ANSWERS

EXERCISE 1.1

1. (C) **2.** (D) **3.** (C) **4.** (B) **5.** (A)

6. (B) **7.** (C) **8.** (A) **9.** (D) **10.** (D)

EXERCISE 1.2

1. No, because an integer can be written in the form $4q$, $4q+1$, $4q+2$, $4q+3$.

2. True, because n $(n+1)$ will always be even, as one out of n or $(n+1)$ must be even.

3. True, because n $(n+1)$ $(n+2)$ will always be divisible by 6, as atleast one of the factors will be divisible by 2 and atleast one of the factors will be divisible by 3.

4. No. Since any positive integer can be written as $3q$, $3q+1$, $3q+2$,

therefore, square will be $9q^2 = 3m$, $9q^2 + 6q + 1 = 3\,(3q^2 + 2q) + 1 = 3m + 1$, $9q^2 + 12q + 3 + 1 = 3m + 1$.

5. No. $(3q + 1)^2 = 9q^2 + 6q + 1 = 3\,(3q^2 + 2q) = 3m + 1$.

6. HCF = 75, as HCF is the highest common factor.

7. $3\times5\times7+7 = 7\,(3\times5 + 1) = 7\,(16)$, which has more than two factors.

8. No, because HCF (18) does not divide LCM (380).

9. Terminating decimal expansion, because $\frac{987}{10500}=\frac{47}{500}$ and $500=5^3\times 2^2$

$\left[\frac{987}{10500}=\frac{329}{3500}=\frac{329}{2^2.5^3.7}=\frac{47}{2^2 5^3}=.094.\right]$

10. Since 327.7081 is a terminating decimal number, so q must be of the form $2^m.5^n$; m, n are natural numbers.

EXERCISE 1.3

8. 63 **9.** 625 **12.** 2520 cm **13.** $2^3.5^4$; 0.0514

EXERCISE 2.1

1. (A) **2.** (C) **3.** (D) **4.** (D) **5.** (B)
6. (A) **7.** (B) **8.** (A) **9.** (C) **10.** (A)
11. (D)

EXERCISE 2.2

1. (i) No (ii) 0, $ax^2 + bx + c$ (iii) *deg p* (x) < *deg g* (x)

(iv) deg $g(x) \leq$ deg $p(x)$ (v) No

2. (i) False (ii) False (iii) True (iv) True (v) True
(vi) False (vii) False

EXERCISE 2.3

1. $1, -\frac{1}{4}$ **2.** $\frac{2}{3}, -2$ **3.** $-1, \frac{-7}{5}$ **4.** $0, -3, 5$ **5.** $\frac{-3}{2}, \frac{-1}{4}$

6. $\frac{\sqrt{2}}{4}, \frac{-3\sqrt{2}}{2}$ **7.** $\frac{1}{2}, \sqrt{2}$ **8.** $\sqrt{3}, -5\sqrt{3}$ **9.** $-2\sqrt{5}, \frac{\sqrt{5}}{2}$ **10.** $\frac{2}{3}, -\frac{1}{7}$

EXERCISE 2.4

1. (i) $-2, \frac{-2}{3}$ (ii) $\frac{5}{2}, \frac{1}{8}$ (iii) $-3\sqrt{3}, \sqrt{3}$ (iv) $\frac{\sqrt{5}}{5}, \frac{-\sqrt{5}}{2}$

2. $a = -1$ and $b = 3$ or $a = 5$, $b = -3$. Zeroes are -1, 2, 5

3. $\frac{-\sqrt{2}}{2}, \frac{-2\sqrt{2}}{3}$ **4.** $k = -3$

Zeroes of $2x^4 + x^3 - 14x^2 + 5x + 6$ are $1, -3, 2, -\frac{1}{2}$

Zeroes of $x^2 + 2x - 3$ are $1, -3$

5. $\sqrt{5}, \sqrt{5}+\sqrt{2}, \sqrt{5}-\sqrt{2}$ **6.** $a = -1, b = -2$

1 and 2 are the zeroes of $q(x)$ which are not the zeroes of $p(x)$.

