ANSWERS KEY

1. (c)	2. (b)	3. (b)	4. (c)	5. (c)	6. (b)	7. (d)	8. (b)	9. (d)	10. (a)
11. (c)	12. (b)	13. (a)	14. (b)	15. (c)	16. (b)	17. (c)	18. (a)	19. (a)	20. (a)
21. (b)	22. (a)	23. (a)	24. (c)	25. (a)	26. (d)	27. (b)	28. (c)	29. (b)	30. (a)
31. (a)	32. (d)	33. (b)	34. (c)	35. (b)	36. (c)	37. (c)	38. (d)	39. (c)	40. (b)
41. (a)	42. (c)	43. (c)	44. (c)	45. (a)	46. (b)	47. (c)	48. (c)	49. (d)	50. (c)
51. (a)	52. (c)	53. (d)	54. (b)	55. (d)	56. (b)	57. (c)	58. (c)	59. (c)	60. (a)
61. (d)	62. (d)	63. (c)	64. (a)	65. (d)	66. (b)	67. (d)	68. (d)	69. (b)	70. (a)
71. (d)	72. (c)	73. (c)	74. (c)	75. (a)	76. (b)	77. (d)	78. (d)	79. (d)	80. (c)
81. (c)	82. (b)	83. (d)	84. (d)	85. (c)	86. (b)	87. (c)	88. (a)	89. (a)	90. (b)
91. (c)	92. (b)	93. (b)	94. (b)	95. (c)	96. (d)	97. (c)	98. (a)	99. (c)	100. (a)

Hints and Solutions

31. Let one angle be $x°$
Therefore, other complement angle be $90° - x°$
[∵ sum of two complementary angles is 90°]
Given, difference of two complementary angles
$$= 12°$$
$$\therefore \quad x° - (90° - x°) = 12°$$
$$\Rightarrow x° - 90° + x° = 12°$$
$$\Rightarrow 2x° = 12° + 90°$$
$$\Rightarrow 2x° = 102°$$
[on transposing $(-90°)$ from LHS to RHS]
On dividing both sides by 2, we get
$$\frac{2x°}{2} = \frac{102}{2}$$
$$\Rightarrow x° = 51°$$
∴ One angle = 51°
and its complement angle = $90° - 51°$
$= 39°$
Hence, the required complementary angles are 51° and 39°

32. We have, diameter = 14 cm
∴ Radius $(r) = \frac{14}{2} = 7$cm
∴ Surface area of a sphere = $4\pi r^2$
$= 4 \times \frac{22}{7} \times 7^2 = 4 \times 22 \times 7 = 616$ cm^2

33. Let the first even number be x.
Second consecutive even number = $x + 2$
and third consecutive even number = $(x + 2) + 2 = x + 4$
so, as per the given condition, we have
$$x + x + 2 + x + 4 = 132$$
$$\Rightarrow 3x + 6 = 132$$
$$\Rightarrow 3x = 132 - 6$$
$$\Rightarrow 3x = 126$$
$$\Rightarrow x = 126 \times \frac{1}{3} = 42$$
∴ Second number = $42 + 2 = 44$
and third number = $42 + 4 = 46$
so, the greatest number = 46

34. $84 - 2r - 2r^2 = 2(r^2 + r - 42)$
$$= -2(r^2 + 7r - 6r - 42)$$
$$= -2[r(r + 7) - 6(r + 7)]$$
$$= -2(r - 6)(r + 7) = 2(6 - r)(r + 7)$$

35. Given, $\frac{x^2+y^2}{x^2-y^2} = \frac{17}{8}$
On applying componendo and dividend, we get $\frac{(x^2+y^2)+(x^2-y^2)}{(x^2+y^2)-(x^2-y^2)} = \frac{17+8}{17-8}$
$$\Rightarrow \frac{2x^2}{2y^2} = \frac{25}{9}$$
$$\Rightarrow \frac{x^2}{y^2} = \left(\frac{5}{3}\right)^2$$
On taking square root both sides, we get
$$\frac{x}{y} = \frac{5}{3}$$
$$\therefore \quad x : y = 5 : 3$$

