**Sample Paper**
(Quantitative Ability)

1. A trader sells two goods having identical cost price (CP). On one he earns a margin of profit equal to 20%, and in the other he cheats on weight claiming to sell at no-profit-no-loss basis. Actually he cheats his customers by going 800 gm only instead of 1 kg. What is his overall percentage gain?

   (a) 20%   (b) 22%   (c) 25%   (d) 30%

2. The smallest number of 6 digits which is exactly divisible by 10, 12 & 25 is:

   (a) 100,100   (b) 100,200   (c) 100, 300   (d) 1,20,000

3. What is the value of $\sqrt{6-\sqrt{6-\sqrt{6-\sqrt{6-\ldots\infty}}}}$?

   (a) 1.5   (b) 1.75   (c) 2   (d) 2.25

Directions (Q. 4 to 7): In these questions, a question is followed by two statements I and II. Choose a if either statement alone is sufficient to answer the question asked, but the other statement by itself is not sufficient to answer the question. Choose b if either statement alone is sufficient to answer the question. Choose c if both the statements I and II together are sufficient to answer the question but neither statement by itself is sufficient to answer the question. Choose d if the two statements, even when taken together, are not sufficient to answer the question.

4. In a school election in Goa, if each of the 900 voters voted for either Edith or Jose (but not both), what percent of the female voters in this election voted for Jose?

   (I) Eighty percent of the female voters voted for Edith.

   (II) Sixty percent of the male voters voted for Jose.

5. What are the values of three positive integers x, y, and z?

   (I) xy = 8   (II) yz = 9

6. What is the per kilogram price of apples?

   (I) Ten kg of apples and 18 dozens of bananas cost ₹ 950

   (II) One kg of apples could be exchanged for two dozens of bananas

7. Hoses X and Y simultaneously fill an empty swimming pool that has a capacity of 50,000 liters. If the flow in each hose is independent of the flow in the other hose, how many hours will it take to fill the pool?

   (I) Hose X alone would take 28 hours to fill the pool.

   (II) Hose Y alone would take 36 hours to fill the pool.

8. A letter lock consists of three rings marked with 13 different letters. What is the number of ways in which it is possible to make unsuccessful attempts to open the lock?

   (a) 1715   (b) 286   (c) 3^{13} (d) 2196

Directions (Q. 9 to 11): Answer these questions on the basis of the following graph which shows the production of items A, B and C during the months: April, May & June:
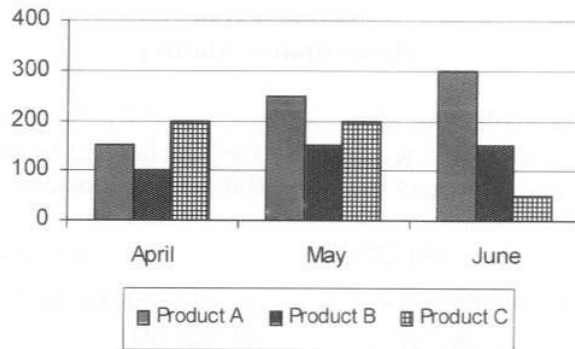
9. The percentage increase of production of item A from April to May is
   (a) 335%   (b) 66%   (c) 74%   (d) 25%

10. The overall production of items A, B, C during April and May is in the ratio
    (a) 1 : 1   (b) 3 : 4   (c) 9 : 11   (d) 11 : 9

11. The total production during the months of April, May & June of the three items, A, B and C are in the ratio
    (a) 7 : 5 : 7   (b) 7 : 5 : 5   (c) 7 : 4.5 : 4   (d) 4.5 : 6 : 5

12. A sum of ₹ 7900 is divided among four individuals A, B, C and D such that

$$\frac{A's\ share}{B's\ share} = \frac{B's\ share}{2 \times C's\ share} = \frac{C's\ share}{3 \times D's\ share}$$

What amount will be received by A if C received six times as much as D?
   (a) ₹ 2400   (b) ₹ 3000   (c) ₹ 3600   (d) ₹ 4800