EXERCISE 3.1

1.	(D)	**2.**	(D)	**3.**	(C)	**4.**	(D)	**5.**	(D)
6.	(C)	**7.**	(C)	**8.**	(D)	**9.**	(D)	**10.**	(D)
11.	(C)	**12.**	(D)	**13.**	(C)				

EXERCISE 3.2

1. (i) Yes (ii) No (iii) No

2. (i) No (ii) Yes (iii) No

3. (i) No (ii) Yes (iii) Yes (iv) No

4. No **5.** False **6.** Not true

EXERCISE 3.3

1. (i) $\lambda = -1$ (ii) $\lambda = 1$ (iii) All real values of λ except ± 1.

2. $k = -6$ **3.** $a = 3, b = 1$

4. (i) All real values of p except 10. (ii) $p = 1$

(iii) All real values of p except $\frac{9}{10}$. (iv) All real values of p except -4.

(v) $p = 4, q = 8$

5. Do not cross each other.

6. $x - y = -4$

$2x + 3y = 7$; infinitely many pairs.

7. 31, $\frac{-5}{7}$ **8.** $x = 1, y = 4$

9. (i) $x = 1.2,\ y = 2.1$ (ii) $x = 6,\ y = 8$ (iii) $x = 3, y = 2$

(iv) $x = \frac{1}{6},\ y = \frac{1}{4}$ (v) $x = 1,\ y = -1$ (vi) $x = a^2, y = b^2$

(vii) $x = \frac{1}{2},\ y = \frac{-3}{2}$

10. $x = 340, y = -165;\ \lambda = -\frac{1}{2}$

11. (i) consistent; $x = -1, y = -1$ (ii) inconsistent

(iii) consistent. The solution is given by $y = 3–x$, where x can take any value, i.e., there are infinitely many solutions.

12. (2,0), (0, 4), (0, –4); 8 sq. units. **13.** $x = y$; Infinitely many lines.

14. $a = 5, b = 2$. **15.** 55º, 85º.

16. Salim's age = 38 years, Daughter's age = 14 years.

17. 40 years. **18.** 40, 48. **19.** 100 students in hall A, 80 students in hall B.

20. Rs 10, Rs 3. **21.** 100.

22. $x = 20, y = 30, \angle A = 130º, \angle B = 100º, \angle C = 50º, \angle D = 80º$

EXERCISE 3.4

1. $x = 1, y = 4$; 4:1 **2.** (0, 0), (4, 4), (6, 2) **3.** 8 sq. units

4. $4x + 4y = 100, 3x = y + 15$, where Rs x and Rs y are the costs of a pen and a pencil box respectively; Rs 10, Rs 15 **5.** (1, 0), (2, 3), (4, 2) **6.** 10 km/h, 40 km/h

7. 2.5 km/h **8.** 10 km/h, 4 km/h **9.** 83

10. Rs 2500, Rs 30 **11.** Rs 600, Rs 400

12. Rs 12000 in scheme A, Rs 10000 in scheme B **13.** 500

EXERCISE 4.1

1. (D) **2.** (C) **3.** (C) **4.** (A) **5.** (B)
6. (D) **7.** (B) **8.** (C) **9.** (B) **10.** (A)
11. (C)

EXERCISE 4.2

1. (i) No, because discriminant = $-7 < 0$.

(ii) Yes, because discriminant = $9 > 0$.

(iii) No, because discriminant = 0.

(iv) Yes, because discriminant = $4 > 0$.

(v) No, because discriminant = $-64 < 0$.

(vi) Yes, because discriminant = $(2+2\sqrt{2})^2 > 0$.

(vii) Yes, because discriminant = $1 > 0$.

(viii) No, because discriminant = $-7 < 0$.

(ix) Yes, because discriminant = $1 > 0$.

(x) Yes, because discriminant = $8 > 0$.

