paragraph leads us to option 2. Refer to the lines, "Because a multinational...increased competition".
32. 3 The 1<sup>st</sup> line of the 3<sup>rd</sup> paragraph leads us to option 3.
33. 2 Option 2 can be inferred from the 3<sup>rd</sup> paragraph.
34. 1 This is directly stated in the 1<sup>st</sup> line of the 4<sup>th</sup> paragraph.
35. 1 Examples of partnerships created by Russian MNCs are given in the 4<sup>th</sup> paragraph, this makes option 1 the answer.
36. 3 The primary focus of the passage is to discuss the various facets of FDI, it is carried throughout the passage. This makes option 3 correct.
37. 3 Option 3 can be clearly inferred from the last line of the 5<sup>th</sup> paragraph.
38. 3 The lines "In the "soft-systems"...problem situations.", in the 5<sup>th</sup> paragraph lead us to option 3.
39. 2 The various models mentioned in the passage involve complex patterns of interaction.
40. 3 In the 7<sup>th</sup> paragraph, the author mentions that "change is seen as a way of preserving or improving order in the system rather than as a fundamental feature of the system", this negates option 3.
41. 1 This can be inferred from the 1<sup>st</sup> sentence of the passage itself.
42. 2 The lines, "The second stage...is essentially the systems perspective", in the 9<sup>th</sup> paragraph lead us to option 2.
43. 4 Option 4 is contradictory to the line "Change is thus externalized beyond the system boundary.", in the first paragraph.
44. 4 The lines, "Change is produced....individual human beings", in the 11<sup>th</sup> paragraph leads to option 4.
45. 3 The last sentence of the 1<sup>st</sup> paragraph lead us to option 3.
46. 3 Only soft systems approach sees change flowing from human understanding; refer to the 5<sup>th</sup> paragraph.

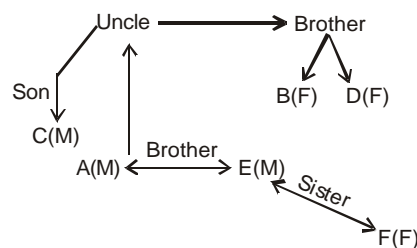
47. 3 The organic model does not see management as a part of the environment but as control center.
48. 1 The soft systems approach and not the Cybernetic model recognizes human role in defining changes; this is mentioned in the 5<sup>th</sup> paragraph.
49. 1 It can be inferred from the 1<sup>st</sup> sentence of the 4<sup>th</sup> paragraph.
50. 1 The first two sentences of the 4<sup>th</sup> paragraph lead us to option 1.

**For questions 51 to 54:**



51. 1 Apart from alphabet A, alphabet N coincides at present.
52. 1 Only one vowel, i.e. A.
53. 4 If the inner circle is rotated anticlockwise, then none of the alphabets will coincide.
54. 2 If the outer circle is rotated clockwise by two sectors from the original position, then two alphabets, i.e. M and Z will coincide.

**For questions 55 to 57:**



55. 1      56. 2

57. 1 A and E are real brothers.

**For questions 58 to 60:**

58. 2 A – 26  
E – 22  
I – 18  
O – 12  
U – 6  
The sum is 84.

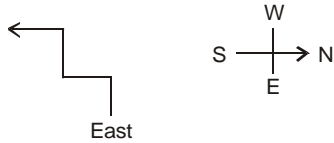
59. 3 5 12 18 23  
V O I D

60. 2 Z, W, R, K, —  
| | | |  
1 4 9 16 25 → (B)

61. 2 B M V K R Q  
The persons sitting adjacent to V are M and K.

62. 1 The opposite order is ..... H H D B B.  
The fifth letter from right to left is H.

63. 2 Let's say Arun's back is the East direction.



Finally, he is going in the South direction.

Now, assume that Arun's back is the West direction.



So, finally he is going in the North direction.  
So, he can go either in North or the South direction.

**For questions 64 to 67:**

64. 3 Option (1) is wrong as P and V cannot be together.  
Option (2) is wrong as Q is there and T is not there.  
Option (3) is correct.  
Option (4) is wrong as U or S has to be the last song.

65. 3 Given that R and W are two of the songs that are played on the first day.  
Since, R is played, therefore V has to be played.  
Also, either S or U must be one of the songs that should be played.  
Option (1) and (4) are ruled out.  
Option (2) is ruled out as if Q is played, then T must be played after Q.  
Hence, option (3) is the correct answer.

66. Option (1): Q, T, P, W, U  
Option (2): R, V, Q, T, U  
Option (3): W, Q, T, P, U  
Option (4): W, Q, T, V, S  
All the options are untrue.

67. 1 Given that R is played at third place.  
Q cannot be played at the second place as T and V both must be played after R. But that will contradict the statement that either S or U must be the fifth song played.

**For questions 68 to 70:**

Name	Games Played	Subject Intrests
Sumit	Chess and Weight training	Psychology
Tarun	Chess and Badminton	Physics
Amul	Golf and Lawn Tennis	Commerce
Dinakaran	Billiards and Chess	Psychology

68. 4

69. 1

70. 3

**For questions 71 to 73:**

As per the information given in question there are two orders that are possible.