13.
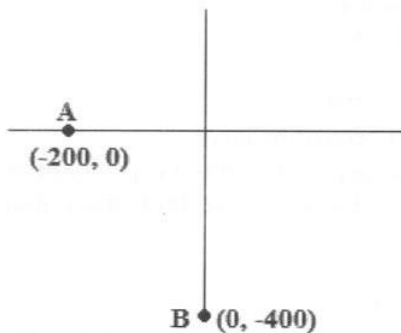
Two trains start at the same time from A and B respectively with 80 and 40 kmph. After how much time will be distance between the trains be the minimum?
   (a) 2.5 h   (b) 4 h   (c) 5 h   (d) None of these

14. What will be the remainder when 30^5 is divided by 7.
    (a) 2   (b) 3   (c) 4   (d) 5

Questions (15):

Two partners in business, Mohit and Mahendra started business in 2002. In 2003 the profit was divided in such a way that Mohit got ₹ 8000 and Mahendra took 20% of the profit. The next year both individually got ₹ 12000. In 2006 Mohit got 25% of the profit, while Mahendra took ₹15000 which was 25% more than what he got the previous year when the profit was shared between him and Mohit in the ratio 2:3.
Based on the above data, answer the following.

15. The ratio of Mohit's share of the profit in 2004 and 2005 to Mahendra's share in the same period was:
   (a) 5 : 2   (b) 5 : 4   (c) 6 : 3   (d) none of these

16. Who earned more money from 2003 to 2006?
   (a) Mohit   (b) Mahendra
   (c) both got equal amounts   (d) cannot be determined

17. A, B and C together can do a piece of work in 10 days; B and C together work thrice as much as A and A and B together work 4 times as much as C. In what time can each do it alone (in days)?
   (a) 45, 22, 52   (b) 40, 18, 50   (c) 40, 200/11, 50   (d) 30, 200/11, 55

18. Devam and Deepak invest `3000 and `4000 respectively in a business. If Devam doubles his capital after 6 months, then in what proportion should Devam and Deepak divide that year's profit?
   (a) 6 : 5   (b) 9 : 8   (c) 5 : 6   (d) 8 : 9

19. A right circular cone is divided into 3 portions A, B and C by planes parallel to the base as shown in the figure. The height of each portion is 1 units. The ratio of the volume of B to that of C is:
   (a) 7 : 19
   (b) 19 : 7
   (c) 1 : 7
   (d) 3 : 5
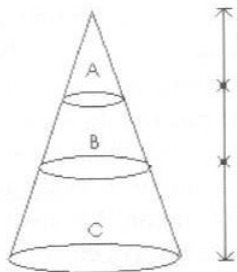
20. A man on a cliff observes a fishing trawler at an angle of depression of 30° which is approaching the shore to the point immediately beneath the observer with a uniform speed. 6 minutes later, the angle of depression of the trawler is found to be 60°. The time taken by the trawler to reach the shore from the position last observed is:
   (a) $3\sqrt{3}$ min   (b) $\sqrt{3}$ min   (c) 1.5 min   (d) 3 min

21. The average weight of 45 students in a class is 52 kg. Five of them whose average weight is 48 kg leave the class and other 5 students whose average weight is 54 kg join the class. What is the new average weight (in kg) of the class?
   (a) 52.6   (b) $52\frac{2}{3}$ (c) $52\frac{1}{3}$ (d) None of these

22. A taxi in a city covers one third of the distance @ 20 km/hr, one fourth @ 30 km/hr and the rest @ 40 km/hr. What is the average speed for the entire journey?

3

(a) $21\dfrac{9}{11}$ km/hr   (b) 25 km/hr   (c) 30 km/hr   (d) none of these

23. In the rectangular co-ordinate system, the area of the shaded region is:
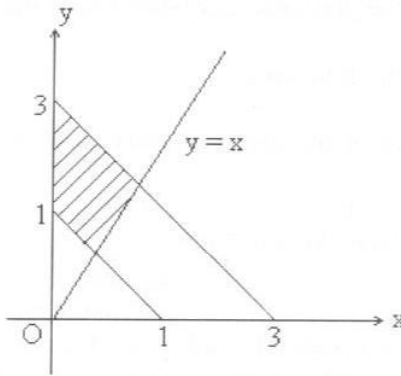
(a) 4 sq. units   (b) 3 sq. units   (c) 2 sq. units   (d) $3\dfrac{1}{2}$ sq. units