2. (i) False, for example : $x^2 = 1$ is a quadratic equation with two roots.

(ii) False, for example $x^2 + 1 = 0$ has no real root.

(iii) False, for example : $x^2+1 = 0$ is a quadratic equation which has no real roots.

(iv) True, because every quadratic polynomial has almost two zeroes.

(v) True, because if in $ax^2+bx+c = 0$, a and c have opposite signs, then $ac<0$ and so $b^2-4ac > 0$.

(vi) True, because if in $ax^2+bx+c = 0$, a and c have same sign and $b = 0$, then $b^2-4ac = -4ac < 0$.

3. $x^2-3x+1=0$ is an equation with integral coefficients but its roots are not integers.

4. $x^2-6x+7=0$, which has roots $3+\sqrt{2}, 3-\sqrt{2}$

5. Yes. $\sqrt{3}x^2-7\sqrt{3}x+12\sqrt{3}=0$. which has roots 3, 4

6. No. **7.** Yes

EXERCISE 4.3

1. (i) $\frac{5}{2}, -1$ (ii) $-1, -\frac{8}{5}$ (iii) $-\frac{4}{3}, 3$ (iv) $5, 2$

(v) $-3\sqrt{2}, \sqrt{2}$ (vi) $\sqrt{5}, 2\sqrt{5}$ (vii) $\sqrt{11}+3, \sqrt{11}-3$

2. (i) $-\frac{3}{2}, \frac{2}{3}$ (ii) $-\frac{1}{2}, 3$ (iii) $\sqrt{2}, -\frac{\sqrt{2}}{6}$

(iv) $\frac{\sqrt{5}}{3}, -2\sqrt{5}$ (v) $\frac{1}{21}, \frac{1}{21}$

EXERCISE 4.4

1. (i) Real roots exist; roots are $\frac{1}{2}, \frac{-3}{4}$

(ii) Real roots exist; roots are $2, -\frac{1}{2}$

(iii) Real roots exist; roots are $\frac{1}{5}+\frac{\sqrt{51}}{5}, \frac{1}{5}-\frac{\sqrt{51}}{5}$

(iv) Real roots exist; roots are $4+\frac{3\sqrt{2}}{2}, 4-\frac{3\sqrt{2}}{2}$

(v) Real roots exist; roots are $-7\sqrt{5}, 2\sqrt{5}$

2. The natural number is 12

3. The natural number is 8

4. Original speed of the train is 45 km/h

5. Zeba's age now is 14 years

6. Nisha's age is 5 years and Asha's age is 27 years.

7. Length of the pond is 34 m and breadth is 24 m

8. 14

EXERCISE 5.1

1.	(D)	**2.**	(B)	**3.**	(B)	**4.**	(B)	**5.**	(C)
6.	(B)	**7.**	(B)	**8.**	(B)	**9.**	(C)	**10.**	(A)
11.	(C)	**12.**	(D)	**13.**	(B)	**14.**	(C)	**15.**	(A)
16.	(A)	**17.**	(C)	**18.**	(A)				

EXERCISE 5.2

1. (i), (iv) and (vii) form an AP as in each of these $a_{k+1} - a_k$ is the same for different values of k.

2. False, as $a_4 - a_3 \neq a_3 - a_2$.

3. Yes, $a_{30} - a_{20} = (30 - 20)d = 10d = -40$.

4. The difference between any two corresponding terms of such APs is the same as the difference between their first terms.

5. No.

6. No, as the total fare (in Rs) after each km is 15, 23, 31, 39, ---

7. (i), (ii) and (iii) form an AP as in the list of numbers formed every succeeding term is obtained by adding a fixed number.