1.

A	R	P	G	N	V
1	2	3	4	5	6

2.

N	G	P	R	A	V
1	2	3	4	5	6

(A) – Ariel, (R) – Rin, (P) – Pepsodent  
(G) – Gillettegel, (N) – Nirma, (V) – Vivel

But when we look at the questions, they have considered the second order.

71. 3

72. 3

73. 3

**For questions 74 to 77:**

A	-13	N	1
B	-12	O	2
C	-11	P	3
D	-10	Q	4
E	-9	R	5
F	-8	S	6
G	-7	T	7
H	-6	U	8
I	-5	V	9
J	-4	W	10
K	-3	X	11
L	-2	Y	12
M	-1	Z	13

74. 3 R → (5), O → (2), D → (-10)  
Thus the product of codes for R, O and D will be negative.
75. 1 YELL will have the same absolute numeric value as BELL.  
As,  $|Y| = |B| = 12$ .
76. 3 PEON →  $|3 \times 9 \times 2 \times 1|$   
CLERK →  $|11 \times 2 \times 9 \times 5 \times 3|$   
HEAD →  $|6 \times 9 \times 13 \times 10|$   
Therefore, the HEAD is having the maximum salary.
77. 3 INKR is the answer as all other three are having the same sum, which is equal to -4.
78. 4
- |     |            |   |            |
|-----|------------|---|------------|
|     | B (Sanjay) |   | S — Sarita |
|     |            |   |            |
| B — | B —        | B | S          |
- Including Sanjay and Sarita there has to be 4 brothers and 3 sisters.  
B and S stand for brother and sister respectively.
79. 2 After they interchange their positions, B is 9th from the right. Also, there are 20 people in the row.  
So, B's position is 12th from the left.

**For questions 80 to 85:**

80. 1 Percentage revenue growth:

2005	2006	2007	2008
16.17	21.8	25.14	24.6

Thus, statement 1 is correct and statement 2 is wrong.  
Hence, option (1) is correct answer.

81. 4 Total Assets growth rate:

2005	2006	2007	2008
62.08	40.32	19.09	36.72

None of the statements is correct.  
Hence, option (4) is correct answer.

82. 3 Gross profit growth rate:

2005	2006	2007	2008
16.4	21.48	23.45	25.93

Statement 1 is correct.  
It is obvious from the table given in the question directly that statement 2 is also correct.  
Hence, option (3) is correct answer.

83. 2 Ratio of COGS to Revenue:

2004	2005	2006	2007	2008
.1742	.1723	.1749	.1860	.1776

Only, statement 2 is correct.  
Hence, option (2) is correct answer.

84. 3 Ratio of Gross profit to Revenue:

2004	2005	2006	2007	2008
.8257	.8276	.8250	.8139	.8223

Both the statements are correct.  
Hence, option (3) is correct answer.

85. 4 Ratio of Total Assets to Total Liabilities:

2004	2005	2006	2007	2008
2.6768	2.1002	2.0709	1.95842	1.9497

None of the statements are correct.  
Hence, option (4) is correct answer.

**For questions 86 to 88:**

As per the information given in the question we get the following:

Female ← Dolly (Mother)	↓ Points decreasing as we go down
Male ← Snehal (Father)	
Male ← Amar	
Male ← Akash	
Male ← Swarn (Uncle)	
Female ← Shikhar (Niece)	

86. 4

87. 3

88. 2

**For questions 89 to 92:**

	Corporate Planning	Information Technology	Human Resource	Finance	Export department
Aryan		√	√		
Harish	√				√
Puru		√	√	√	√
Sheetal				√	
Aditya	√				√
	MBA	MCA	PMIR	MFC	MIB

89. 3

90. 2

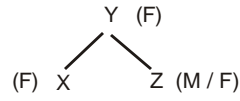
91. 1

92. 4

**For questions 93 and 94:**

93. 4  $P * Q + R$   
 $\Rightarrow P * Q \rightarrow P$  is sister-in-law of  $Q$ .  
 $Q + R \rightarrow Q$  is mother-in-law of  $R$ .  
 $(F) P - Q (F)$   
 $\quad \quad \quad \downarrow$   
 $\quad \quad \quad R (M / F)$   
 Hence, option (4) is answer.

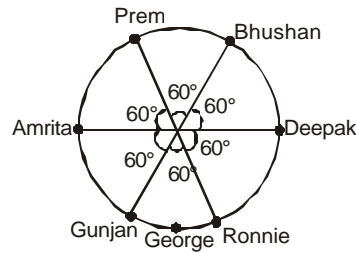
94. 1  $X - Y + Z$   
 $\Rightarrow X - Y \rightarrow X$  is daughter-in-law of  $Y$ .  
 $Y + Z \rightarrow Y$  is mother-in-law of  $Z$ .



Hence option, (1) is the correct answer.