24. $\dfrac{1}{1.3}+\dfrac{1}{3.5}+\dfrac{1}{5.7}+...+\dfrac{1}{(2n-1)(2n+1)}=?$

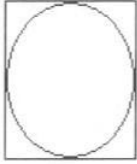(a) $\dfrac{n}{2n-1}$ (b) $\dfrac{n}{2n+1}$ (c) $\dfrac{1}{2n+1}$ (d) $\dfrac{1}{2n-1}$

25. A & B are running on a 240m circular path starting at the same point, in opposite direction. If the speed of A & B are 6m/sec, & 4m/sec respectively when will they meet for the first time? Also when will they meet for the first time at the starting point?
(a) 24 seconds , 120 seconds   (b) 120 seconds, 120 seconds
(c) 24 seconds, 240 seconds   (d) 120 seconds, 240 seconds

Directions (Que. 26 to 30): Each of the Questions consists of two quantities, one in Column A and one in Column B. You are to compare the two quantities and choose

(a) if the quantity in Column A is <u>always</u> greater;
(b) if the quantity in Column B is <u>always</u> greater;
(c) if the quantities are <u>always</u> equal;
(d) if none of the other choices is <u>always</u> correct.

	Column A	Column B
26.	5393 × 73,415	6293 × 71,714
	The area of the circle with centre at C is 16π	
27.	x	4
28.	p, q and r are 3 consecutive odd integers such that p < q < r	
	p + q + 1	q + r − 1
	When two women Sangeeta and Gita started to dieting under the guidance of a dietitian,	

29.	Sangeeta's weight was 5 kg more than Gita's. When they stopped each lost 15 kg.
	Percent of Sangeetas's starting weight lost on diet. Percent of Gita's starting weight lost on diet.
30.

A circular tabletop is cut from the square pieces of wood as shown above

Percent of the wood surface that is not used for the tabletop   25% |

31. Which number in the inner triangle in place of ? would match the pattern of the three triangles?
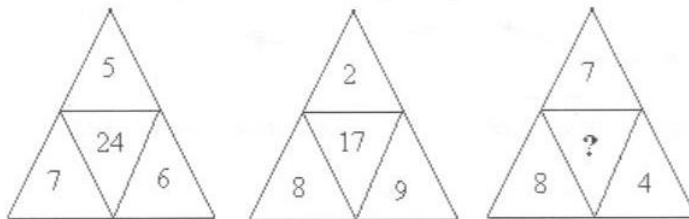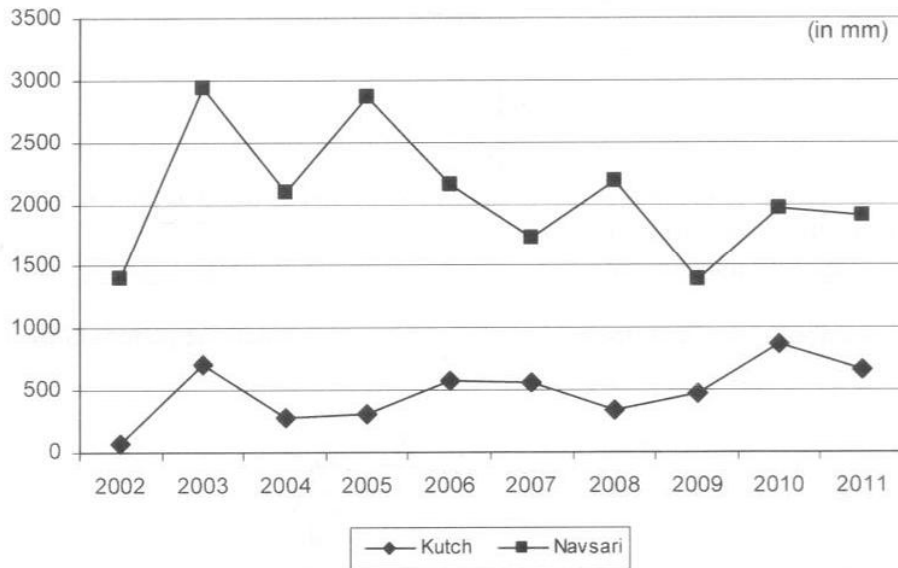

(a) 19   (b) 15   (c) 28   (d) None of these

32. A man borrows ₹ 4000 at 15% compound rate of interest. All the end of first and second years, he pays respectively ₹ 1500 and ₹ 2000. How much should he pay at end to third year to clear off the debt?