36. Here, greatest sector represent 40% of whole circle, so maximum number of people like Light music.

37. Total number of CD's = 1000
∴ Number of semi-classicial CD's = 20% of 1000

$$= \frac{20}{100} \times 1000 = 200$$

Number of folk music CD's = 30% of 1000

$$= \frac{30}{100} \times 1000 = 300$$

38. $\because \sqrt{24} = \sqrt{2 \times 2 \times 2 \times 3} = 2\sqrt{6}$

$\sqrt{216} = \sqrt{3 \times 3 \times 3 \times 2 \times 2 \times 2} = 6\sqrt{6}$

$\sqrt{96} = \sqrt{2 \times 2 \times 2 \times 2 \times 2 \times 3} = 4\sqrt{6}$

So, $\frac{2\sqrt{6}+6\sqrt{6}}{4\sqrt{6}} = \frac{\sqrt{6}(2+6)}{4\sqrt{6}} = \frac{8\sqrt{6}}{4\sqrt{6}} = \frac{8}{4} = 2$

39. Given, CP = Rs 12000, SP= Rs 8000

Loss = CP –SP = 12000 – 8000

= Rs 4000

$\therefore$ Loss% $= \frac{Loss}{Cost\ price} \times 100$

$$= \frac{4000}{12000} \times 100 = \frac{100}{3}\% = 33\frac{1}{3}\%$$

40. $\because (3x + 2y)^2 = (3x)^2 + (2y)^2 + 2 \times (3x)(2y)$

$$= 9x^2 + 4y^2 + 12xy$$

Similarly, $(3x - 2y)^2 = 9x^2 + 4y^2 - 12xy$

$$\therefore (3x + 2y)^2 + (3x - 2y)^2$$

$$= (9x^2 + 4y^2 + 12xy) + (9x^2 + 4y^2 - 12xy)$$

$$= 18x^2 + 8y^2$$

41. Area covered by the grass = Area of the park left after cementing the path – Area of rectangular beds

= 504 m^2 - 2(1.5 × 2) m^2

= 504 m^2 – 6 m^2

= 498 m^2

42. We have, $5^{3x-1} + 25 = 125$

$$\Rightarrow 5^{3x-1} \times \frac{1}{25} = 125$$

$$\Rightarrow \frac{5^{3x}}{5} \times \frac{1}{5 \times 5} = 5 \times 5 \times 5$$

$$\Rightarrow 5^{3x} \times \frac{1}{5^3} = 5^3$$

$$\Rightarrow 5^{3x} = 5^3 \times 5^3$$

$$\Rightarrow 5^{3x} = 5^{3+3} = 5^6$$

$\Rightarrow 3x = 6$ [$\because$ bases are same]

$$\Rightarrow x = 6 \times \frac{1}{3} = 2$$

43. If the speed of car remains constant. Then, distance is directly proportional to time, i.e. $d \propto 1$

Here, $d_1 = 60\ km$, $t_2 = 2$ and $d_2 = ?$, $t_2 = 6$

$\Rightarrow \frac{d_1}{t_1} = \frac{d_2}{t_2}$ [$\because d$ =distance, t =time]

$$\frac{60}{2} = \frac{d_2}{6}$$

$\therefore\ d_2 = \frac{60 \times 6}{2} = 180$ km

So, 180 km travelled by the car in 6 h.

44. It is given that

$x - \frac{1}{x} = 7$ .....(i)

On squaring Eq. (i) both sides, we get

$$\left(x - \frac{1}{x}\right)^2 = (7)^2$$

$$\Rightarrow (x)^2 + \left(\frac{1}{x}\right)^2 - 2 \times x \times \frac{1}{x} = 49$$

[in LHS using identity, $(a - b)^2 = a^2 + b^2 - 2ab$]

$$\Rightarrow x^2 + \frac{1}{x^2} - 2 = 49$$

$$\Rightarrow x^2 + \frac{1}{x^2} = 49 + 2$$

$$\Rightarrow x^2 + \frac{1}{x^2} = 51$$

45. For a pair of integers whose product is −36 and whose difference = 15

So, first integer = −3 and second integer = 12

Their product = (−3) × 12 = −(3×12) = −36 and the difference between these two integer is 15.

