

ANSWERS / RUBRICS

Question No: 11

سوال نمبر 11

a) If one packet contain $2\frac{1}{4}$ liters of milk then find the quantity of milk in 18 such packets. (05 marks)

اگر ایک پیکٹ میں $2\frac{1}{4}$ لٹر دودھ ہو تو ایسے 18 پیکٹوں میں دودھ کی مقدار معلوم کریں۔ (5 نمبر)

لٹر $2\frac{1}{4} = 1$ پیکٹ میں دودھ

(2 نمبر) $2\frac{1}{4} \times 18 = 18$ پیکٹوں میں دودھ

(1 نمبر) $= \frac{9}{4} \times 18$

(1 نمبر) $= \frac{81}{2}$

(1 نمبر) $= 40\frac{1}{2}$ لٹر

Milk in 1 packet = $2\frac{1}{4}$ l

Milk in 18 packets = $2\frac{1}{4} \times 18$ (2 Marks)

= $\frac{9}{4} \times 18$ (1 Mark)

= $\frac{81}{2}$ (1 Mark)

= $40\frac{1}{2}$ l (1 Mark)

Calculate the square root of 103041 by division method. (5 marks)

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Shaping Futures

103041 کا جذر بذریعہ تقسیم معلوم کریں۔ (5 نمبر)

Question No: 12

سوال نمبر 12

$$\begin{aligned}\sqrt{3364} &= \sqrt{2 \times 2 \times 29 \times 29} \quad (1 \text{ mark}) \\ &= \sqrt{2^2 \times 29^2} \quad (1 \text{ mark}) \\ &= \sqrt{(2 \times 29)^2} \quad (1 \text{ mark}) \\ &= 2 \times 29 \quad (1 \text{ mark}) \\ &= 58 \quad (1 \text{ mark})\end{aligned}$$

$$\begin{aligned}\sqrt{3364} &= \sqrt{2 \times 2 \times 29 \times 29} \quad (1 \text{ نمبر}) \\ &= \sqrt{2^2 \times 29^2} \quad (1 \text{ نمبر}) \\ &= \sqrt{(2 \times 29)^2} \quad (1 \text{ نمبر}) \\ &= 2 \times 29 \quad (1 \text{ نمبر}) \\ &= 58 \quad (1 \text{ نمبر})\end{aligned}$$

If one packet contains $5\frac{1}{4}$ liters of oil, then find the quantity of oil in 5 such packets. (5 marks)

اگر ایک پیکٹ میں $5\frac{1}{4}$ لٹر تیل ہو تو ایسے 5 پیکٹوں میں کتنا تیل ہو گا؟ (5 نمبر)

$$\begin{aligned}\text{Oil in 1 packet} &= 5\frac{1}{4} \text{ l} \\ \text{Oil in 5 packets} &= 5\frac{1}{4} \times 5 \quad (2 \text{ marks}) \\ &= \frac{21}{4} \times 5 \quad (1 \text{ mark}) \\ &= \frac{105}{4} \quad (1 \text{ mark}) \\ &= 26\frac{1}{4} \text{ l} \quad (1 \text{ mark})\end{aligned}$$

$$\begin{aligned}5\frac{1}{4} \text{ لٹر} &= \text{ایک پیکٹ میں تیل} \\ 5 \text{ پیکٹوں میں تیل} &= 5\frac{1}{4} \times 5 \quad (2 \text{ نمبر}) \\ &= \frac{21}{4} \times 5 \quad (1 \text{ نمبر}) \\ &= \frac{105}{4} \quad (1 \text{ نمبر}) \\ &= 26\frac{1}{4} \text{ لٹر} \quad (1 \text{ نمبر})\end{aligned}$$

Question No: 12

سوال نمبر 12

$$\begin{array}{r}
 1728 \\
 \underline{-2} \quad 864 \\
 \underline{-2} \quad 432 \\
 \underline{-2} \quad 216 \\
 \underline{-2} \quad 108 \\
 \underline{-2} \quad 54 \\
 \underline{-2} \quad 27 \\
 \underline{-3} \quad 9 \\
 \underline{-3} \quad 1
 \end{array}$$

$$\begin{array}{r}
 3 \overline{) 1728} \\
 \underline{3} \quad 17 \\
 \underline{15} \quad 28 \\
 \underline{27} \quad 1
 \end{array}$$

$$1728 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 3 \quad (2 \text{ نمبر})$$

مفرد تجزی

$$= 2^3 \times 2^3 \times 3^3$$

دونوں طرف جزر المکعب لینے سے

$$\sqrt[3]{1728} = \sqrt[3]{2^3 \times 2^3 \times 3^3} \quad (2 \text{ نمبر})$$

$$= (2^3 \times 2^3 \times 3^3)^{\frac{1}{3}} \quad (2 \text{ نمبر})$$

$$= (2^{3 \times \frac{1}{3}} \times 2^{3 \times \frac{1}{3}} \times 3^{3 \times \frac{1}{3}})$$

$$= 2 \times 2 \times 3 = 12 \quad (1 \text{ نمبر})$$

Prime factorization of 1728

$$= \underbrace{2 \times 2 \times 2}_{2^3} \times \underbrace{2 \times 2 \times 2}_{2^3} \times \underbrace{3 \times 3 \times 3}_{3^3} \quad (2 \text{ marks})$$

$$= 2^3 \times 2^3 \times 3^3$$

Taking cube root both sides

$$\sqrt[3]{1728} = \sqrt[3]{2^3 \times 2^3 \times 3^3} \quad (2 \text{ marks})$$

$$= (2^3 \times 2^3 \times 3^3)^{\frac{1}{3}} \quad (2 \text{ marks})$$

$$= (2^{3 \times \frac{1}{3}} \times 2^{3 \times \frac{1}{3}} \times 3^{3 \times \frac{1}{3}})$$

$$= 2 \times 2 \times 3 = 12 \quad (1 \text{ mark})$$

(2 marks)

(2 marks)

(1 mark)

AL-RIAZ ACADEMY
Shaping Futures

$$\begin{aligned}\sqrt[3]{1728} &= \sqrt[3]{2^3 \times 2^3 \times 3^3} && (2 \text{ marks}) \\ &= (2^3 \times 2^3 \times 3^3)^{\frac{1}{3}} && (2 \text{ marks}) \\ &= (2^{3 \times \frac{1}{3}} \times 2^{3 \times \frac{1}{3}} \times 3^{3 \times \frac{1}{3}}) \\ &= 2 \times 2 \times 3 = 12 && (1 \text{ mark})\end{aligned}$$

$$\begin{aligned}&3\sqrt[3]{2^3 + 2^3 + 3^3} \\ &= (2^3 + 2^3 + 3^3)^{\frac{1}{3}}\end{aligned}$$

$$\begin{aligned}\sqrt[3]{1728} &= \sqrt[3]{2^3 \times 2^3 \times 3^3} \text{ (نمبر 2)} \\ &= (2^3 \times 2^3 \times 3^3)^{\frac{1}{3}} \text{ (نمبر 2)} \\ &= (2^{3 \times \frac{1}{3}} \times 2^{3 \times \frac{1}{3}} \times 3^{3 \times \frac{1}{3}}) \\ &= 2 \times 2 \times 3 = 12 \text{ (نمبر 1)}\end{aligned}$$