(a) ₹ 1605   (b) ₹ 1715   (c) ₹ 1800   (d) ₹ 2005

Questions (33 to 35)

Rain Fall Data - Kuchchh and Navsari Districts

33. What is the average rainfall of Navsari district in the period 2002-2011 in mm?
   (a) 1650   (b) 1843   (c) 2062   (d) 2235
34. Average rainfall of Navsari approximated bears the following ratio to the average rainfall of Kachchh.
   (a) 3.5:1   (b) 8.5:2   (c) 3.75:1   (d) 51:10
35. In Navsari in which year does the rainfall show sharpest percentage drop compared to the previous year.
   (a) 2004   (b) 2006   (c) 2007   (d) 2009

Questions (36 & 37)

Tree population in Municipal Corporation Areas - Eight major cities in Gujarat

Mahanagar Palika	Human Population	Geographical Area in Ha.	Number of Trees above 10 cm GBH
Ahmedabad	55,70,590	46,985	6,18,048
Surat	44,62,000	39,549	3,33,990
Vadodara	16,66,700	16,264	7,47,193
Gandhinagar	2,08,300	5,700	8,66,672

Rajkot	12,87,000	10,400	1,37,522
Bhavnagar + Victoria Park	5,93,770	5,320	4,75,953
Junagadh	3,20,250	5,670	76,694
Jamnagar	5,29,310	3,434	45,877
Total	**1,46,37,920**	**1,33,322**	**33,01,949**

36. Which major city has the lowest tree density per hectare of geographical area?
(a) Ahmedabad   (b) Surat   (c) Rajkot   (d) Jamnagar

37. In the municipal corporation areas what is number of trees above 10 cm GBH per thousand human populations?
(a) 0.2   (b) 8   (c) 226   (d) 24.8

38. Two economists adopted different techniques to measure the per capita income of farmers of Gujarat. Later it is proven that the first economist over-estimated the true value by x%, while the second under-estimated the true value by y%.
What % is the estimate of the second economist relative to the estimate of the first?
(a) $\dfrac{100-y}{100+x}$ (b) $\dfrac{100+x}{100-y}\times100$ (c) $\dfrac{100+x}{100-y}$ (d) $\dfrac{100-y}{100+x}\times100$

39. What is the sum of the following series?
$$\frac{2}{7}+\frac{4}{7^2}+\frac{6}{7^3}+\frac{8}{7^4}+\frac{10}{7^5}+\dots\infty$$
(a) $\dfrac{6}{7}$ (b) $\dfrac{7}{12}$ (c) $\dfrac{7}{24}$ (d) $\dfrac{7}{18}$

40. If x □ y implies x^y and the < > stand for ( ), while * and ≠ stand respectively for × and +, then solve for x in the following.
2 □ 3 * < 2 □ 2 o 5 > = 3 □ 2 * 2 □ < x + 1 >
(a) 0   (b) 1   (c) $1\dfrac{1}{2}$ (d) 2

Answer Key: Sample Paper
Quantitative Ability

1	c	11	d	21	b	31	c
2	b	12	d	22	d	32	c
3	c	13	b	23	c	33	c
4	a	14	c	24	b	34	b
5	c	15	b	25	a	35	d
6	c	16	a	26	b	36	b
7	c	17	c	27	a	37	c
8	d	18	b	28	b	38	d
9	b	19	a	29	b	39	d
10	b	20	d	30	b	40	d

Solution: Sample Paper
(Quantitative Ability)

1. Margin of profit is defined as the portion of SP that goes to the trader as profit. In short,
$\text{Margin\%} = \dfrac{SP - CP}{SP} \times 100$, which is equivalent to the following:

$$\left(1 - \dfrac{\text{Margin\%}}{100}\right) = \dfrac{CP}{SP}$$

In the specific situation, $SP = \dfrac{5CP}{4}$ Thus the gain percentage would be 25%

The extent of cheating implies that gain percentage is $\dfrac{1000 - 800}{800} \times 100 = 25\%$

Hence (c)

2. The LCM of the three given numbers is 300. The smallest six digit number is 1,00,000, which on division by 300 leaves a remainder of 100. Hence to get the required number you have to add 200 to 1,00,000.
Option (b)

3. Let $x = \sqrt{6 - \sqrt{6 - \sqrt{6 - \sqrt{6 - ...\infty}}}}$

The expression $\sqrt{6 - x}$ is infinitely repeated.
Its value should be such that if we put the value in the square root function we should get back the same number. Mathematically, the number should be such that $\sqrt{6 - x} = x$. Moreover the number should be less than $\sqrt{6} \approx 2.4$.