**For questions 95 to 97:**

According to the information given in question the sitting order will be



95. 2

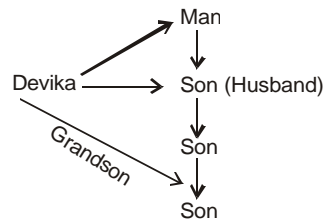
96. 2

97. 3

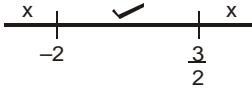
98. 4. The word when un-jumbled would read as 'ABHORRENCE', thus its opposite would be 'liking'.

99. 4. The word when un-jumbled would read as 'CONGRUITY', thus its opposite would be 'mismatch'.

100.1



101. 3	'Avant Garde' has a French origin. Rest of the words have a Latin origin.	117. 4	The given sentence has an error of parallelism. Option 4 is grammatically correct. Options 1 and 3 have errors of parallelism. In option 2 the pronoun 'they' does not have a definite antecedent.
102. 2	'Accoustical' has a Greek origin.	118. *	All the options are erroneous as the given sentence has 'by' which fits with none of the options.
103. 1	'Asinine' means like an ass whereas 'Vulpine' means like a fox. 'Avian' is related to birds.	119. 1	Only option 1 maintains a parallel structure throughout the sentence. Using the phrase 'like an expert' would be erroneous.
104. 2	'Stallion' is an uncastrated male horse. 'Mare' is a female horse. 'Ram' is a male sheep. 'Ewe' is the female sheep. The order of relationship of 'Goose' and 'Gander' is given opposite when compared with the question pair.	120. 1	The key to solving this question lies in filling the 2 <sup>nd</sup> blank; here 'distinct' best fits the blank.
105. 4	An eponym is a word based on or derived from a person's name. Only 'Fresco' which means a painting is not an eponym.	121. 1	The key to solving this question lies in filling the 4 <sup>th</sup> blank which would be best filled by the plural word – 'controversies'.
106. 3	The given scheme of months fit in the Gregorian calendar.	122. 1	'Stygian' is a synonym of 'dark'; similarly 'abysmal' is a synonym of 'low'.
107. 2	All the given words are types of plays.	123. 3	'Contiguous' is a synonym of 'abut' which means to be adjacent. Similarly, 'simultaneous' is a synonym of 'coincide'.
108. 1	All the given words are types of poems.	124. 3.	The best answer is 3, the intended subject here is 'interest'. The plural 'men' would limit the meaning to a specific group of 'men'. The sentence, on the other hand, refers to a general perspective.
109. 2	'Black Box' is spelled correctly. All the others are one word and not separate words.	125. 4	Only option 4 removes the error of parallelism as evident in the given sentence as well as in the other options.
110. 3	In option 1, 'Billow' and 'Blame' are verbs also. In option 2, 'Assert' and 'Chasten' can be verbs. In option 4, 'Farcical' is an adjective.	126. 1	Only option 1 uses the correct tense-forms. The given sentence requires the simple present to be followed by the future perfect continuous.
111. 1	In option 2, 'Acquaint' is a verb. In option 3, 'Panorama' is a noun. In option 4, 'acknowledge' is a verb and 'posterity' is a noun.	127. 1	The given sentence uses the incorrect pronoun 'it' instead of 'this'. Only option 1 rectifies the error and conveys the intended meaning.
112. 4	In option 1, 'servile' cannot be a verb and a noun. In option 2, 'assert' cannot be a noun and an adjective. In option 3, 'billow' cannot be an adjective.	128. 4	In option 4, it should be 'making these kinds of mistakes' or 'this kind of mistakes.'
113. 1	'Feast today, Famine tomorrow' means if you indulge yourself with all that you have today, you may have to go without tomorrow. Thus it comes closest to the 'wisdom of thriftiness'.	129. 2	Option 2 uses 'more' which is superfluous before 'preferable'.
114. 2	'Carpet Bagger' in modern usage in the United States, is sometimes used derisively to refer to a politician who runs for public office in an area in which he or she is not originally from and/or has only lived for a very short time.	130. 1	In option 1, there should be no comma after 'that' as the given sentence is in indirect speech.
115. 4	Option 4 comes closest to the given proverb.	131. 1	'Acquiescence' means the act or condition of acquiescing or giving tacit assent; agreement or consent by silence or without objection; compliance. It comes closest to option 1.
116. 2	Option 2 comes closest to the meaning of the given proverb.		