If $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$, $A = \{1, 3, 5\}$ and $B = \{2, 4, 6\}$ then verify that $(A \cup B)^C = A^C \cap B^C$ (8 marks)

(نمبر 8) $(A \cup B)^C = A^C \cap B^C$ کو تصدیق کریں کہ $B = \{2, 4, 6\}$ اور $A = \{1, 3, 5\}$, $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$ اگر

$$\begin{aligned}A \cup B &= \{1, 3, 5\} \cup \{2, 4, 6\} \\ A \cup B &= \{1, 2, 3, 4, 5, 6\} && (2 \text{ marks}) \\ (A \cup B)^C &= U - A \cup B \\ (A \cup B)^C &= \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\} - \{1, 2, 3, 4, 5, 6\} \\ (A \cup B)^C &= \{7, 8, 9, 10\} && (2 \text{ marks}) \\ A^C &= U - A\end{aligned}$$

$$\begin{aligned}A^C &= \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\} - \{1, 3, 5\} \\ A^C &= \{2, 4, 6, 7, 8, 9, 10\} && (1.5 \text{ marks}) \\ B^C &= U - B \\ B^C &= \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\} - \{2, 4, 6\} \\ B^C &= \{1, 3, 5, 7, 8, 9, 10\} && (1.5 \text{ marks}) \\ A^C \cap B^C &= \{2, 4, 6, 7, 8, 9, 10\} \cap \{1, 3, 5, 7, 8, 9, 10\} \\ A^C \cap B^C &= \{7, 8, 9, 10\} && (1 \text{ mark})\end{aligned}$$

$$\begin{aligned}A \cup B &= \{1, 3, 5\} \cup \{2, 4, 6\} \\ A \cup B &= \{1, 2, 3, 4, 5, 6\} \text{ (نمبر 2)} \\ (A \cup B)^C &= U - A \cup B \\ (A \cup B)^C &= \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\} - \{1, 2, 3, 4, 5, 6\} \\ (A \cup B)^C &= \{7, 8, 9, 10\} \text{ (نمبر 2)} \\ A^C &= U - A\end{aligned}$$

$$\begin{aligned}A^C &= \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\} - \{1, 3, 5\} \\ A^C &= \{2, 4, 6, 7, 8, 9, 10\} \text{ (نمبر 1.5)} \\ B^C &= U - B \\ B^C &= \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\} - \{2, 4, 6\} \\ B^C &= \{1, 3, 5, 7, 8, 9, 10\} \text{ (نمبر 1.5)}\end{aligned}$$

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Shaping Futures

اگر $U = \{0, 1, 2, \dots, 10\}$, $A = \{1, 2, 5, 7, 9\}$, $B = \{0, 2, 4, 6, 8\}$ ہو تو ثابت کریں: $(A \cap B)^C = A^C \cup B^C$ (8 نمبر)



$$A \cap B = \{1, 2, 5, 7, 9\} \cap \{0, 2, 4, 6, 8\}$$

$$A \cap B = \{2\} \text{ (2 نمبر)}$$

$$(A \cap B)^C = U - A \cap B$$

$$(A \cap B)^C = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10\} - \{2\}$$

$$(A \cap B)^C = \{0, 1, 3, 4, 5, 6, 7, 8, 9, 10\} \text{ (2 نمبر)}$$

$$A^C = U - A$$

$$A^C = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10\} - \{1, 2, 5, 7, 9\}$$

$$A^C = \{0, 3, 4, 6, 8, 10\} \text{ (1.5 نمبر)}$$

$$B^C = U - B$$

$$A \cap B = \{1, 2, 5, 7, 9\} \cap \{0, 2, 4, 6, 8\}$$

$$A \cap B = \{2\} \text{ (2 marks)}$$

$$(A \cap B)^C = U - A \cap B$$

$$(A \cap B)^C = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10\} - \{2\}$$

$$(A \cap B)^C = \{0, 1, 3, 4, 5, 6, 7, 8, 9, 10\} \text{ (2 marks)}$$

$$A^C = U - A$$

$$A^C = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10\} - \{1, 2, 5, 7, 9\}$$

$$A^C = \{0, 3, 4, 6, 8, 10\} \text{ (1.5 marks)}$$

$$B^C = U - B$$

$$B^C = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10\} - \{0, 2, 4, 6, 8\}$$

$$B^C = \{1, 3, 5, 7, 9, 10\} \text{ (1.5 marks)}$$

L.H.S →

a) Find the cube root of 1728. (7 marks)

1728 کا جذر المکعب معلوم کریں۔ (7 نمبر)

$$\begin{array}{r|l}
 2 & 1728 \\
 \hline
 2 & 864 \\
 \hline
 2 & 432 \\
 \hline
 2 & 216 \\
 \hline
 2 & 108 \\
 \hline
 2 & 54 \\
 \hline
 \end{array}$$

(2 نمبر) $1728 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 3$ کی

مفرد تجزی

$$= 2^3 \times 2^3 \times 3^3$$

دونوں طرف جزر المکعب لینے سے

(2 نمبر) $\sqrt[3]{1728} = \sqrt[3]{2^3 \times 2^3 \times 3^3}$

$$= (2^3 \times 2^3 \times 3^3)^{\frac{1}{3}} \text{ (2 نمبر)}$$

Prime factorization of 1728

$$= 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 3 \quad (2 \text{ marks})$$

$$= 2^3 \times 2^3 \times 3^3$$

Taking cube root both sides

$$\sqrt[3]{1728} = \sqrt[3]{2^3 \times 2^3 \times 3^3} \quad (2 \text{ marks})$$

$$= (2^3 \times 2^3 \times 3^3)^{\frac{1}{3}} \quad (2 \text{ marks})$$

AL-RIAZ ACADEMY
Shaping Futures

Total weight of rice = $58\frac{1}{2}$ kg
 $= \frac{117}{2}$ kg (1 Mark)

Weight of 1 packet = $6\frac{1}{2}$ kg
 $= \frac{13}{2}$ kg (1 Mark)

Number of packets = $\frac{117}{2} \div \frac{13}{2}$ (1 mark)
 $= \frac{117}{2} \times \frac{2}{13}$ (1 mark)
 $= 9$ (1 mark)

$$58\frac{1}{2} = \frac{117}{2}$$

$$6\frac{1}{2} = \frac{13}{2}$$

$$\frac{117}{2} \times \frac{2}{13} = \frac{117}{13}$$

Find square root of 3969 by prime factorization. (5 marks)

$$\sqrt{3969}$$

3	3969	✓
3	1323	(0.5 mark)
3	441	(0.5 mark)
3	147	(0.5 mark)
7	49	(0.5 mark)
7	7	
	1	