It is easy to see that 2 is the right candidate because $\sqrt{6 - 2} = 2$.

4. The statement I alone is sufficient because every voter voted for one of the candidates. If 80% female voters voted for Edith the rest 20% must have voted for Jose.
Statement II alone is not sufficient because we are not told about how the female voters cast their vote.
Option (a)

5. Because we are interested in finding values of all three variables x, y and z neither I nor II alone will be sufficient.
Now consider the situation when both I and II are true.
Statement I implies that x and y will have the values (1, 8) or (2, 4) For the first pair it is possible that
$x = 1$, $y = 8$ and also $x = 8$, $y = 1$
From statement II, the possible pair of values for y and z are (3, 3) and (1, 9)
When both I and II are true the conclusion is that $y = 1$
$\therefore x = 8$, y=1 and $z = 9$
Hence (c)

6. In statement I there are two unknowns, hence I alone would not be sufficient.

In statement II, there is no monetary value mentioned, hence II alone will not be sufficient. Combining, if A and B are respectively the values of one kg apples and one dozen bananas, you will get:

10A + 18B = 950 ... (1)

A = 2B ... (2)

These two equations have unique solution. Hence (c)

7. Statement I gives the rate of Hose X and that alone is not enough. Similarly statement II alone is also not sufficient. Combining one can get the answer.

Option (c)

8. Since each ring has 13 different positions the total number of attempts that can be made to open the lock is 13^3. Out of these, there is just one attempt which will open the lock.

Thus, the number of ways of making unsuccessful attempts is $13^3 - 1 = 2196$.

9. It is enough to work with approximate values in this DI set

April production ≈ 150

May production ≈ 250

Option (b)

10. Overall production in April = 450

Overall production in May = 600

Option (b)

11. Overall production in June = 500

Taking data of previous answer ratio is 450 : 600 : 500

= 4.5 : 6 : 5

Option (d)

12. If k be the value of the equal proportions, the last condition implies that k=2.

Then

B = 4C, and A = 2B ∴ B = 24D, A = 48D

From the last condition,

$A + B + C + D = D(48 + 24 + 6 + 1) = 79D = ₹\ 7900$

$\therefore D = 100 \Rightarrow A = 4800$

13. After h hours the rains have moved respectively to the points (-200 + 80h, 0) and (0, -400 + 40h)

The distance between the train is

$D^2 = (80h - 200)^2 + (40h - 400)^2$

$\left(\dfrac{D}{40}\right)^2 = (2h - 5)^2 + (h - 10)^2$

$= 4h^2 - 20h + 25 + h^2 - 20h + 100$

$= 5h^2 - 40h + 125$

$= 5[(h - 4)^2 + 9]$

This distance will be minimum when h = 4 i.e. after four hours from the start.

14. According to the law of remainders

$\text{Remainder}\left(\dfrac{30 \times 30 \times 30 \times 30 \times 30}{7}\right) = \text{Remainder}\left(\dfrac{2 \times 2 \times 2 \times 2 \times 2}{7}\right)$

Because 30 divided by 7 leaves remainder 2.

Now 32 divided by 7 will leave remainder 4.

∴ Final remainder is 4

15 & 16

An easy way to do this problem is to develop a matrix in which details could be filled in:

Year	Mohit	Mahendra
2003	8,000	2,000
2004	12,000	12,000
2005	18,000	12,000
2006	5,000	15,000
	43,000	41,000

In the period 2004 to 2005, Mohit got ₹ 30,000, while Mahendra got ₹ 24,000.

Hence the ratio of profit was 5:4

Moreover, during the same period Mohit earned ₹ 43,000 in profits, while Mahendra earned only 41,000. This should make answers clear.