8. (i) Yes (ii) No (iii) No

EXERCISE 5.3

1. $(A_1) \rightarrow (B_4)$

$(A_2) \rightarrow (B_5)$

$(A_3) \rightarrow (B_1)$

$(A_4) \rightarrow (B_2)$

2. (i) $1, \frac{5}{4}, \frac{3}{2}$ (ii) $\frac{11}{3}, \frac{10}{3}, 3$ (iii) $4\sqrt{3}, 5\sqrt{3}, 6\sqrt{3}$

(iv) $(a+2) + (b+1), (a+2) + (b+2), (a+3) + (b+2)$

(v) $5a + 4,\ 6a + 5,\ 7a + 6$

3. (i) $\frac{1}{2}, \frac{1}{3}, \frac{1}{6}$ (ii) $-5, -8, -11$ (iii) $\sqrt{2}, \frac{3}{\sqrt{2}}, \frac{4}{\sqrt{2}}$

4. $a=-1, b=15, c=31$ **5.** 3, 7, 11, 15, --- **6.** $d=-\frac{1}{5}, n=27$

7. 1, 6, 11, 16, --- **8.** 126 **10.** Yes, 17th term. **11.** $k = 0$

12. 67, 69, 71 **13.** 40°, 60°, 80°

14. 16th term; –21 **15.** –1 **16.** –78 **17.** 12th term

18. 73 **19.** 3 **20.** $n = 6, d = 10$

21. (i) –9400 (ii) $\frac{7n-1}{2}$ (iii) $\frac{11(11a-6b)}{a+b}$ **22.** 16th term; –632

23. –780 **24.** 5, 13, 21, --- **25.** $k = 27$ **27.** –510

28. 100 **29.** 330 **30.** 1170 **31.** 504

32. $n = 5, 11$ **33.** 11 **34.** Rs 800 **35.** 25 months.

EXERCISE 5.4

1. 970 **2.** (i) 12250 (ii) 12750 (iii) 75250

3. 3 **4.** 3, 7, 11, 15, --- **5.** (i) 1683 (ii) 13167

6. 1:3; 5:49 **8.** 50 **9.** Rs 3900; Rs 44500

10. 728 m; 26 m.

EXERCISE 6.1

1. (C) **2.** (B) **3.** (C) **4.** (A) **5.** (D)
6. (B) **7.** (B) **8.** (A) **9.** (B) **10.** (C)
11. (A) **12.** (C)

EXERCISE 6.2

1. No, $25^2 \neq 5^2 + 24^2$ **2.** No, $\angle D = \angle R$ but $\angle F \neq \angle P$.

3. Yes, because $\frac{PA}{QA} = \frac{PB}{BR}$ **4.** Yes, SAS criterion.

5. No, $\Delta QPR \sim \Delta STM$ **6.** No, Corresponding sides must also be proportional.

7. Yes, as the corresponding two sides and the perimeters are equal, their third sides will also be equal.

8. Yes, AAA criterion. **9.** No, ratio will be $\frac{9}{25}$.

10. No, For this, $\angle P$ should be 90°.

11. Yes, AA criterion.

12. No, angles should be included angles between the two pairs of proportional sides.

EXERCISE 6.3

2. $x = 2$ **4.** 9:1 **6.** $4\sqrt{3}$ cm **7.** 18 cm

8. 1:3 **9.** 60 cm **10.** 108 cm^2 **12.** 12 cm

13. $\frac{55}{3}$ cm **14.** 10 m **15.** 8 m

EXERCISE 6.4

1. 5 cm, 2 cm **2.** BC = 6.25 cm, EF = 16.8 cm. **5.** 0.8 m

6. 8 km **7.** 20.4 m **8.** 9 m

9. $2\sqrt{5}$ cm, 6 cm **10.** $2\sqrt{5}$ cm, 5 cm, $3\sqrt{5}$ cm **14.** 8 cm, 12 cm, 16 cm

EXERCISE 7.1

1.	(B)	**2.**	(B)	**3.**	(C)	**4.**	(B)	**5.**	(C)
6.	(B)	**7.**	(C)	**8.**	(B)	**9.**	(D)	**10.**	(A)
11.	(B)	**12.**	(D)	**13.**	(B)	**14.**	(A)	**15.**	(A)
16.	(D)	**17.**	(D)	**18.**	(B)	**19.**	(B)	**20.**	(C)