3	3969	
3	1323	(0.5 نمبر)
3	441	(0.5 نمبر)
3	147	(0.5 نمبر)
7	49	(0.5 نمبر)
7	7	
	1	

3969 کا جذر بذریعہ مفرد تجزی معلوم کریں۔ (5 نمبر)

$$= \frac{117}{2} \text{ کلوگرام (1 نمبر)}$$

$$\text{کلوگرام } 6\frac{1}{2} = \text{ایک پیکٹ کا وزن}$$

$$= \frac{13}{2} \text{ کلوگرام (1 نمبر)}$$

$$(1 \text{ نمبر}) = \frac{117}{2} \div \frac{13}{2} = \text{پیکٹوں کی کل تعداد}$$

$$= \frac{117}{2} \times \frac{2}{13} (1 \text{ نمبر})$$

$$= 9 (1 \text{ نمبر})$$

Question No: 12

سوال نمبر 12

a.) If $A = \{1, 2, 3, 4\}$, $B = \{3, 4, 6, 7\}$ and $C = \{1, 2, 6, 7, 8\}$, then verify that:

$(A \cap B) \cap C = A \cap (B \cap C)$ (5 marks)

اگر $A = \{1, 2, 3, 4\}$, $B = \{3, 4, 6, 7\}$ اور $C = \{1, 2, 6, 7, 8\}$ ہو تو ثابت کریں۔

$(A \cap B) \cap C = A \cap (B \cap C)$ (5 نمبر)

L.H.S = $(A \cap B) \cap C$

$(A \cap B) = \{1, 2, 3, 4\} \cap \{3, 4, 6, 7\}$

$= \{3, 4\}$ (نمبر 1)

$(A \cap B) \cap C = \{3, 4\} \cap \{1, 2, 6, 7, 8\}$

$= \phi$ (نمبر 1.5)

R.H.S = $A \cap (B \cap C)$

$(B \cap C) = \{3, 4, 6, 7\} \cap \{1, 2, 6, 7, 8\}$

$= \{6, 7\}$ (نمبر 1)

$A \cap (B \cap C) = \{1, 2, 3, 4\} \cap \{6, 7\}$

$= \phi$ (نمبر 1.5)

L.H.S = R.H.S

L.H.S = $(A \cap B) \cap C$ ✓

$(A \cap B) = \{1, 2, 3, 4\} \cap \{3, 4, 6, 7\}$

$= \{3, 4\}$ (1 mark)

$(A \cap B) \cap C = \{3, 4\} \cap \{1, 2, 6, 7, 8\}$

$= \phi$ (1.5 marks)

R.H.S = $A \cap (B \cap C)$

$(B \cap C) = \{3, 4, 6, 7\} \cap \{1, 2, 6, 7, 8\}$

$= \{6, 7\}$ (1 mark)

$A \cap (B \cap C) = \{1, 2, 3, 4\} \cap \{6, 7\}$

$= \phi$ (1.5 marks)

L.H.S = R.H.S

If $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$, $A = \{1, 3, 5\}$ and $B = \{2, 4, 6\}$ then verify that $(A \cup B)^C = A^C \cap B^C$ (8 marks)

اگر $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$, $A = \{1, 3, 5\}$ اور $B = \{2, 4, 6\}$ ہو تو تصدیق کریں کہ $(A \cup B)^C = A^C \cap B^C$ (8 نمبر)

$$A \cup B = \{1, 3, 5\} \cup \{2, 4, 6\}$$

$$A \cup B = \{1, 2, 3, 4, 5, 6\} \text{ (نمبر 2)}$$

$$(A \cup B)^C = U - A \cup B$$

$$(A \cup B)^C = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\} - \{1, 2, 3, 4, 5, 6\}$$

$$(A \cup B)^C = \{7, 8, 9, 10\} \text{ (نمبر 2)}$$

$$A^C = U - A$$

$$A^C = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\} - \{1, 3, 5\}$$

$$A^C = \{2, 4, 6, 7, 8, 9, 10\} \text{ (نمبر 1.5)}$$

$$B^C = U - B$$

$$B^C = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\} - \{2, 4, 6\}$$

$$B^C = \{1, 3, 5, 7, 8, 9, 10\} \text{ (نمبر 1.5)}$$

$$A^C \cap B^C = \{2, 4, 6, 7, 8, 9, 10\} \cap \{1, 3, 5, 7, 8, 9, 10\}$$

$$A^C \cap B^C = \{7, 8, 9, 10\} \text{ (نمبر 1)}$$

$$A \cup B = \{1, 3, 5\} \cup \{2, 4, 6\}$$

$$A \cup B = \{1, 2, 3, 4, 5, 6\} \text{ (2 marks)}$$

$$(A \cup B)^C = U - A \cup B$$

$$(A \cup B)^C = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\} - \{1, 2, 3, 4, 5, 6\}$$

$$\text{L.H.S } (A \cup B)^C = \{7, 8, 9, 10\} \text{ (2 marks)}$$

$$A^C = U - A$$

$$A^C = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\} - \{1, 3, 5\}$$

$$\rightarrow A^C = \{2, 4, 6, 7, 8, 9, 10\} \text{ (1.5 marks)}$$

$$B^C = U - B$$

$$B^C = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\} - \{2, 4, 6\}$$

$$\rightarrow B^C = \{1, 3, 5, 7, 8, 9, 10\} \text{ (1.5 marks)}$$

$$A^C \cap B^C = \{2, 4, 6, 7, 8, 9, 10\} \cap \{1, 3, 5, 7, 8, 9, 10\}$$

$$A^C \cap B^C = \{7, 8, 9, 10\} \text{ (1 mark)}$$

AL-RIAZ ACADEMY

Shaping Future

→ $= \phi$ (1.5 marks)
L.H.S = R.H.S

$$A \cap (B \cap C) = \{1, 2, 3, 4\} \cap \{6, 7\}$$

$$= \phi \text{ (نمبر 1.5)}$$

L.H.S = R.H.S

Aleem bought a motorcycle for Rs 80000 and sold it for Rs 90000. Find his percentage profit. (5 Marks)

علیم نے 80000 روپے میں ایک موٹر سائیکل خریدا اور اسے 90000 روپے میں بیچ دیا۔ اس کا نفع فی صد معلوم کریں۔ (5 نمبر)

Cost price (C.P) = Rs 80000

Selling Price (S.P) = Rs 90000

Profit = S.P - C.P

= 90000 - 80000 (1 mark)

= Rs 10000 (1 mark)