46. HCF of $\frac{12}{7}, \frac{18}{7}, \frac{24}{7} = \frac{\text{HCF}\,(12,18,24)}{\text{LCM}\,(7,7,7)} = \frac{6}{7}$

47. The prime factorisation of 5832

2	5832
2	2916
2	1458
3	729
3	243
3	81
3	27
3	9
3	3
	1

5832 = $\underline{2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3}$

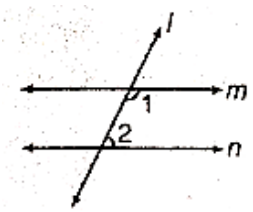
Therefore,

$\sqrt[3]{5832} = \sqrt{2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3}$

$$2 \times 3 \times 3 = 18$$

48. Let l be a transversal intersecting two parallel lines m and n.

Let $\angle 1 = 3x$ and $\angle 2 = 2x$



Also, $\angle 1 + \angle 2 = 180°$

$\Rightarrow 3x + 2x = 180°$

$\Rightarrow x = 36°$

$\therefore \angle 1 = 3 \times 36° = 108°$

and $\angle 2 = 2 \times 36° = 72°$

so, the greater of two angles is 108°.

49. We have, $-5 + 2\sqrt{5} - \sqrt{5} = -5 + \sqrt{5}$

Here, -5 is a rational number and $\sqrt{5}$ is an irrational number. We know that, the addition of a rational number and an irrational number is always an irrational number.

Thus, $(-5 + \sqrt{5})$ is an irrational number.

Hence, $(0 - 5 + 2\sqrt{5} - \sqrt{5})$ is an irrational number.

50. Given, total surface area of the cube = 86 cm^2

But we know that, total surface area of cube = $6a^2$ [$\because$ a = edge of the cube]

$\therefore \ 6a^2 = 486$

$\Rightarrow a^2 = \frac{486}{6} = 81$

$\Rightarrow a = \sqrt{81} = 9$cm

[on taking positive square root]

We know that, lateral surface area of cube = $4a^2$

$= 4(9)^2 = 4 \times 81 = 324$ cm^2

51. In the given triangle, $\angle P = y$, $\angle Q = 40°$, $\angle PRQ = 30°$, $\angle SRP = x$

We know that, the sum of all angles in a triangle is equal to 180°.

$\therefore \angle PQR + \angle QPR + \angle PRQ = 180°$

$\Rightarrow 40° + y + 30° = 180°$

$\Rightarrow y = 180° - 70° = 110°$

Also, the sum of interior opposite angles is equal to exterior angel.

$\because 40° + 110° = 150° = x$

$\Rightarrow x = 150°$

Now, $2x = 2 \times 150°$

$\therefore \ 2x = 300°$

52. We have, perimeter = 77cm

$(x + 1) + (x + 2) + (2x + 2) + (2x + 1) + (x + 1) = 77$

$\Rightarrow 7x + 7 = 77$

$\Rightarrow 7x = (77 - 7)$

$\Rightarrow 7x = 70$

$\Rightarrow x = 70 \times \frac{1}{7}$

$\Rightarrow x = 10$

Hence, the required value of x is 10 cm.

53. Given, $p(x) = x^3 - 4x^2 + x + 6$ .....(i)

Put $x = 3$ in eq. (i), we get

$p(3) = (3)^3 - 4(3)^2 + 3 + 6$

$= 27 - 36 + 9 = 0$

54. Given, $a : b = 5 : 3$

$\therefore \frac{a}{b} = \frac{5}{3}$

Now, $\frac{5a+8b}{6a-7b} = \frac{\frac{5a}{b}+\frac{8b}{b}}{\frac{6a}{b}-\frac{7b}{b}}$

[divided numerator and denominator by b]

$= \frac{5 \times \frac{5}{3} + 8}{6 \times \frac{5}{3} - 7} = \frac{\frac{25}{3} + 8}{\frac{30}{3} - 7} = \frac{\frac{25+24}{3}}{\frac{30-21}{3}}$

$= \frac{\frac{49}{3}}{\frac{9}{3}} = \frac{49}{3} \times \frac{3}{9} = \frac{49}{9}$ $\left[\because \frac{a}{b} = \frac{5}{3}\right]$