17. Let A, B, C take respectively a, b and c days.

$$\frac{1}{a} + \frac{1}{b} + \frac{1}{c} = \frac{1}{10} \quad \dots (1)$$

$$\frac{1}{b} + \frac{1}{c} = \frac{3}{a} \quad \dots (2)$$

$$\frac{1}{a} + \frac{1}{b} = \frac{4}{c} \quad \dots (3)$$

Putting for $\frac{1}{b} + \frac{1}{c}$ form (2) into (1)

$$\frac{4}{a} = \frac{1}{10} \qquad \therefore a = 40$$

Similarly, c = 50

$$\frac{1}{b} = \frac{1}{10} - \frac{1}{40} - \frac{1}{50} = \frac{20 - 5 - 4}{200} = \frac{11}{200} \Rightarrow b = \frac{200}{11}$$

18. Ratio of profit has to be in the ratio of investments.

$$\frac{3000 \times 6 + 6000 \times 6}{4000 \times 12} = \frac{9}{8}$$

19. The radii of circles at the three levels from the top are in the ratio 1 : 2 : 3. Take top layer (i.e. A layer) radius of base as 1. This is fine because you are interested in the ratio of volumes.

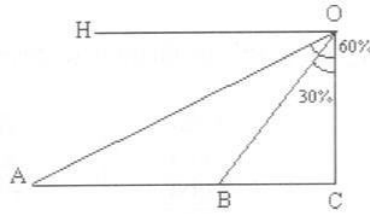$$V_A = \frac{1}{3}\pi\, 1^2 \times 1 = \frac{\pi}{3}$$

$$V_B = \frac{1}{3}\pi\, 2^2 \times 2 - V_A = \frac{8\pi}{3} - \frac{\pi}{3} = \frac{7\pi}{3}$$

$$V_C = \frac{1}{3}\pi\, 3^2 \times 3 - \frac{1}{3}\pi\, 2^2 \times 2 = \frac{19\pi}{3}$$

$$\therefore V_B : V_C = 7 : 19$$

20.

OH is the horizontal line. A is the initial position of the trawler. By virtue of the given conditions $\angle HOA = 30^\circ$

Let $OC = h$ the height of the cliff
Using properties of 30°-60°-90° triangle,

$$BC = \frac{h}{\sqrt{3}}, \quad AC = \sqrt{3}h \quad \therefore AB = \sqrt{3}h - \frac{h}{\sqrt{3}} = \frac{2}{\sqrt{3}}h$$

$$\frac{\text{Time from B to C}}{\text{Time from A to B}} = \frac{BC}{AB} = \frac{\frac{h}{\sqrt{3}}}{\frac{2h}{\sqrt{3}}} = \frac{1}{2}$$

$$\therefore \text{Time from B to C} = 6 \times \frac{1}{2} = 3 \text{ min}$$

21. Total increase in weight is $5 \times 54 - 5 \times 48 = 5 \times 6 = 30$

So increase in average weight $\frac{30}{45} = \frac{2}{3}$

22. Let the total distance be x

$$\text{Average speed} = \frac{\text{Total distance}}{\text{Total time}}$$

$$= \frac{x}{\frac{x}{3 \times 20} + \frac{x}{4 \times 30} + \frac{5x}{12 \times 40}}$$

$$= \frac{1}{\frac{1}{80} + \frac{1}{120} + \frac{5}{480}}$$

$$= \frac{480}{6 + 4 + 5} = 32 \text{ km/hr}$$

Hence the correct answer choice is (d)

23. The Required Area $= \frac{1}{2}\left[\frac{1}{2} \times 3 \times 3 - \frac{1}{2} \times 1 \times 1\right] = \frac{1}{4} \times 8 = 2$

Hence the correct answer choice is (c)

24. You know that $(2n-1)$ is nth term of the AP: 1, 3, 5, 7 … when $(2n+1)$ is $(n+1)$th term of the same AP. Let us call the nth term of given series a_n.

The difference of the two terms in the denominator is constant and equal to 2.

Hence $2a_1 = \frac{1}{1} - \frac{1}{3}$

$$2a_2 = \frac{1}{3} - \frac{1}{5}$$

4

$$2a_3 = \frac{1}{5} - \frac{1}{3}$$

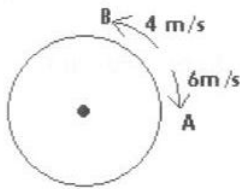$$2a_n = \frac{1}{2n-1} - \frac{1}{2n+1}$$

Adding

$$\therefore 2(a_1 + a_2 + \dots + a_n) = 1 - \frac{1}{2n+1} = \frac{2n}{2n+1}$$

$$\therefore \text{The sum} = \frac{n}{2n+1}$$

Hence (b)

25.