EXERCISE 7.2

1. True. Because all three sides of both triangles are proportional.

2. True. The three points lie on the line $x = -4$.

3. False, since two points lie on the y – axis and one point lies in quadrant I.

4. False. $PA = \sqrt{2}$ and $PB = \sqrt{10}$, i.e., $PA \neq PB$.

5. True, since ar (ΔABC) = 0.

6. False, since the diagonals donot bisect each other.

7. True, radius of the circle = 5 and OP > 5

8. False, since $AP \neq AQ$

9. True, since P divides AB in the ratio 1 : 2

10. True, since B divides AC in the ratio 2 : 7

11. False, since $PC = \sqrt{26} < 6$, P will lie inside the circle.

12. True, Mid-points of both the diagonals are the same and the diagonals are of equal length.

EXERCISE 7.3

1. Scalene triangle

2. (9, 0), (5, 0), 2 points

3. Rectangle

4. $a = -3$

5. (–3, 5) the middle point of AB. Infinite number of points. In fact all points which are solutions of the equation $2x+y+1 = 0$.

6. $\left(\frac{-1}{2}, 0\right)$, isosceles triangle

7. $\frac{19}{14}$

8. $y = -3, -5$, $PQ = \sqrt{290}$, $13\sqrt{2}$

9. 0

10. 6:7, $\left(\frac{-34}{13}, 0\right)$

11. 1:5

12. $a = 1$ $b = -3$

13. $k = 22$, $AB = 2\sqrt{61}$

14. $a = 5, 3$

15. 19

16. 11

17. $a = 2$, Area = 6 sq. unit

18. $\left(\frac{4}{5}, \frac{21}{5}\right)$

19. $2, \frac{1}{2}$

20. 8:1, $\left(\frac{8}{3}, \frac{-1}{9}\right)$

EXERCISE 7.4

1. $\left(0,\ 3-4\sqrt{3}\right)$ **2.** $\frac{3}{4}$ sq. units.

3. (i) $\left(\frac{x_2+x_3}{2}, \frac{y_2+y_3}{2}\right)$ (ii) $\left(\frac{x_1+x_2+x_3}{3}, \frac{y_1+y_2+y_3}{3}\right)$

(iii) same as (ii) (iv) same as (ii)

4. $a=-3, h=\frac{12\sqrt{26}}{13}$

5. Yes, Jaspal should be placed at the point (7, 5)

6. House to Bank = 5 km

Bank to school = 10 km

School to Office = 12 km

Total distance travelled = 27 km

Distance from house to office = 24.6 km

Extra distance = 2.4 km

EXERCISE 8.1

1.	(B)	**2.**	(A)	**3.**	(B)	**4.**	(C)	**5.**	(B)
6.	(B)	**7.**	(C)	**8.**	(A)	**9.**	(A)	**10.**	(D)
11.	(B)	**12.**	(C)	**13.**	(C)	**14.**	(B)	**15.**	(A)

EXERCISE 8.2

1.	True	**2.**	False	**3.**	False [sin 80° – sin 10° = positive : as θ increases, value of sin θ increases]				
4.	True	**5.**	True	**6.**	False	**7.**	False	**8.**	False
9.	False	**10.**	False	**11.**	False	**12.**	True		

EXERCISE 8.3

8. 30° **9.** $\frac{-1}{2}$ **10.** $\frac{15}{2}$ m **11.** 1 **12.** 90° **14.** 45°

EXERCISE 8.4

3. $10\left(\sqrt{3}+1\right)$ m **7.** $25\sqrt{3}$ m **13.** $10\sqrt{3}$ m; 10 m **14.** h (cot α – cot β)

16. $5\left(\sqrt{3}+3\right)$ m **18.** 8 m

EXERCISE 9.1

1. (B) **2.** (D) **3.** (C) **4.** (A) **5.** (D)
6. (C) **7.** (A) **8.** (A) **9.** (D) **10.** (B)