$\therefore (5a + 8b) : (6a - 7b) = 49 : 9$

55. Total number of sector = 3 green + 5 black + 10 red = 18

Number of non-black sectors i.e. number of green and red sectors = 3+10=13

$\therefore$ Probability of getting a non-black sector = $\frac{13}{18}$

56. Given that, $\sqrt{248 + \sqrt{52 + \sqrt{144}}}$

$= \sqrt{248 + \sqrt{52 + 12}}$ [$\because$ $144 = (12)^2$]

$= \sqrt{248 + \sqrt{64}}$

$= \sqrt{248 + 8}$ [$\because$ $64 = (8)^2$]

$= \sqrt{256} = 16$

Hence, value of the expression is 16.

57. Here, principle(P) =Rs 48000

Rate (R)= 8% per annum

Time (n) = 1 yr

when interest is compounded half-yearly, then

$$A = P\left(1+\frac{R}{200}\right)^2 = 48000\left(1+\frac{8}{200}\right)^2$$
$$= 48000 \times \frac{26}{25} \times \frac{26}{25} = 76.8 \times 26 \times 26$$
= Rs 51916.80
∴ Compound Interest (CI) = A – P
= Rs (51916.80 – 48000)
= Rs 3916.80

58. (c)

59. According to the given figure,
Area of wall = Length × Breadth
$= (5x + 2) \times 5x$
$= 5x \times 5x \times +5x \times 2$
$= 25x^2 + 10x$sq unit
Area of window $= 2x \times x = 2x^2$sq unit
and area of door $= 3x \times x = 3x^2$sq unit
Now, total area of window and door
$= 2x^2 + 3x^2$
$= 5x^2$sq unit
Thus, remaining area of wall to be painted
$= (25x^2 + 10x) - (5x^2)$
$= 25x^2 + 10x - 5x^2$
$= 20x^2 + 10x$
$= 10x(2x + 1)$ sq unit

60. $\angle y + 40° = 180°$ [by linear pair]
$\Rightarrow \angle y = 180° - 40°$
$\Rightarrow \angle y = 140°$
$\angle z = 40°$ [vertically opposite angles]
$\because \angle x + 25° + \angle z = 180°$ [by linear pair]
$\angle x + 25°40° = 180°$
$\angle x = 180° - 65° = 115°$
Hence, $\angle x = 115°$, $\angle y = 140°$
and $\angle z = 40°$

61. Given, birds travel = 15000 km
So, 15000 km = 15000 × 1000 m
[$\because$ 1 km = 1000 m]
$= 15 \times 10^3 \times 10^3\ m$
[$\because a^m \times a^n = a^{m+n}$]
$= 1.5 \times 10^7$ m
So, birds travel 1.5×10^7m.

62. Since, more persons can reap a field in lesser days.
Hence, number of persons and number of days to reap a field are in inverse proportion.
Let number of persons = n and number of days = d
Here, $n_1 = 30,\ d_1 = 17,\ d_2 = 10$ and n_2 =?
In case of inverse proportion,
$n_1 d_1 = n_2 d_2$
$\Rightarrow 30 \times 17 = n_2 \times 10$
$\Rightarrow n_2 = \frac{30 \times 17}{10} = 51$
Hence, number of more persons which should be engaged = 51 – 30 = 21

63. For a negative integer and a positive integer whose difference is +2
First integer = 1
and second integer = -1
$\therefore 1 - (-1) = 1 + 1 = 2$

64. We have to find the LCM of 10, 15, 20, 25, 30, 35

2	10, 15, 20, 25, 30, 35
2	5, 15, 10, 25, 15, 35
3	5, 15, 5, 25, 15, 35
5	5, 5, 5, 15, 5, 35
5	1, 1, 1, 5, 1, 7
7	1, 1, 1, 1, 1, 7
	1, 1, 1, 1, 1, 1

∴ LCM = 2 × 2 × 3 × 5 × 5 × 7 = 2100
In 7 hour (7 × 3600 sec), then the ring will toll together, $= \frac{7 \times 3600}{2100} = 12$ times