132. 2 'Wheedle' means to endeavor to influence (a person) by smooth, flattering, or beguiling words or acts.
133. 3 'Immiseration' means to cause to become impoverished.
134. 4 'Beatitude' means any of the declarations of blessedness pronounced by Jesus in the Sermon on the Mount.
135. 2 'Bedizen' means to dress or adorn in a showy, gaudy, or tasteless manner.
136. 3 'Cachinnate' means to laugh loudly or immoderately.
137. 1 'Canoodle' means caress, fondle, or pet amorously. This comes closest to cuddle.
138. 3 'Tumescence' means to be swollen, it comes closest to 'engorge' which means to congest with blood.
139. 4 'Twaddle' which means silly idle talk comes closest to 'waffle' which means to talk foolishly or without purpose.
140. 1 'Ennui' means a feeling of utter weariness and discontent resulting from satiety or lack of interest; boredom; it comes closest to lassitude.
141. 2 'Cantankerous' which means disagreeable would be the closest opposite of co-operative.
142. 4 'Emblazon', which means to inscribe conspicuously, is the closest opposite of subtle.
143. 3 'Inveigh' means to protest strongly or attack vehemently with words; 'endorse' comes as its closest opposite.
144. 1 'Static' would come as the closest opposite to 'leaven' which means an element that produces an altering or transforming influence.
145. 4 'Opprobrium' which means disgrace would have 'honour' as its opposite.
146. 1 'Parsimonious' which means miserly would have 'extravagant' as its opposite.
147. 2 'Insidious' which means treacherous or deceitful would have 'apparent' as its closest opposite.
148. 2 'Satiated' would be the closest opposite of 'rapacious' which means greedy.
149. 3 'Soporific' means sleep inducing, 'alert' would be its opposite.
150. 2 'Rare' would be the best opposite of 'ubiquitous' which means existing everywhere or widespread.
151. 4  $f(x) = 8x - 3x^2$   
 Putting  $\frac{d}{dx}(f(x)) = 8 - 6x = 0$   
 $x = \frac{4}{3}$   
 maximum value of  $f(x) = 8\left(\frac{4}{3}\right) - 3\left(\frac{4}{3}\right)^2 = \frac{16}{3}$
152. 1  $2x^2 + x < 6$   
 $\Rightarrow (x + 2)(2x - 3) < 0$   
  
 So,  $-2 < x < \frac{3}{2}$
153. 4 Put  $x = 1$  in the options the value should come out to be 1.  
 Only option (4) satisfies this.
154. 2 Let after '6:00 p.m. and m seconds' the hands of his watch form an angle of 110 degree for the first time and after '6:00 p.m. and n seconds' the hands of his watch form an angle of 110 degree for the second time. .  
 In every one second the minute's hand covers  $\frac{360}{3600}$  or  $\frac{1}{10}$  degree.  
 In every one second the hour's hand covers  $\frac{30}{3600}$  or  $\frac{1}{120}$  degree.  
 (This is because the minute's hand covers one circle or 360 degree in one hour or 3600 seconds while the hour's hand covers  $\frac{1}{12}$ th of a circle or 30 degree in one hour or 3600 seconds).  
 Initial angle formed at 6:00 p.m. = 180 degree  
 Angle formed by the hands of his watch:  
 $= 180 + \frac{m}{120} - \frac{m}{10}$  when the minute's hand is behind the hour hand.  
 and  $\frac{n}{10} - \frac{n}{120} - 180$  when the hour's hand is behind the minute's hand.

So,  $180 - \frac{11m}{120} = 110$  or  $\frac{11m}{120} = 70 \dots (i)$

and  $\frac{11n}{120} - 180 = 110$  or  $\frac{11n}{120} = 290 \dots (ii)$

From (ii) - (i) :

$m - n = 2400$  seconds =  $\frac{2400}{60} = 40$  minutes.

155. 2  $(x - 8)(x - 10)$  represents a parabola  $2^y$  represents an exponential curve. These two will intersect at max. at two points. As 'x' and 'y' are integers both 'x - 8' and 'x - 10' must be multiples of 2 (integral multiples).  
 $x = 12$  and  $x = 6$  satisfies this.

156. 4 Putting the values from the options the point

$(-1, 1)$  does not satisfy  $y = \frac{x}{x+1}$ .

157. 3  $y = x^2$  and  $y = 3x + k$

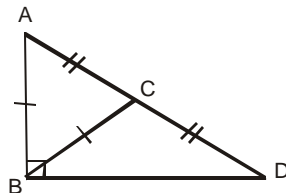
So,  $x^2 = 3x + k$  or  $x^2 - 3x - k = 0$

The above equation must have discriminant equal to zero (for two identical solution)

$D^2 = 9 + 4k = 0$

$k = \frac{-9}{4}$

158. 2



The above figure represents the case given in the question. If  $AC = CD$  and also  $\angle ABD = 90^\circ$ , we can say that C is the centre of the circle passing through A, B and D and AD is the diameter. So the radius must be AC, CD or BC. Also given that  $BC = AB$ , we can conclude that  $AB = BC = CA$ .

Hence  $\triangle ABC$  is equilateral and  $\angle DAB$  must be  $60^\circ$ .

159. 1 Slope of lines (a) =  $\frac{2}{3}$ , (b) =  $\frac{-2}{3}$ , (c) =  $\frac{-2}{3}$ , (d) =  $\frac{-3}{2}$

as  $\left(\frac{2}{3}\right) \times \left(\frac{-3}{2}\right) = -1$

We can say (a) and (d) represent perpendicular lines.