Profit % = $\frac{\text{Profit}}{\text{C.P}} \times 100$

Profit % = $\frac{10000}{80000} \times 100$ (1 mark)

Profit % = $\frac{1}{8} \times 100$ (1 mark)

Profit % = 12.5% (1 mark)

روپے 80000 = قیمت خرید

روپے 90000 = قیمت فروخت

قیمت خرید - قیمت فروخت = نفع

= 90000 - 80000 (نمبر 1)

= 10000 روپے (نمبر 1)

$100 \times (\text{نفع} / \text{قیمت خرید}) = \text{نفع فی صد}$

(نمبر 1) $= \frac{10000}{80000} \times 100$ = نفع فی صد

(نمبر 1) $= \frac{1}{8} \times 100$ = نفع فی صد

(نمبر 1) = 12.5 فی صد = نفع فی صد

Question No: 13

سوال نمبر 13

a.) Find the cube root of 1728. (7 marks)

AL-RIAZ ACADEMY
Shaping Futures

$$\begin{aligned}
 \sqrt{3969} &= \sqrt{3 \times 3 \times 3 \times 3 \times 7 \times 7} & (1 \text{ mark}) \\
 &= \sqrt{3^2 \times 3^2 \times 7^2} & (0.5 \text{ mark}) \\
 &= 3 \times 3 \times 7 & (0.5 \text{ mark}) \\
 &= 63 & (1 \text{ mark})
 \end{aligned}$$

Question No: 12

سوال نمبر 12

a) If $A = \{1, 2, 3, 4\}$, $B = \{3, 4, 6, 7\}$ and $C = \{1, 2, 6, 7, 8\}$, then verify that:
 $(A \cap B) \cap C = A \cap (B \cap C)$ (5 marks)

اگر $A = \{1, 2, 3, 4\}$, $B = \{3, 4, 6, 7\}$ اور $C = \{1, 2, 6, 7, 8\}$ ہو تو ثابت کریں۔
 $(A \cap B) \cap C = A \cap (B \cap C)$ (5 نمبر)

$$\begin{aligned}
 \text{L.H.S} &= (A \cap B) \cap C \\
 (A \cap B) &= \{1, 2, 3, 4\} \cap \{3, 4, 6, 7\} \\
 &= \{3, 4\} & (1 \text{ mark}) \\
 (A \cap B) \cap C &= \{3, 4\} \cap \{1, 2, 6, 7, 8\} \\
 &= \phi & (1.5 \text{ marks}) \\
 \text{R.H.S} &= A \cap (B \cap C) \\
 (B \cap C) &= \{3, 4, 6, 7\} \cap \{1, 2, 6, 7, 8\}
 \end{aligned}$$

$$\begin{aligned}
 \text{L.H.S} &= (A \cap B) \cap C \\
 (A \cap B) &= \{1, 2, 3, 4\} \cap \{3, 4, 6, 7\} \\
 &= \{3, 4\} & (1 \text{ نمبر}) \\
 (A \cap B) \cap C &= \{3, 4\} \cap \{1, 2, 6, 7, 8\} \\
 &= \phi & (1.5 \text{ نمبر}) \\
 \text{R.H.S} &= A \cap (B \cap C) \\
 (B \cap C) &= \{3, 4, 6, 7\} \cap \{1, 2, 6, 7, 8\}
 \end{aligned}$$

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 Shaping Futures

$$Y = \{4, 6, 8, 9\}$$

$$X \cap Y = \{1, 4, 5\} \cap \{4, 6, 8, 9\}$$

$$= \{4\} \quad (2.5 \text{ marks})$$

and $Y \cap X = \{4, 6, 8, 9\} \cap \{1, 4, 5\}$

$$= \{4\} \quad (2.5 \text{ marks})$$

Hence proved $X \cap Y = Y \cap X$

$$X \cap Y = \{1, 4, 5\} \cap \{4, 6, 8, 9\}$$

$$= \{4\} \quad (2.5 \text{ نمبر})$$

$$Y \cap X = \{4, 6, 8, 9\} \cap \{1, 4, 5\}$$

$$= \{4\} \quad (2.5 \text{ نمبر})$$

پس ثابت ہوا $X \cap Y = Y \cap X$

Hameed bought a piece of land in Rs 600000 and sold it in Rs 450000. Find his loss percentage. (5 marks)

حمید نے زمین کا ایک ٹکڑا 600000 روپے میں خریدا اور اس کو 450000 روپے میں فروخت کر دیا۔ اس کا نقصان فیصد معلوم کریں۔ (5 نمبر)

Cost Price = Rs 600000 ✓

Sale Price = Rs 450000 ✓

Loss = Cost Price - Sale Price

$$= 600000 - 450000$$

$$= \text{Rs } 150000 \quad (2 \text{ marks})$$

Loss Percentage = $\frac{\text{Loss}}{\text{Cost Price}} \times 100\%$

$$= \frac{150000}{600000} \times 100$$

$$= \frac{15}{6} \times 10 \quad (1 \text{ mark})$$

$$= 25\% \quad (2 \text{ marks})$$

روپے 600000 = قیمت خرید

روپے 450000 = قیمت فروخت

قیمت فروخت - قیمت خرید = نقصان

$$= 600000 - 450000$$

$$= 150000 \text{ روپے (2 نمبر)}$$

نقصان فیصد = $(\text{قیمت خرید} / \text{نقصان}) \times 100\%$

$$= \frac{150000}{600000} \times 100$$

$$= \frac{15}{6} \times 10 \quad (1 \text{ نمبر})$$

$$= 25 \text{ فیصد (2 نمبر)}$$

$$= \frac{10}{6} \times 10 \quad (1 \text{ mark})$$

$$= 25\% \quad (2 \text{ marks})$$

$$= \frac{600000}{100} \times 100$$

$$= \frac{15}{6} \times 10 \quad (1 \text{ نمبر})$$

$$= 25\% \quad (2 \text{ نمبر})$$

Question No: 13

سوال نمبر 13

a.) Find the cube root of 17576. (7 marks)

17576 کا جذر المکعب معلوم کریں۔ (7 نمبر)

2	17576
2	8788
2	4394
13	2197
13	169
13	13
	1

$$17576 = 2 \times 2 \times 2 \times 13 \times 13 \times 13 \quad (2 \text{ marks})$$

$$= 2^3 \times 13^3$$

Taking cube root both sides

$$17576 = 2 \times 2 \times 2 \times 13 \times 13 \times 13 \quad (2 \text{ نمبر})$$

$$= 2^3 \times 13^3$$

دونوں طرف جزر المکعب لینے سے

ANSWERS / RUBRICS

Question No: 11

سوال نمبر 11

a) If one packet contain $2\frac{1}{4}$ liters of milk then find the quantity of milk in 18 such packets. (05 marks)