In 1 sec their separation is 10 m

So they would meet for the first time after 24 sec.

The individuals A and B respectively come back to the starting the point in every 40 and 60 sec. So after 120 sec (LCM of 60 & 40) would meet again at the starting point.

Option (a)

26. No need to waste time multiplying large numbers.

Product of two unequal positive numbers increases when the numbers move to each other i.e. the smaller is increased and the larger is diminished.

Option (b)

27. Given that $\pi r^2 = 16\pi$ $\therefore$ diameter = 8

$$2x^2 = 8^2 \Rightarrow x = 4\sqrt{2}$$

Option (a)

28. We know p = q − 2 and r = q + 2

p + q + 1 = 2q − 1; and q + r − 1 = 2q + 1

Option (b)

29. They lost equal amount of weight. At start Sangeeta's weight was more. Therefore Gita lost higher percentage of weight.

30. Let r be radius of circle.

Area of wood = 2r × 2r = $4r^2$

Area of tabletop = $\pi r^2 = 3.14\pi$

Wood not used = $0.86r^2$

% of wood not used = $\frac{0.86}{4} < \frac{1}{4}$

Option (b)

31. Focusing on the first triangle on the left and working with 5, 6 and 7 in pairs or single you cannot get 24 easily. So think in reverse $24^2 = 576$. Similarly, $17^2 = 289$.

Hence the number must be 28.

32. At the end of year 1 debt remaining = $4000 \times 1.15 - 1500 = 3100$
At the end of year 2 the debt remaining = $3100 \times 1.5 - 2000 = 1565$
At the end of year 3 he has to pay $1565 \times 1.15 = 1800$
Option (c)

33. Using approximate values
Average rainfall Navsari

$$\approx \frac{1}{10}(1400 + 2900 + 2100 + 2850 + 2150 + 1700 + 2200 + 14 + 1950 + 1900) = 2055$$

Option (c)

34. Average rainfall Kuchchh

$$\approx \frac{1}{10}(100 + 700 + 300 + 300 + 550 + 550 + 350 + 500 + 850 + 650) = 485$$

Ratio (approx) = 4.2
Option (b)

35. Highest percentage decline will materialize when drop is sharp and initial value is comparatively small. These two happen together for 2009.
Option (d)

36. Trim the numbers and compare

Ahmedabad Trees/ha $\approx \dfrac{618}{47}$ etc.

One can easily see that Surat has lowest number per hectare.
Option (b)

37. It is easy to that the average number of trees per thousand population is only 226.

38. Let I be true value.

Estimate of the first = $I\left(1 + \dfrac{x}{100}\right)$

Estimate of the second = $I\left(1 - \dfrac{y}{100}\right)$

Required % = $\dfrac{1 - \dfrac{y}{100}}{1 + \dfrac{x}{100}} \times 100 = \dfrac{100 - y}{100 + x} \times 100$

39. Let $S = \dfrac{2}{7} + \dfrac{4}{7^2} + \dfrac{6}{7^3} + \dfrac{8}{7^4} + \dfrac{10}{7^5} + \ldots \infty$

$\dfrac{S}{7} = \dfrac{2}{7^2} + \dfrac{4}{7^3} + \dfrac{6}{7^4} + \dfrac{8}{7^5} + \ldots \infty$

$\dfrac{6S}{7} = \dfrac{2}{7} + \dfrac{2}{7^2} + \dfrac{2}{7^3} + \dfrac{2}{7^4} + \dfrac{2}{7^5} + \ldots \infty$

$$= \frac{2}{7}\left(1 + \frac{1}{7} + \frac{1}{7^2} + \frac{1}{7^3} + \ldots \infty\right)$$

$$= \frac{2}{7} \times \frac{1}{1 - \frac{1}{7}} = \frac{1}{3}$$

$$\therefore S = \frac{7}{18}$$

Option (d)

40. $2^3 \times (2^2 + 5) = 3^2 \times 2^{x+1}$
$\therefore x = 2$