EXERCISE 9.2

1. False **2.** False **3.** True **4.** True **5.** True
6. False **7.** True **8.** False **9.** True **10.** True

EXERCISE 9.3

1. 3 cm

EXERCISE 9.4

3. 20 cm **5.** 4.8 cm **7.** 30° **11.** $\frac{20}{3}$ cm

12. 70º **13.** $8\sqrt{2}\,\text{cm}^2$ **14.** 24 cm

EXERCISE 10.1

1. (D) **2.** (B) **3.** (A) **4.** (C) **5.** (B)
6. (D)

EXERCISE 10.2

1. True **2.** False **3.** False **4.** True

EXERCISE 10.3

2. Yes **7.** No

EXERCISE 10.4

1. 3.25 cm **2.** Yes, yes **3.** 4 cm **6.** 8 cm

EXERCISE 11.1

1. (B) **2.** (A) **3.** (B) **4.** (A) **5.** (B)
6. (A) **7.** (D) **8.** (B) **9.** (C) **10.** (D)

EXERCISE 11.2

1. No, radius of the circle is $\frac{a}{2}$

2. Yes, side of the square is $2a$ cm

3. No, side of the outer square = diagonal of the inner square

4. No, it is only true for minor segment.

5. No, it is πd.

6. Yes, distance covered in one revolution = $2\pi r$

7. No, it will depend on the value of radius.

8. Yes, it will be true for the arcs of the same circle.

9. No, it will be true for the arcs of the same circle.

10. No, it will be true for arcs of the same circle.

11. Yes, radius of the circle breadth of the rectangle.

12. Yes, their radii are equal

13. Yes, their radii are equal

14. No, diagonal of the square is p cm.

EXERCISE 11.3

1. 33 cm **2.** $(16\pi - 32)$ cm^2 **3.** 308 cm^2
4. 500. **5.** 154 m^2 **6.** $(380 + 25\pi)$cm^2
7. 54.5 cm^2 **8.** $(32 + 2\pi)$m^2 **9.** $(248 - 4\pi)$m^2

10. $\left(\frac{308}{3}-49\sqrt{3}\right)\text{cm}^2$ **11.** 30.96 cm^2 **12.** 39.25 cm^2

13. 308 cm^2 **14.** 15246 m^2 **15.** 1386 cm^2 **16.** $\frac{60}{\pi}\text{cm}$

EXERCISE 11.4

1. Rs 26400 **2.** 560 **3.** $\left(24\sqrt{21}-77\right)\text{m}^2$

4. $\left(75.36-36\sqrt{3}\right)\text{cm}^2$ **5.** Rs 3061.50 **6.** 196 cm^2

7. 1.967 cm^2 (approx) **8.** 8.7 cm^2 **9.** 42 cm^2

10. 168 cm^2 **11.** 4.3 m^2 **12.** 800 cm^2 **13.** 1 : 3 : 5

14. $45\frac{5}{6}\text{cm}^2$ **15.** $73\frac{1}{3}\text{cm}$, Areas: $\frac{154}{3}\text{cm}^2$, 154 cm^2; Arc lengths: $\frac{44}{3}\text{cm}$; Arc lengths of two sectors of two different circles may be equal, but their area need not be equal.

17. $(180-8\pi)\ \text{cm}^2$ **18.** 40 **19.** $\left(\frac{25\pi}{4}+\frac{25}{2}\right)\text{cm}^2$ **20.** 462 cm^2

EXERCISE 12.1

1. (A)	**2.** (A)	**3.** (B)	**4.** (B)	**5.** (C)
6. (D)	**7.** (A)	**8.** (A)	**9.** (B)	**10.** (A)
11. (B)	**12.** (C)	**13.** (A)	**14.** (A)	**15.** (A)
16. (B)	**17.** (C)	**18.** (A)	**19.** (A)	**20.** (D)

EXERCISE 12.2

1. False	**2.** False	**3.** False	**4.** False	**5.** False
6. True	**7.** False	**8.** True		

EXERCISE 12.3

1. 6 cm **2.** 84 **3.** 15 cm **4.** 7:1 **5.** 160 cm^2

6. 277 cm^3 **7.** 855 cm^2 (approx.)