اگر ایک پیکٹ میں $2\frac{1}{4}$ لٹر دودھ ہو تو ایسے 18 پیکٹوں میں دودھ کی مقدار معلوم کریں۔ (5 نمبر)

$$\text{Milk in 1 packet} = 2\frac{1}{4} \text{ l}$$

$$\text{Milk in 18 packets} = 2\frac{1}{4} \times 18 \text{ (2 Marks)}$$

$$= \frac{9}{4} \times 18 \text{ (1 Mark)}$$

$$= \frac{81}{2} \text{ (1 Mark)}$$

$$= 40\frac{1}{2} \text{ l (1 Mark)}$$

$$\text{لٹر } 2\frac{1}{4} = 1 \text{ پیکٹ میں دودھ}$$

$$18 \text{ پیکٹوں میں دودھ} = 2\frac{1}{4} \times 18 \text{ (2 نمبر)}$$

$$= \frac{9}{4} \times 18 \text{ (1 نمبر)}$$

$$= \frac{81}{2} \text{ (1 نمبر)}$$

$$= 40\frac{1}{2} \text{ لٹر (1 نمبر)}$$

Calculate the square root of 103041 by division method. (5 marks)

103041 کا جذر بذریعہ تقسیم معلوم کریں۔ (5 نمبر)

Question No: 12

سوال نمبر 12

ANSWERS / RUBRICS

Question No: 11

سوال نمبر 11

a). If $58\frac{1}{2}$ kg of rice is to be packed equally in $6\frac{1}{2}$ kg packets then how many packets of rice will be packed? (5 Marks)

اگر $58\frac{1}{2}$ کلوگرام چاول کو $6\frac{1}{2}$ کلوگرام کے پیکیٹوں میں پیک کیا جائے تو چاولوں کے کتنے پیکیٹ بنیں گے۔ (5 نمبر)

Total weight of rice = $58\frac{1}{2}$ kg

= $\frac{117}{2}$ kg (1 Mark)

Weight of 1 packet = $6\frac{1}{2}$ kg

= $\frac{13}{2}$ kg (1 Mark)

Number of packets = $\frac{117}{2} \div \frac{13}{2}$ (1 mark)

= $\frac{117}{2} \times \frac{2}{13}$ (1 mark)

= 9 (1 mark)

کلوگرام $58\frac{1}{2}$ = چاولوں کا کل وزن

(1 نمبر) کلوگرام $= \frac{117}{2}$

کلوگرام $6\frac{1}{2}$ = ایک پیکیٹ کا وزن

(1 نمبر) کلوگرام $= \frac{13}{2}$

(1 نمبر) $= \frac{117}{2} \div \frac{13}{2}$ = پیکیٹوں کی کل تعداد

(1 نمبر) $= \frac{117}{2} \times \frac{2}{13}$

(1 نمبر) = 9

Find square root of 3969 by prime factorization. (5 marks)

3969 کا جذر بذریعہ مفرد تجزی معلوم کریں۔ (5 نمبر)

3	3969	
3	1323	(0.5 mark)
3	441	(0.5 mark)
3	147	(0.5 mark)
3	49	(0.5 mark)
7	7	(0.5 mark)

3	3969	
3	1323	(0.5 نمبر)
3	441	
3	147	
3	49	
7	7	

ANSWERS / RUBRICS

Question No: 11

سوال نمبر 11

a) If $58\frac{1}{2}$ kg of rice is to be packed equally in $6\frac{1}{2}$ kg packets then how many packets of rice will be packed? (5 Marks)

اگر $58\frac{1}{2}$ کلوگرام چاول کو $6\frac{1}{2}$ کلوگرام کے پیکٹوں میں پیک کیا جائے تو چاولوں کے کتنے پیکٹ بنیں گے۔ (5 نمبر)

$$\begin{aligned}\text{Total weight of rice} &= 58\frac{1}{2} \text{ kg} \\ &= \frac{117}{2} \text{ kg (1 Mark)}\end{aligned}$$

$$\begin{aligned}\text{Weight of 1 packet} &= 6\frac{1}{2} \text{ kg} \\ &= \frac{13}{2} \text{ kg (1 Mark)}\end{aligned}$$

$$\begin{aligned}\text{Number of packets} &= \frac{117}{2} \div \frac{13}{2} \text{ (1 mark)} \\ &= \frac{117}{2} \times \frac{2}{13} \text{ (1 mark)} \\ &= 9 \text{ (1 mark)}\end{aligned}$$

$$\begin{aligned}\text{کلوگرام } 58\frac{1}{2} &= \text{چاولوں کا کل وزن} \\ &= \frac{117}{2} \text{ کلوگرام (1 نمبر)}\end{aligned}$$

$$\begin{aligned}\text{کلوگرام } 6\frac{1}{2} &= \text{ایک پیکٹ کا وزن} \\ &= \frac{13}{2} \text{ کلوگرام (1 نمبر)}\end{aligned}$$

$$\begin{aligned}\text{(1 نمبر) } \frac{117}{2} \div \frac{13}{2} &= \text{پیکٹوں کی کل تعداد} \\ &= \frac{117}{2} \times \frac{2}{13} \text{ (1 نمبر)} \\ &= 9 \text{ (1 نمبر)}\end{aligned}$$

Find square root of 3969 by prime factorization. (5 marks)

3969 کا جذر بذریعہ مفرد تجزیہ معلوم کریں۔ (5 نمبر)

$$\begin{array}{r|l} 3 & 3969 \\ \hline 3 & 1323 \\ \hline 3 & 441 \end{array} \quad \begin{array}{l} (0.5 \text{ mark}) \\ (0.5 \text{ mark}) \end{array}$$

$$\begin{array}{r|l} 3 & 3969 \\ \hline 3 & 1323 \\ \hline 3 & 441 \end{array} \quad \begin{array}{l} (0.5 \text{ نمبر}) \\ (0.5 \text{ نمبر}) \end{array}$$

$$A \cap B = \{1, 2, 5, 7, 9\} \cap \{0, 2, 4, 6, 8\}$$

$$A \cap B = \{2\} \quad (2 \text{ marks})$$

$$(A \cap B)^c = U - A \cap B$$

$$(A \cap B)^c = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10\} - \{2\}$$

$$(A \cap B)^c = \{0, 1, 3, 4, 5, 6, 7, 8, 9, 10\} \quad (2 \text{ marks})$$

$$A^c = U - A$$

$$A^c = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10\} - \{1, 2, 5, 7, 9\}$$

$$A^c = \{0, 3, 4, 6, 8, 10\} \quad (1.5 \text{ marks})$$

$$B^c = U - B$$

$$B^c = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10\} - \{0, 2, 4, 6, 8\}$$

