

Notes for valuers

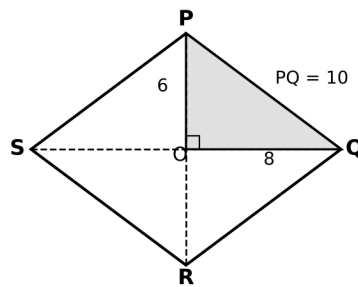
- Award step marks for correct method even if the final answer has a small arithmetic slip.
- Accept any other correct method (for example, division method instead of prime factorisation).
- Section D: only one of (a) or (b) is to be valued.

SECTION – A**20 × 1 = 20**

1. B) 1024
2. B) 9
3. B) 14
4. D) 8
5. A) 125
6. A) 2
7. B) the sum of two cubes in two different ways
8. B) -32
9. A) 2^7
10. B) 4.5×10^7
11. B) ₹64
12. B) 40
13. C) 60
14. C) 360°
15. C) square
16. B) 90°
17. A) 70°
18. B) the sum of its digits is divisible by 9
19. B) even
20. B) $a^2 - b^2$

SECTION – B**4 × 2 = 8**

21. $576 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3 = 2^6 \times 3^2$ [1 + 1]
 $\sqrt{576} = 2^3 \times 3 = 24$
22. $(3^5 \times 3^2) \div 3^4 = 3^{5+2-4} = 3^3 = 27$ [1 + 1]
23. The diagonals of a rhombus bisect each other at right angles, so $\angle POQ = 90^\circ$. [1 + 1]
 $PQ^2 = OP^2 + OQ^2 = 6^2 + 8^2 = 36 + 64 = 100$, so **PQ = 10 cm.**



24. Total parts = $2 + 3 = 5$; one part = $600 \div 5 = ₹120$

[1 + 1]

Ravi = $2 \times 120 = ₹240$, Sita = $3 \times 120 = ₹360$

SECTION – C

5 × 4 = 20

25. $1323 = 3 \times 3 \times 3 \times 7 \times 7 = 3^3 \times 7^2$

[1 each]

The factor 7 does not appear in a group of three, so multiply by 7.

$$1323 \times 7 = 9261 = 3^3 \times 7^3$$

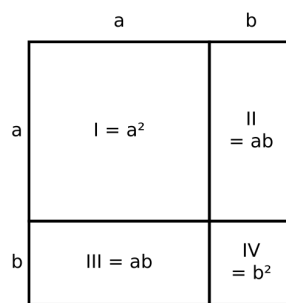
$$\sqrt[3]{9261} = 3 \times 7 = 21$$

26. (i) I = a^2 , II = ab , III = ab , IV = b^2

[2 + 1 + 1]

(ii) Area of the whole square = sum of the four parts: $(a + b)^2 = a^2 + 2ab + b^2$

(iii) $103^2 = (100 + 3)^2 = 100^2 + 2 \times 100 \times 3 + 3^2 = 10000 + 600 + 9 = 10609$



27. (i) 14,96,00,000 km = 1.496×10^8 km

[1 each]

(ii) 3,00,000 = 3×10^5

(iii) $(2^4)^3 \div 2^{10} = 2^{12} \div 2^{10} = 2^2 = 4$

(iv) $2^{10} = 1024$ and $10^3 = 1000$, so 2^{10} is greater.

28. Let the angles be $3x, 4x, 5x, 6x$. Sum of angles of a quadrilateral = 360° .

[1 + 1 + 2]

$$3x + 4x + 5x + 6x = 360 \rightarrow 18x = 360 \rightarrow x = 20$$

Angles: $60^\circ, 80^\circ, 100^\circ, 120^\circ$

29. (i) 1 cm stands for 25 km, so 6.4 cm stands for $6.4 \times 25 = 160$ km.

[2 + 2]

(ii) Map distance = $375 \div 25 = 15$ cm.

SECTION – D

4 × 8 = 32

30. a) (i) $7056 = 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 7 \times 7 = 2^4 \times 3^2 \times 7^2$; $\sqrt{7056} = 2^2 \times 3 \times 7 = 84$

[4 + 4]

(ii) $36^2 = 1296$ and $37^2 = 1369$. 1300 lies between them.

Number to be subtracted = $1300 - 1296 = 4$; the perfect square is 1296 and $\sqrt{1296} = 36$.

30. b) (i) The cube has 3 layers of 3×3 unit cubes: $3 \times 3 \times 3 = 27$ unit cubes. A cube of side 5 needs $5^3 = 125$ unit cubes.

[4 + 4]

(ii) $13824 = 2^9 \times 3^3 = (2^3)^3 \times 3^3$, so $\sqrt[3]{13824} = 2^3 \times 3 = 24$.

- 31. a)** (i) $2^{5+3-6} = 2^2 = 4$ [2 each]
 (ii) $(-1)^{50} = 1$ (even power), $(-1)^{51} = -1$ (odd power); sum = **0**
 (iii) $3^6 \div 3^4 = 3^2 = 9$
 (iv) $1 \times 1 \times 4 = 4$
- 31. b)** (i) After 1 fold: 0.2 mm; 2 folds: 0.4 mm; 3 folds: **0.8 mm** [3 + 3 + 2]
 (ii) After 10 folds: $0.1 \times 2^{10} = 0.1 \times 1024 = 102.4$ mm (about 10 cm)
 (iii) Each fold multiplies the thickness by 2, not adds 2. Repeated multiplication (powers) grows much faster than repeated addition, so the numbers become very large in a few steps.
- 32. a)** (i) Adjacent angles of a parallelogram are supplementary: $(3x + 10) + (2x - 5) = 180 \rightarrow 5x + 5 = 180 \rightarrow x = 35$ [4 + 4]
 $\angle A = 115^\circ$, $\angle B = 65^\circ$, $\angle C = \angle A = 115^\circ$, $\angle D = \angle B = 65^\circ$
 (ii) Any four: opposite sides are parallel; opposite sides are equal; opposite angles are equal; adjacent angles add up to 180° ; diagonals bisect each other.
- 32. b)** (i) (1) True – a square has all sides equal and opposite sides parallel. (2) False – a rhombus need not have right angles. (3) True – a rectangle has both pairs of opposite sides parallel. (4) False – a kite has two pairs of equal adjacent sides, not all four equal. [4 + 4]
 (ii) Diagonals of a rectangle are equal and bisect each other, so $OP = OQ$: $2x + 4 = 3x - 1 \rightarrow x = 5$; $OP = 14$ cm, so each diagonal = **28 cm**.
- 33. a)** (i) $98^2 = (100 - 2)^2 = 10000 - 400 + 4 = 9604$ [2 each]
 (ii) $102 \times 98 = (100 + 2)(100 - 2) = 10000 - 4 = 9996$
 (iii) $51^2 = (50 + 1)^2 = 2500 + 100 + 1 = 2601$
 (iv) $47 \times 53 = (50 - 3)(50 + 3) = 2500 - 9 = 2491$
- 33. b)** (i) Lemons per glass = $3/4$; for 20 glasses = $3/4 \times 20 = 15$ lemons [2 each]
 (ii) Speed = $180 \div 3 = 60$ km/h; in 5 hours = **300 km**
 (iii) $5 + 4 = 9$ parts; $36 \div 9 = 4$; **boys = 20, girls = 16**
 (iv) $8 : 12 = 2 : 3$ and $10 : 15 = 2 : 3$; the ratios are equal, so **they are in proportion** (also $8 \times 15 = 12 \times 10 = 120$).

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