160. 3 Let a, b, c (in that order) be a, a + d and a + 2d

Now, (a + 1), (a + d) & (a + 2d) are in G.P.

(a), (a + d) & (a + 2d + 2) are in G.P.

So,  $(a + d)^2 = (a + 1)(a + 2d) \dots (i)$

&  $(a + d)^2 = a(a + 2d + 2) \dots (ii)$

By (i)  $\div$  (ii),

$a = 2d$

Putting this in (i) we get

$d = 4$  and  $a = 8$ .

So,  $b = a + d = 12$ .

161. 2 According to the given conditions

$\frac{49 + 7x}{50 + 8x} \geq 0.9$

$\Rightarrow 49 + 7x \geq 45 + 7.2x$  or  $x \leq 20$

for  $x = 20$  total balls counted =  $50 + 8(20) = 210$

162. 4 Combined distance covered by two men in

1st hour = 7.75 km

2nd hour =  $(7.75 + 0.5)$  km

3rd hour =  $(7.75 + 2(0.5))$  km and so on...

Let the number of hours taken to meet = n

Total distance covered in n hours

=  $7.75n + (0 + 0.5 + 2(0.5) + \dots + (n - 1)(0.5))$

=  $7.75n + \frac{n}{2}(n - 1)(0.5)$

=  $7.75n + \frac{n(n - 1)}{4} = 76$

So,  $n = 8$

The man who starts from R covers  $(4.5)8 = 36$  kms

Other man covers 40 kms.

Difference = 4 kms

163. 1 Let A, B and C start with a, b and c (in rupees)

Amount with each after A gives to B and C (in the order A, B and C)

$a - b - c, 2b, 2c$

Amount with each after B gives to C and A (in the order A, B and C)

$2a - 2b - 2c, 3b - c - a, 4a$

Amount with each after C gives to A and B (in the order A, B and C)

$4a - 4b - 4c, 6b - 2c - 2a, 7c - a - b$

Total initial amount =  $a + b + c = 16 \times 3 = 48 \dots (i)$

(As the total final amount must remain same)

Final amount with A =  $4(a - b - c) = 16$

or  $a - b - c = 4 \dots (ii)$

From (i) + (ii)

$2a = 52$  or  $a = 26$ .



164. 3 If  $n$  straight lines are drawn in a plane with no two parallel and no three concurrent, then the number of regions into which they divide the plane is given

$$\text{by } \frac{n(n+1)}{2} + 1$$

for  $n = 6$  the answer must be  $\frac{6 \times 7}{2} + 1 = 22$

165. 3  $S = 160t - 16t^2$

Highest value of  $S$  will be reached when  $\frac{dS}{dt} = 0$

or  $160 - 32t = 0$

or  $t = 5$

$$S_{\text{(max)}} = 160 \times 5 - 16 \times (5)^2 = 800 - 400 = 400$$

166. 1 Let the equation of parallel line be  $y = \frac{3}{4}x + c$

Now by distance formula:

$$\frac{|6 - c|}{\sqrt{(-1)^2 + \left(\frac{3}{4}\right)^2}} = 4$$

$$\Rightarrow \frac{4}{5} |6 - c| = 4$$

$$\Rightarrow c = 1 \text{ or } c = -11$$

$$y = \frac{3}{4}x + 1 \text{ is a possible equation for L.}$$

167. 2 As the win leads to multiplying the amount by 1.5 and loss leads to multiplying the amount by 0.5 we will multiply initial amount by 1.5 thrice and by 0.5 thrice (in any order). The overall resultant will remain same.

So, final amount with the person will be (in all cases):

$$64(1.5)^3(0.5)^3 = \text{Rs. } 27$$

Hence the final result is a loss of Rs. 37

168. 3  $\sqrt[3]{x+9} - \sqrt[3]{x-9} = 3$

$$\Rightarrow \sqrt[3]{x+9} = 3 + \sqrt[3]{x-9}$$

$$\Rightarrow x+9 = 27 + (x-9) + 3 \cdot 3 \cdot \sqrt[3]{x-9} + 9 \sqrt[3]{x+9}$$

$$\text{(using } 3 + \sqrt[3]{x-9} = \sqrt[3]{x+9} \text{)}$$

$$\Rightarrow -9 = 9 \sqrt[3]{x^2 - 81}$$

$$\Rightarrow \sqrt[3]{x^2 - 81} = -1$$

$$\Rightarrow x^2 = 80$$

$$\text{or } 75 < x^2 < 85$$

169. 4  $[\log_{10}(5 \log_{10} 100)]^2$

$$= [\log_{10}(5 \times 2)]^2 = (\log_{10} 10)^2 = 1^2 = 1$$

170. 3  $x^2 - 4y^2 = 0 \Rightarrow (x-2y)(x+2y) = 0$

Hence,  $x - 2y = 0$  or  $x + 2y = 0$

Both above equations are of straight lines.