$$B^c = \{1, 3, 5, 7, 9, 10\} \quad (1.5 \text{ marks})$$

$$A^c \cup B^c = \{0, 3, 4, 6, 8, 10\} \cup \{1, 3, 5, 7, 9, 10\}$$

$$A^c \cup B^c = \{0, 1, 3, 4, 5, 6, 7, 8, 9, 10\} \quad (1 \text{ mark})$$

$$A \cap B = \{1, 2, 5, 7, 9\} \cap \{0, 2, 4, 6, 8\}$$

$$A \cap B = \{2\} \quad (2 \text{ نمبر})$$

$$(A \cap B)^c = U - A \cap B$$

$$(A \cap B)^c = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10\} - \{2\}$$

$$(A \cap B)^c = \{0, 1, 3, 4, 5, 6, 7, 8, 9, 10\} \quad (2 \text{ نمبر})$$

$$A^c = U - A$$

$$A^c = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10\} - \{1, 2, 5, 7, 9\}$$

$$A^c = \{0, 3, 4, 6, 8, 10\} \quad (1.5 \text{ نمبر})$$

$$B^c = U - B$$

$$B^c = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10\} - \{0, 2, 4, 6, 8\}$$

$$B^c = \{1, 3, 5, 7, 9, 10\} \quad (1.5 \text{ نمبر})$$

$$A^c \cup B^c = \{0, 3, 4, 6, 8, 10\} \cup \{1, 3, 5, 7, 9, 10\}$$

$$A^c \cup B^c = \{0, 1, 3, 4, 5, 6, 7, 8, 9, 10\} \quad (1 \text{ نمبر})$$

a.) Find the square root of 3364 by prime factorization. (5 marks)

مفرد تجزی کے ذریعے 3364 کا جذر معلوم کریں۔ (5 نمبر)

$$\sqrt{3364} = \sqrt{2 \times 2 \times 29 \times 29} \quad (1 \text{ mark})$$

$$= \sqrt{2^2 \times 29^2} \quad (1 \text{ mark})$$

$$= \sqrt{(2 \times 29)^2} \quad (1 \text{ mark})$$

$$= 2 \times 29 \quad (1 \text{ mark})$$

$$= 58 \quad (1 \text{ mark})$$

$$\sqrt{3364} = \sqrt{2 \times 2 \times 29 \times 29} \quad (1 \text{ نمبر})$$

$$= \sqrt{2^2 \times 29^2} \quad (1 \text{ نمبر})$$

$$= \sqrt{(2 \times 29)^2} \quad (1 \text{ نمبر})$$

$$= 2 \times 29 \quad (1 \text{ نمبر})$$

$$= 58 \quad (1 \text{ نمبر})$$

AL-RIAZ ACADEMY
Shaping Futures

If one packet contains $5\frac{1}{4}$ liters of oil, then find the quantity of oil in 5 such packets. (5 marks)

اگر ایک پیکٹ میں $5\frac{1}{4}$ لٹر تیل ہو تو ایسے 5 پیکٹوں میں کتنا تیل ہو گا؟ (5 نمبر)

$$\text{Oil in 1 packet} = 5\frac{1}{4} \text{ l}$$

$$\text{Oil in 5 packets} = 5\frac{1}{4} \times 5 \quad (2 \text{ marks})$$

$$= \frac{21}{4} \times 5 \quad (1 \text{ mark})$$

$$5\frac{1}{4} \text{ لٹر} = \text{ایک پیکٹ میں تیل}$$

$$5 = 5\frac{1}{4} \times 5 \quad (2 \text{ نمبر})$$

$$= \frac{21}{4} \times 5 \quad (1 \text{ نمبر})$$

سوال نمبر 12

a). If $X = \{1, 4, 5\}$ and $Y = \{4, 6, 8, 9\}$, then verify $X \cap Y = Y \cap X$. (5 marks)

اگر $X = \{1, 4, 5\}$ اور $Y = \{4, 6, 8, 9\}$ ہو تو ثابت کریں $X \cap Y = Y \cap X$ (5 نمبر)



AL-RIAZ ACADEMY
Shaping Futures

$$X = \{1, 4, 5\}$$

$$Y = \{4, 6, 8, 9\}$$

$$X \cap Y = \{1, 4, 5\} \cap \{4, 6, 8, 9\}$$

$$= \{4\} \quad (2.5 \text{ marks})$$

$$\text{and } Y \cap X = \{4, 6, 8, 9\} \cap \{1, 4, 5\}$$

$$X = \{1, 4, 5\}$$

$$Y = \{4, 6, 8, 9\}$$

$$X \cap Y = \{1, 4, 5\} \cap \{4, 6, 8, 9\}$$

$$= \{4\} \quad (2.5 \text{ نمبر})$$

$$X = \{1, 4, 5\}$$

$$Y = \{4, 6, 8, 9\}$$

$$X \cap Y = \{1, 4, 5\} \cap \{4, 6, 8, 9\} \\ = \{4\} \quad (2.5 \text{ marks})$$

$$\text{and } Y \cap X = \{4, 6, 8, 9\} \cap \{1, 4, 5\} \\ = \{4\} \quad (2.5 \text{ marks})$$

Hence proved $X \cap Y = Y \cap X$

$$X = \{1, 4, 5\}$$

$$Y = \{4, 6, 8, 9\}$$

$$X \cap Y = \{1, 4, 5\} \cap \{4, 6, 8, 9\} \\ = \{4\} \quad (2.5 \text{ نمبر})$$

$$Y \cap X = \{4, 6, 8, 9\} \cap \{1, 4, 5\} \\ = \{4\} \quad (2.5 \text{ نمبر})$$

پس ثابت ہوا $X \cap Y = Y \cap X$

Hameed bought a piece of land in Rs 600000 and sold it in Rs 450000. Find his loss percentage. (5 marks)

حمید نے زمین کا ایک ٹکڑا 600000 روپے میں خریدا اور اس کو 450000 روپے میں فروخت کر دیا۔ اس کا نقصان فیصد معلوم کریں۔ (5 نمبر)

$$Y = \{4, 6, 8, 9\}$$

$$X \cap Y = \{1, 4, 5\} \cap \{4, 6, 8, 9\}$$

$$= \{4\} \quad (2.5 \text{ marks})$$

$$\text{and } Y \cap X = \{4, 6, 8, 9\} \cap \{1, 4, 5\}$$

$$= \{4\} \quad (2.5 \text{ marks})$$

Hence proved $X \cap Y = Y \cap X$

$$X \cap Y = \{1, 4, 5\} \cap \{4, 6, 8, 9\}$$

$$= \{4\} \quad (\text{نمبر } 2.5)$$

$$Y \cap X = \{4, 6, 8, 9\} \cap \{1, 4, 5\}$$

$$= \{4\} \quad (\text{نمبر } 2.5)$$

پس ثابت ہوا $X \cap Y = Y \cap X$

Hameed bought a piece of land in Rs 600000 and sold it in Rs 450000. Find his loss percentage. (5 marks)