8. 14 cm, 7 cm; 132 cm^3, 66 cm^3; 396 cm^3 **9.** 327.4 cm^3

10. 150 **11.** 1500 **12.** 2541 **13.** 12960 **14.** 450

EXERCISE 12.4

1. 28.44 cm **2.** 8.6 m **3.** 3960 cm^3, 29.7 kg **4.** 480000 words
5. 51 minutes 12 sec **6.** 74.25m^3,80.61 m^2 **7.** Rs 2250
8. 2 hours **9.** 112 m **10.** 0.5 cm **11.** 487.6 cm^3
12. Rs 230.12 **13.**36 cm, 43.27 cm **14.** 301.44 cm^2, 377.1 cm^3
15. 4 m **16.** 54 **17.** 1.584 m^3
18. 90 cm **19.**2.5 cm **20.** 170.8 cm^3

EXERCISE 13.1

1. (C) **2.** (B) **3.** (A) **4.** (C) **5.** (B)
6. (B) **7.** (B) **8.** (C) **9.** (C) **10.** (C)
11. (A) **12.** (D) **13.** (D) **14.** (A) **15.** (C)
16. (B) **17.** (C) **18.** (A) **19.** (A) **20.** (A)
21. (D) **22.** (B) **23.** (C) **24.** (A) **25.** (C)
26. (B)

EXERCISE 13.2

1. Not always, because for calculating median of a grouped data, the formula used is based on the assumption that the observations in the classes are uniformly distributed (or equally spaced).

2. Not necessary, the mean of the data does not depend on the choice of *a* (assumed mean).

3. No, it is not always the case. The values of these three measures can be the same. It depends on the type of data.

4. Not always. It depends on the data.

5. No, the outcomes are not equally likely. For example, outcome 'one girl' means *gbb, bgb, bbg* 'three girls' means *ggg* and so on.

6. No, the outcomes are not equally likely. The outcome '3' is more likely than the others.

7. Peehu; probability of Apoorv's getting $36 = \frac{1}{36}$ while probability of Peehu's getting $36 = \frac{1}{6} = \frac{6}{36}$.

8. Yes, the probability of each outcome is $\frac{1}{2}$, since the two outcomes are equally likely.

9. No, outcomes '1' and 'not 1' are not equally likely, $P(1)=\frac{1}{6}$, $P(\text{not } 1)=\frac{5}{6}$,

10. No, the outcomes are not equally likely. Outcome 'no head' means 'TTT'; outcome 'one head' means THT, HTT, TTH and so on. P (TTT) = $\frac{1}{8}$, P (one head) = $\frac{3}{8}$ and so on.

11. No, the outcomes 'head' and 'tail' are equally likely every time regardless of what you get in a few tosses.

12. It could be a tail or head as both the outcomes are equally likely, in each toss.

13. No, head and tail are equally likely. So, no question of expecting a tail to have a higher chance in the 4th toss.

14. Yes, the outcomes 'odd number', 'even number' are equally likely in the situation considered.

EXERCISE 13.3

1. 5.5 **2.** 35 **3.** 12.93 **4.** 26 **5.** Rs. 356.5

6. 109. 92 **7.** 123.4 kg **8.** 14.48 km/*l*; No, the manufacturer is claiming mileage 1.52 km/h more than the average mileage

9.

Weight (in kg)	Number of persons
Less then 45	4
Less then 50	8
Less then 55	21
Less then 60	26
Less then 65	32
Less then 70	37
Less then 75	39
Less then 80	40

10.

Marks	Number of students
0-10	10
10-20	40
20-30	80
30-40	140
40-50	170
50-60	130
60-70	100
70-80	70
80-90	40
90-100	20

11.