171. 4 "Rs. 24 less  $12\frac{1}{2}\%$ " means Rs.  $24 - \frac{25}{2}\%$  of 24"

$$= \text{Rs. } 21$$

$$33\frac{1}{3}\% \text{ of } 21 \text{ is } 28.$$

If 28 is the amount after 20% discount then initial

$$\text{amount must be } \frac{28}{0.8} = \text{Rs. } 35$$

172. 4  $2^x = 8^{y+1} = 2^{3y+3}$

$$\text{Hence, } x = 3y + 3 \dots \text{(i)}$$

$$\text{Also, } 9^y = 3^{x-9} \text{ or } 3^{2y} = 3^{x-9}$$

$$\text{Hence, } 2y = x - 9 \dots \text{(ii)}$$

Solving (i) and (ii)

$$3y + 3 - 9 = 2y$$

$$\Rightarrow y = 6 \text{ \& } x = 21$$

$$x + y = 27$$

173. 3 Price of all sheep is the same (Let price = P)

$$\text{Percentage gain} = \frac{49P}{700P} \times 100 = 7\%$$

174. 4 Let the numbers be  $a$  and  $b$

$$\text{Difference} = (a - b)$$

$$\text{Sum} = (a + b)$$

$$\text{Product} = ab$$

$$a - b : a + b : ab = 1 : 7 : 24$$

$$\frac{a - b}{a + b} = \frac{1}{7} \text{ and } \frac{a + b}{ab} = \frac{7}{24}$$

$$\text{Hence, } a = 8 \text{ and } b = 6$$

$$ab = 48$$

175. 2 Let the speed of first, second and third be a, b and c respectively

$$\frac{a}{b} = \frac{10}{8}, \frac{a}{c} = \frac{10}{6}$$

$$\text{So, } \frac{b}{c} = \frac{8}{6} = \frac{10}{\frac{60}{8}}$$

$$\text{B beat C by } 10 - \frac{60}{8} = \frac{20}{8} = 2\frac{1}{2} \text{ kms}$$

176. 3  $\frac{a+b}{b+c} = \frac{c+d}{d+a}$

$$\Rightarrow ad + a^2 + bd + ab = bc + bd + c^2 + cd$$

$$\Rightarrow a(d+a+b) = c(b+c+d)$$

Clearly  $a = c$  satisfies above

Also if  $a + b + c + d = 0$

then  $d + a + b = -c$

and  $b + c + d = -a$

So, the equation becomes  $-ac = -ca$  which is again true.

So, either  $a = c$  or  $(a + b + c + d) = 0$  or both.

177. 1 When a correct time of 24 hrs or  $24 \times 60 = 1440$  minutes has passed the time passed according to

the watch must be  $1440 - \frac{5}{2}$  minutes.

Here from 1 p.m. on March 15 to 9 a.m. on March

21, a total of  $\left(5 + \frac{5}{6}\right) \times 24 \times 60$  minutes have

passed according to the watch.

Now,

Watch	Actual time passed
$1440 - \frac{5}{2}$	$\rightarrow 1440$
$\frac{35}{6} \times 24 \times 60$	$\rightarrow \frac{35}{6} \times 24 \times 60 \times \frac{1440}{1440 - \frac{5}{2}}$

Positive correction = n

$$= \frac{35}{6} \times 1440 \times \frac{1440}{1440 - \frac{5}{2}} - \frac{35}{6} \times 1440$$

$$= \frac{35}{6} \times 1440 \left( \frac{\frac{5}{2}}{1440 - \frac{5}{2}} \right)$$

$$= 14\frac{14}{23} \text{ minutes}$$

178. 2  $2^{2x^2-7x+5} = 1$

$$\text{Hence, } 2x^2 - 7x + 5 = 0$$

Discriminant for the above equation =  $49 - 40$

$$= 7 > 0$$

So, the above equation has two real and distinct roots.

Hence 2 real values of x will satisfy the equation.

179. 2  $\sqrt{-4}$  and  $\sqrt{-16}$  are invalid.

180. 2  $25_b = 2b + 5$

$$52_b = 5b + 2$$

$$\text{So, } 2(2b + 5) = 5b + 2$$

$$4b + 10 = 5b + 2$$

$$b = 8$$

181. 2 Each element of 4 is  $n^2$  (n is a natural number)

Now out of  $n^2 + k, \frac{n^2}{k}, n^2k$

Only  $n^2k$  can be always a perfect square if k is 1.

182. 3  $S = (x-1)^4 + 4(x-1)^3 + 6(x-1)^2 + 4(x-1) + 1$

Putting  $x = 1$ , we get  $S = 1$

So, S cannot be  $(x-1)^4$  or  $(x+1)^4$

Putting  $x = 0$ , we get  $S = 0$

So,  $S = (x-2)^4$  cannot be the answer.