حمید نے زمین کا ایک ٹکڑا 600000 روپے میں خریدا اور اس کو 450000 روپے میں فروخت کر دیا۔ اس کا نقصان فیصد معلوم کریں۔ (5 نمبر)

روپے 600000 = قیمت خرید

روپے 450000 = قیمت فروخت

قیمت فروخت - قیمت خرید = نقصان

$$= 600000 - 450000$$

$$= 150000 \text{ روپے (نمبر } 2)$$

$$100\% \times (\text{قیمت خرید} / \text{نقصان}) = \text{نقصان فیصد}$$

$$= \frac{150000}{600000} \times 100$$

$$= \frac{15}{6} \times 10 \quad (\text{نمبر } 1)$$

$$= 25 \text{ فیصد (نمبر } 2)$$

$$\text{Cost Price} = \text{Rs } 600000$$

$$\text{Sale Price} = \text{Rs } 450000$$

$$\text{Loss} = \text{Cost Price} - \text{Sale Price}$$

$$= 600000 - 450000$$

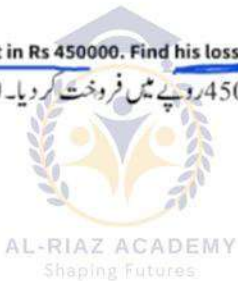
$$= \text{Rs } 150000 \quad (2 \text{ marks})$$

$$\text{Loss Percentage} = \frac{\text{Loss}}{\text{Cost Price}} \times 100\%$$

$$= \frac{150000}{600000} \times 100$$

$$= \frac{15}{6} \times 10 \quad (1 \text{ mark})$$

$$= 25\% \quad (2 \text{ marks})$$



The marked price of a water bottle is Rs. 1900. The selling price of the bottle is Rs. 1729. Find the discount percentage on water bottle. (5 marks)

ایک پانی والی بوتل کی لکھی ہوئی قیمت 1900 روپے ہے۔ اس بوتل کی قیمت فروخت 1729 روپے ہے۔ بوتل کی چھوٹ فیصد معلوم کریں۔ (5 نمبر) روبرک:

Rubric:

$$\text{Discount} = 1900 - 1729 = \text{Rs } 171 \quad (1 \text{ mark})$$

$$\text{Percentage Discount} = \frac{\text{Discount}}{\text{Marked Price}} \times 100 \quad (1 \text{ mark})$$

$$\text{Percentage Discount} = \frac{171}{1900} \times 100 \quad (2 \text{ marks})$$

$$\text{Percentage Discount} = 9\% \quad (1 \text{ mark})$$



AL-RIAZ ACADEMY
Shaping Futures

$$\text{چھوٹ} = 1900 - 1729 = 171 \text{ روپے} \quad (1 \text{ نمبر})$$

$$\text{چھوٹ فیصد} = \frac{\text{Discount}}{\text{Marked Price}} \times 100 \quad (1 \text{ نمبر})$$

$$\text{چھوٹ فیصد} = \frac{171}{1900} \times 100 \quad (2 \text{ نمبر})$$

$$\text{چھوٹ فیصد} = 9\% \quad (1 \text{ نمبر})$$

$$\begin{aligned}
 &= \frac{\sqrt{3 \times 3}}{\sqrt{2 \times 2 \times 3}} \quad (1 \text{ Mark}) \\
 &= \frac{3 \times 3}{2 \times 2 \times 3} \quad (1 \text{ Mark}) \\
 &= \frac{9}{12} \quad (1 \text{ Mark})
 \end{aligned}$$

$$\frac{9}{12}$$

$$\begin{array}{r}
 210 \\
 3 \overline{) 9} \\
 \underline{3} \\
 3 \\
 \underline{3} \\
 0
 \end{array}$$

$$\begin{array}{r}
 3 \\
 3 \overline{) 3} \\
 \underline{3} \\
 0
 \end{array}$$

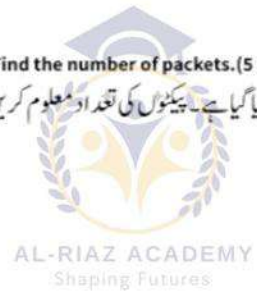
$$\begin{aligned}
 &= \frac{\sqrt{3 \times 3}}{\sqrt{2 \times 2 \times 3}} \quad (1 \text{ Mark}) \\
 &= \frac{3 \times 3}{2 \times 2 \times 3} \quad (1 \text{ Mark}) \\
 &= \frac{9}{12} \quad (1 \text{ Mark})
 \end{aligned}$$

27½ kg rice is to be packed equally in 2¾ kg packets. Find the number of packets. (5 Marks)

27½ کلوگرام چاول کو 2¾ کلوگرام کے پیکٹوں میں برابر پیک کیا گیا ہے۔ پیکٹوں کی تعداد معلوم کریں۔ (5 نمبر)

$$\begin{aligned}
 \text{Total rice} &= 27\frac{1}{2} \text{ kg} = \frac{55}{2} \text{ kg} \quad (1 \text{ mark}) \\
 \text{Weight of each packet} &= 2\frac{3}{4} \text{ kg} = \frac{11}{4} \text{ kg} \quad (1 \text{ mark}) \\
 \text{Number of packets} &= \frac{55}{2} \div \frac{11}{4} \quad (1 \text{ mark}) \\
 &= \frac{55}{2} \times \frac{4}{11} \quad (1 \text{ mark}) \\
 &= 10 \quad (1 \text{ mark})
 \end{aligned}$$

$$\begin{aligned}
 (1 \text{ نمبر}) \text{ کلوگرام ام} &= \frac{55}{2} = 27\frac{1}{2} \text{ کلوگرام} \\
 (1 \text{ نمبر}) \text{ کلوگرام ام} &= \frac{11}{4} = 2\frac{3}{4} \text{ کلوگرام} \\
 (1 \text{ نمبر}) &= \frac{55}{2} \div \frac{11}{4} \\
 &= \frac{55}{2} \times \frac{4}{11} \quad (1 \text{ نمبر}) \\
 &= 10 \quad (1 \text{ نمبر})
 \end{aligned}$$



Question No: 12

$$\begin{aligned}\text{Loss Percentage} &= \frac{\text{Loss}}{\text{Cost Price}} \times 100\% \\ &= \frac{150000}{600000} \times 100 \\ &= \frac{15}{6} \times 10 \quad (1 \text{ mark}) \\ &= 25\% \quad (2 \text{ marks})\end{aligned}$$

