

Notes for valuers

- Award step marks for correct method even if the final answer has a small arithmetic slip.
- Accept any other correct method (for example, division method instead of prime factorisation).
- Section D: only one of (a) or (b) is to be valued.

SECTION – A**20 × 1 = 20**

1. C) 200
2. B) odd
3. B) 25
4. B) 0.9
5. C) 64
6. A) 10
7. A) 2
8. B) 81
9. B) a^{mn}
10. C) 1
11. B) 5,20,000
12. B) 2026
13. B) 10
14. B) 90°
15. B) rhombus
16. A) 100°
17. C) 3105
18. B) odd
19. C) $a^2 - 2ab + b^2$
20. B) 2 : 3

SECTION – B**4 × 2 = 8**

21. (i) Figure 4 has $4 \times 4 = 16$ dots; 7 dots (the 4th odd number) were added to Figure 3. [1 + 1]
 (ii) Sum of the first n odd numbers = n^2 ; so the first 10 odd numbers add up to $10^2 = 100$.
22. $3375 = 3 \times 3 \times 3 \times 5 \times 5 \times 5 = 3^3 \times 5^3$ [1 + 1]
 $\sqrt[3]{3375} = 3 \times 5 = 15$
23. $(5^2 \times 5^4) \div 5^3 = 5^6 \div 5^3 = 5^3 = 125$ [1 + 1]
24. $x + 2x + 3x + 4x = 360^\circ \rightarrow 10x = 360^\circ \rightarrow x = 36^\circ$ [1 + 1]
 Angles: **$36^\circ, 72^\circ, 108^\circ, 144^\circ$**

SECTION – C

5 × 4 = 20

25. $2400 = 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 5 \times 5 = 2^5 \times 3 \times 5^2$

[1 each]

The unpaired factors are one 2 and one 3, so divide by $2 \times 3 = 6$.

$2400 \div 6 = 400 = 2^4 \times 5^2$

$\sqrt{400} = 2^2 \times 5 = 20$

26. (i) $3^4 \times 5^2$

[1 each]

(ii) $4^3 = 64$ and $3^4 = 81$, so **3^4 is greater.**

(iii) **5.97×10^{24} kg**

(iv) $5^6 \div 5^5 = 5$

27. The diagonals of a rectangle bisect each other, so $OA = OC$: $2x + 1 = x + 4 \rightarrow x = 3$.

[2 + 1 + 1]

$OA = 7$ cm, so **$AC = 14$ cm.** The diagonals of a rectangle are equal, so **$BD = 14$ cm.**

(iii) Properties used: diagonals of a rectangle are equal and bisect each other.

28. (i) The last two digits 48 are divisible by 4, so **5148 is divisible by 4.** Sum of digits $5 + 1 + 4 + 8 = 18$, which is divisible by 9, so **5148 is divisible by 9.**

[2 + 2]

(ii) Let the numbers be $n, n + 1, n + 2$. Sum $= 3n + 3 = 3(n + 1)$, which is always a multiple of 3.

29. (i) Blue : white = 2 : 5. 2 parts = 6 L, so 1 part = 3 L; white = $5 \times 3 = 15$ litres.

[2 + 2]

(ii) $2 + 3 + 4 = 9$ parts; $1800 \div 9 = 200$; **$A = ₹400, B = ₹600, C = ₹800$.**

SECTION – D

4 × 8 = 32

30. a) (i) $5929 = 7 \times 7 \times 11 \times 11 = 7^2 \times 11^2$; $\sqrt{5929} = 7 \times 11 = 77$

[4 + 4]

(ii) LCM of 6, 8, 15 = $120 = 2^3 \times 3 \times 5$. To make it a perfect square, multiply by $2 \times 3 \times 5 = 30$.

Smallest square number = $120 \times 30 = 3600 (= 60^2)$.

30. b) (i) $1^3 + 12^3 = 1 + 1728 = 1729$ and $9^3 + 10^3 = 729 + 1000 = 1729$.

[3 + 5]

(ii) $2744 = 2^3 \times 7^3 \rightarrow \sqrt[3]{2744} = 14$; $5832 = 2^3 \times 3^6 = 2^3 \times (3^2)^3 \rightarrow \sqrt[3]{5832} = 2 \times 9 = 18$.

31. a) (i) $(-2)^5 = -32$

[2 each]

(ii) $4^5 \div 4^4 = 4$

(iii) $2^6 \div 2^4 = 2^2 = 4$

(iv) $(1/2)^3 \times 2^3 = (1/8) \times 8 = 1$

31. b) (i) 47 = XLVII; 1326 = MCCCXXVI

[2 each]

(ii) $MCMXLVII = 1000 + 900 + 40 + 7 = 1947$

(iii) Any two: only ten symbols are needed; the value of a digit depends on its place, so large numbers are short to write; zero shows an empty place; addition, multiplication and other calculations are much easier.

(iv) $3,405 = 3 \times 10^3 + 4 \times 10^2 + 0 \times 10^1 + 5 \times 10^0$

32. a) (i) Completed table:

[4 + 4]

Property	Parallelogram	Rectangle	Rhombus	Square
Opposite sides are parallel	Yes	Yes	Yes	Yes
All sides are equal	No	No	Yes	Yes
Diagonals are equal	No	Yes	No	Yes
Diagonals meet at right angles	No	No	Yes	Yes

(ii) $\angle P + \angle Q = 180^\circ$ and $\angle P = 2\angle Q \rightarrow 3\angle Q = 180^\circ \rightarrow \angle Q = 60^\circ, \angle P = 120^\circ, \angle R = 120^\circ, \angle S = 60^\circ$

32. b) (i) Fourth angle = $360^\circ - (75^\circ + 90^\circ + 110^\circ) = 360^\circ - 275^\circ = 85^\circ$ [2 + 4 + 2]

(ii) $\angle C = \angle A = 60^\circ$; $\angle B = \angle D = 180^\circ - 60^\circ = 120^\circ$; diagonals of a rhombus are perpendicular, so $\angle AOB = 90^\circ$.

(iii) A square has opposite sides equal and parallel and all four angles 90° . These are exactly the conditions for a rectangle, so every square is a rectangle.

33. a) (i) $105^2 = (100 + 5)^2 = 10000 + 1000 + 25 = 11025$ [2 each]

(ii) $99 \times 101 = (100 - 1)(100 + 1) = 10000 - 1 = 9999$

(iii) $(2x + 3)^2 = 4x^2 + 12x + 9$

(iv) $(3a - 2b)(3a + 2b) = 9a^2 - 4b^2$

33. b) (i) Actual height = $30 \times 50 = 1500 \text{ cm} = 15 \text{ m}$ [2 each]

(ii) $7 + 5 = 12$ parts; $48 \div 12 = 4$; **boys = 28, girls = 20**

(iii) $y \div x = 10/2 = 20/4 = 30/6 = 5$ in every case, so **x and y are in direct proportion; constant = 5.**

(iv) Cost of 1 kg = $330 \div 6 = ₹55$; cost of 10 kg = **₹550**

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