Marks	Number of candidates
0-10	2
10-20	2
20-30	3
30-40	4
40-50	6
50-60	6
60-70	5
70-80	2
80-90	4

12. $a = 12$, $b = 13$, $c = 35$, $d = 8$, $e = 5$, $f = 50$

13.

(i) Less than type		(ii) More than type	
Ages (in years)	**Number of students**	**Ages (in years)**	**Number of students**
Less than 10	0	More than or equal to 10	300
Less than 20	60	More than or equal to 20	240
Less than 30	102	More than or equal to 30	198
Less than 40	157	More than or equal to 40	143
Less than 50	227	More than or equal to 50	73
Less than 60	280	More than or equal to 60	60
Less than 70	300		

14.

Marks	Number of students
0-20	17
20-40	5
40-60	7
60-80	8
80-100	13

15. Rs 1263.15 **16.** 109.17 km/h **17.** Rs 11875

18. 201.7 kg **19.** (i) $\frac{1}{6}$ (ii) $\frac{5}{6}$ **20.** (i) $\frac{1}{6}$ (ii) $\frac{5}{12}$ (iii) 0

21. (i) $\frac{1}{9}$ (ii) $\frac{1}{9}$ (iii) 0 **22.** $\frac{4}{9}$

23. $P(2)=\frac{1}{18}$, $P(3)=\frac{1}{9}$, $P(4)=\frac{1}{6}$, $P(5)=\frac{1}{6}$, $P(6)=\frac{1}{6}$, $P(7)=\frac{1}{6}$, $P(8)=\frac{1}{9}$ $P(9)=\frac{1}{18}$

24. $\frac{3}{4}$ **25.** (i) $\frac{1}{8}$ (ii) $\frac{1}{2}$ **26.** $\frac{2}{9}$

27. (i) $\frac{5}{11}$ (ii) $\frac{7}{22}$ (iii) $\frac{17}{22}$

28. (i) $\frac{13}{49}$ (ii) $\frac{3}{49}$ **29.** (i) $\frac{10}{49}$ (ii) $\frac{1}{49}$

30. (i) $\frac{1}{10}$ (ii) $\frac{3}{10}$ (iii) $\frac{3}{5}$

31. (i) $\frac{14}{99}$ (ii) $\frac{85}{99}$ **32.** (i) $\frac{1}{2}$ (ii) $\frac{9}{100}$

33. $\frac{21}{26}$ **34.** 0.69 **35.** $\frac{11}{75}$

36. P (not defective) = $\frac{3}{4}$, P (2nd bulb defective) = $\frac{5}{23}$

37. (i) $\frac{4}{9}$ (ii) $\frac{5}{9}$ (iii) $\frac{1}{3}$ (iv) $\frac{5}{18}$

38. (i) $\frac{1}{8}$ (ii) $\frac{1}{8}$ (iii) $\frac{3}{4}$

39. (i) 5 scores (0, 1, 2, 6, 7, 12) (ii) $\frac{1}{3}$

40. (i) $\frac{7}{8}$ (ii) $\frac{15}{16}$ **41.** (i) $\frac{5}{6}$ (ii) $\frac{1}{3}$

42. (i) 0.009 (ii) $\frac{8}{999}$

[Hint : (ii) After first player has won the prize the number of perfect squares greater than 500 will be reduced by 1]

EXERCISE 13.4

1. 51.75 **2.** 48.41 **3.** 31 years **4.** 201.96 g

7. Median salary = Rs 13420, Modal salary = Rs 12730

8. $f_1 = 28$, $f_2 = 24$ **9.** $p = 5$, $q = 7$

11. Median = 17.81 hectares, Mode = 17.76 hectares

12. Median rainfall = 21.25 cm

13. average = 170.3 sec.

14. (i)

Distance (in m)	No. of students	Cummulative frequency
0-20	6	6
20-40	11	17
40-60	17	34
60-80	12	46
80-100	4	50

(iii) 49.41 m.