Hence,  $S = x^4$

**Alternative method:**

$$x^4 = (x-1+1)^4$$

$$= {}^4C_0(x-1)^4 + {}^4C_1(x-1)^3(1)^1 + {}^4C_2(x-1)^2(1)^2 + {}^4C_3(x-1)(1)^3 + {}^4C_4(x-1)^0(1)^4$$

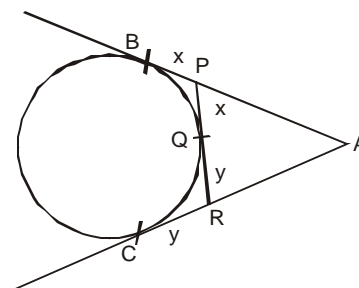
$$= (x-1)^4 + 4(x-1)^3 + 6(x-1)^2 + 4(x-1) + 1 = S.$$

183. 2 Doubling both the base and exponent we get  $(2a)^{2b}$

$$(2a)^{2b} = (4a^2)^b = (4a.a)^b$$

$$\text{So, } x = 4a$$

184. 3 Refer to the figure below:



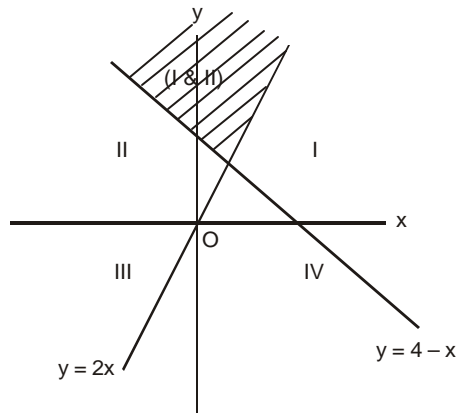
We need to find  $AP + PR + RA$   
 Let  $BP = x$ .  
 As tangents from P are equal,  $PQ = x$  as well  
 Similarly  $QR = y = CR$   
 Also,  $AB = AC = 20$  or  $AB + AC = 40$   
 $\Rightarrow AP + PB + AR + RC = 40$   
 $\Rightarrow AP + PQ + QR + RA = AP + PR + RA = 40$ .

185. 1  $y = 2\log x$  } The two curves will intersect when  
 $y = \log 2x$  }

$$\begin{aligned} 2\log x &= \log 2x \\ \log x^2 &= \log 2x \\ x^2 - 2x &= 0 \\ x(x-2) &= 0 \\ x &= 2 \end{aligned}$$

as  $x \neq 0$ , Domain log logarithm does not include  $x = 0$ .  
 Hence, they intersect at one point only at  $x = 2$ .

186. 1 The two lines ' $y = 2x$ ' and ' $y = 4 - x$ ' are plotted and the shaded region represents ' $y > 2x$ ' and ' $y > 4 - x$ ' (satisfying both);



187. 2 If  $3x^3 - 9x^2 + kx - 12$  is divisible by  $x - 3$   
 Then on putting  $x = 3$  in the expression it should vanish.  
 $3(3)^3 - 9(3)^2 + 3k - 12 = 0 \Rightarrow k = 4$   
 Dividing  $3x^3 - 9x^2 + 4x - 12$  by ' $x - 3$ ':

$$\begin{array}{r} 3x^2 + 4 \\ x - 3 \overline{) 3x^3 - 9x^2 + 4x - 12} \\ \underline{3x^3 - 9x^2 + 4x - 12} \\ x \end{array}$$

Thus,  $3x^3 - 9x^2 + 4x - 12$  is also divisible by  $3x^2 + 4$

188. 1 Let  $AP = 2x$ ,  $PQ = 3x$   
 and  $AQ = 3y$ ,  $QB = 4y$   
 $AQ : QB = 3 : 4$   
 $AP : BP = 2 : 3$   
 $AB = 5x = 7y$

$$x = \frac{7}{5}y \quad \dots(i)$$

Now,  $PQ = AB - AP - QB = 7y - 4y - 2x$   
 $= 3y - 2x = 2 \quad \dots(ii)$

Solving (i) and (ii),  
 $y = 10$   
 Hence,  $AB = 70$ .

189. 1 Let 'a' be the price of 1st magazine.  
 31st magazine will have a price equal to the combine price of middle and adjacent one  
 Let us assume  
 31st price = 16th price + 17th price  
 $a + 60 = a + 30 + a + 32$   
 Not possible.

Let us assume  
 31st price = 16th price + 15th price  
 $a + 60 = 2a + 62$   
 $a = 2$   
 Thus, the adjacent magazine is referred to as left of middle magazine.

190. 4  $\log_5 12 = \frac{\log_{10} 12}{\log_{10} 5} = \frac{\log_{10} 4 \times 3}{\log_{10} \left(\frac{10}{2}\right)}$   
 $= \frac{\log_{10} 4 + \log_{10} 3}{\log_{10} 10 - \log_{10} 2} = \frac{2\log_{10} 2 + \log_{10} 3}{1 - \log_{10} 2} = \frac{2a + b}{1 - a}$

191. 2 Ratio of speeds is equal to ratio of distances travelled

$$\frac{A}{B} = \frac{d}{d-20}; \quad \frac{B}{C} = \frac{d}{d-10}; \quad \frac{A}{C} = \frac{d}{d-28}$$

$$\text{Also } \frac{A}{C} = \frac{A}{B} \times \frac{B}{C}$$

$$\Rightarrow \frac{d}{d-28} = \frac{d}{d-20} \times \frac{d}{d-10}$$

$$\frac{d-20}{d-28} = \frac{d}{d-10}$$

Use options  $d = 100$ , satisfies L.H.S. and R.H.S. as follows:

Put  $d = 100$

$$\frac{80}{72} = \frac{100}{90}$$

$$\frac{10}{9} = \frac{10}{9}$$

L.H.S. = R.H.S.

192. \* **Error in the question.**  
**[None of the given option]**  
 The farthest points on the square will be diagonally opposite points.  
 For this square having side 1 diagonal will be  $\sqrt{2}$  units apart.  
 Hence if use 'a' as  $\sqrt{2}$  then surely we will get a pair of points having distance between them less than or equal to  $\sqrt{2}$ .
193. 1  $\sqrt{x^2 + y^2}$  is the distance from origin (0, 0) of point (x, y). The distance is minimum for the line if we calculate perpendicular distance on line from origin (0, 0):  

$$\frac{|5(0) + 12(0) - 60|}{\sqrt{5^2 + 12^2}} = \frac{60}{13}$$
194. 1  $\sqrt{\frac{4}{3}} - \sqrt{\frac{3}{4}} = \frac{4-3}{\sqrt{12}} = \frac{1}{\sqrt{12}}$   
 Option (1) is  $\sqrt{\frac{3}{6}} = \sqrt{\frac{3}{36}} = \sqrt{\frac{1}{12}}$
195. 4 There are (n - 1) 1's and one number is  $1 - \left(\frac{1}{n}\right)$   
 than arithmetic mean =  $\frac{(n-1) \times 1 + \left(1 - \frac{1}{n}\right)}{n} = 1 - \frac{1}{n^2}$
196. 1  $r = \text{Average Speed} = \frac{\text{TotalDistance}}{\text{TotalTime}} = \frac{150 + 150}{3\frac{1}{3} + 4\frac{1}{6}}$   

$$= \frac{300}{\frac{10}{3} + \frac{25}{6}} = \frac{360}{9} = 40 = r$$
  
 Going rate in (kmph)  $\frac{150}{3\frac{1}{3}} = 45$   
 Average rate for going trip will exceed the average for entire trip by  $45 - 40 = 5$
197. 3  $\left(1 - \frac{1}{a}\right)^6 = {}^n C_0 (1)^6 \left(-\frac{1}{a}\right)^0 \dots {}^6 C_4 (1)^2 \left(-\frac{1}{a}\right)^4 +$   

$${}^6 C_5 (1)^1 \left(-\frac{1}{a}\right)^5 + {}^6 C_6 \left(-\frac{1}{a}\right)^6$$
  
 Sum of last three coefficients  

$${}^6 C_4 - {}^6 C_5 + 1 = 15 - 6 + 1 = 10$$

198. 2  $a = \log_8 225$  and  $b = \log_2 15$   

$$\frac{a}{b} = \frac{\log_8 225}{\log_2 15} = \frac{\frac{\log_{10} 225}{\log_{10} 8}}{\frac{\log_{10} 15}{\log_{10} 2}} = \frac{\log_{10} 225}{\log_{10} 8} \cdot \frac{\log_{10} 2}{\log_{10} 15}$$
  

$$= \frac{2 \log_{10} 15}{3 \log_{10} 2} = \frac{2}{3}$$
  

$$\Rightarrow \frac{a}{b} = \frac{2}{3}$$
  

$$\Rightarrow a = \frac{2b}{3}$$
199. 1 Let  $a - 2d, a - d, a, a + d, a + 2d$  are the five angles of pentagon in arithmetic progression.  
 Interior angle sum for pentagon is 540.  
 $a - 2d + a - d + a + a + d + a + 2d = 540$   
 $5a = 540$   
 $a = 108$   
 Hence one of the angle is 108.
200. 1 Together all of the P, Q, R can do in 'x' hrs.  
 P alone can do the work in x + 6 hrs.  
 Q alone can do the work in x + 1 hrs.  
 R alone can do the work in 2x hrs.  

$$\frac{1}{2x} + \frac{1}{x+1} + \frac{1}{x+6} = \frac{1}{x}$$
  

$$\frac{(x+1)(x+6) + 2x(x+1) + 2x(x+6)}{2x(x+1)(x+6)} = \frac{1}{x}$$
  

$$3x^2 + 7x - 6 = 0$$
  

$$(3x - 2)(x + 3) = 0$$
  

$$x = \frac{2}{3}$$
  
 or Alternatively check by option  $\frac{2}{3}$   

$$\frac{1}{2x} + \frac{1}{x+1} + \frac{1}{x+6} = \frac{1}{x}$$
  

$$\frac{1}{2 \times \frac{2}{3}} + \frac{1}{\frac{2}{3} + 1} + \frac{1}{\frac{2}{3} + 6} = \frac{3}{2}$$
  

$$\frac{3}{2} = \frac{3}{2}$$
  
 LHS = RHS.