Question No: 13

سوال نمبر 13

a) Find the cube root of 2197. (7 marks)

$$\begin{aligned}2197 &= 13 \times 13 \times 13 \quad (1 \text{ mark}) \\ &= 13^3 \quad (1 \text{ mark}) \\ \text{Taking cube root both sides} \\ \sqrt[3]{2197} &= \sqrt[3]{13^3} \quad (2 \text{ marks}) \\ \sqrt[3]{2197} &= (13^3)^{\frac{1}{3}} \quad (2 \text{ marks}) \\ \sqrt[3]{2197} &= 13 \quad (1 \text{ mark})\end{aligned}$$



$$\begin{aligned}\text{قیمت خرید / نقصان} &= \text{نقصان فیصد} \\ &= \frac{150000}{600000} \times 100 \\ &= \frac{15}{6} \times 10 \quad (1 \text{ نمبر}) \\ &= 25 \text{ فیصد} \quad (2 \text{ نمبر})\end{aligned}$$

2197 کا جذر المکعب معلوم کریں۔ (7 نمبر)

$$\begin{aligned}2197 &= 13 \times 13 \times 13 \quad (1 \text{ نمبر}) \\ &= 13^3 \quad (1 \text{ نمبر}) \\ \text{دونوں طرف جزر المکعب لینے سے} \\ \sqrt[3]{2197} &= \sqrt[3]{13^3} \quad (2 \text{ نمبر}) \\ \sqrt[3]{2197} &= (13^3)^{\frac{1}{3}} \quad (2 \text{ نمبر}) \\ \sqrt[3]{2197} &= 13 \quad (1 \text{ نمبر})\end{aligned}$$

Verify: $(A \cap B)^c = A^c \cup B^c$, if $U = \{1, 2, 3, \dots, 10\}$, $A = \{1, 2, 4\}$, $B = \{3, 5, 7, 9\}$ (8 marks)

تصدیق کریں $(A \cap B)^c = A^c \cup B^c$ اگر $U = \{1, 2, 3, \dots, 10\}$, $A = \{1, 2, 4\}$, $B = \{3, 5, 7, 9\}$ (8 نمبر)

سوال نمبر 11

a). If $58\frac{1}{2}$ kg of rice is to be packed equally in $6\frac{1}{2}$ kg packets then how many packets of rice will be packed? (5 Marks)

اگر $58\frac{1}{2}$ کلوگرام چاول کو $6\frac{1}{2}$ کلوگرام کے پیکٹوں میں پیک کیا جائے تو چاولوں کے کتنے پیکٹ بنیں گے۔ (5 نمبر)

Total weight of rice = $58\frac{1}{2}$ kg

= $\frac{117}{2}$ kg (1 Mark)

Weight of 1 packet = $6\frac{1}{2}$ kg

= $\frac{13}{2}$ kg (1 Mark)

Number of packets = $\frac{117}{2} \div \frac{13}{2}$ (1 mark)

= $\frac{117}{2} \times \frac{2}{13}$ (1 mark)

= 9 (1 mark)

کلوگرام $58\frac{1}{2}$ = چاولوں کا کل وزن

= $\frac{117}{2}$ کلوگرام (1 نمبر)

کلوگرام $6\frac{1}{2}$ = ایک پیکٹ کا وزن

= $\frac{13}{2}$ کلوگرام (1 نمبر)

(1 نمبر) $\frac{117}{2} \div \frac{13}{2}$ = پیکٹوں کی کل تعداد

= $\frac{117}{2} \times \frac{2}{13}$ (1 نمبر)

= 9 (1 نمبر)



Find square root of 3969 by prime factorization. (5 marks)

3969 کا جذر بذریعہ مفرد تجزی معلوم کریں۔ (5 نمبر)

3	3969	
3	1323	(0.5 mark)
3	441	(0.5 mark)
3	147	(0.5 mark)
7	49	(0.5 mark)
7	7	

3	3969	
3	1323	(0.5 نمبر)
3	441	(0.5 نمبر)
3	147	(0.5 نمبر)
7	49	(0.5 نمبر)
7	7	

$$= \frac{1}{6} \times 10 \quad (1 \text{ mark})$$

$$= 25\% \quad (2 \text{ marks})$$

Question No: 13

سوال نمبر 13

a) Find the cube root of 17576. (7 marks)

17576 کا جذر المکعب معلوم کریں۔ (7 نمبر)



2	17576
2	8788
2	4394
13	2197
13	169
13	13
	1

$$17576 = 2 \times 2 \times 2 \times 13 \times 13 \times 13 \quad (2 \text{ marks})$$

$$= 2^3 \times 13^3$$

Taking cube root both sides

$$17576 = 2 \times 2 \times 2 \times 13 \times 13 \times 13 \quad (2 \text{ نمبر})$$

$$= 2^3 \times 13^3$$

دونوں طرف جزر المکعب لینے سے

a) Find the cube root of 17576. (7 marks)

17576 کا جذر المکعب معلوم کریں۔ (7 نمبر)

2	17576 ✓
2	8788 ✓
2	4394 ✓
13	2197 ✓
13	169 ✓
13	13 ✓
	1 ✓

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Shaping Futures

$$17576 = 2 \times 2 \times 2 \times 13 \times 13 \times 13 \quad (2 \text{ نمبر})$$

$$= 2^3 \times 13^3$$

$$17576 = 2 \times 2 \times 2 \times 13 \times 13 \times 13 \quad (2 \text{ marks})$$

$$= \underline{2^3 \times 13^3}$$

Taking cube root both sides

$$\sqrt[3]{17576} = \sqrt[3]{2^3 \times 13^3} \quad (2 \text{ marks})$$

$$= (2^{3 \times \frac{1}{3}} \times 13^{3 \times \frac{1}{3}}) \quad (2 \text{ marks})$$

$$= 2 \times 13 = 26 \quad (1 \text{ mark})$$

دونوں طرف جزر المکعب لینے سے

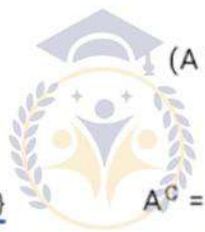
$$\sqrt[3]{17576} = \sqrt[3]{2^3 \times 13^3} \quad (2 \text{ نمبر})$$

$$= (2^3 \times 13^3)^{\frac{1}{3}} \quad (2 \text{ نمبر})$$

$$= (2^{3 \times \frac{1}{3}} \times 13^{3 \times \frac{1}{3}})$$

$$= 2 \times 13 = 26 \quad (1 \text{ نمبر})$$

$A \cap B = \{1, 2, 5, 7, 9\} \cap \{0, 2, 4, 6, 8\}$
 $A \cap B = \{2\}$ (2 marks)
 $(A \cap B)^C = U - A \cap B$
 $(A \cap B)^C = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10\} - \{2\}$
 $(A \cap B)^C = \{0, 1, 3, 4, 5, 6, 7, 8, 9, 10\}$ (2 marks)
 $A^C = U - A$
 $A^C = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10\} - \{1, 2, 5, 7, 9\}$
 $A^C = \{0, 3, 4, 6, 8, 10\}$ (1.5 marks)
 $B^C = U - B$
 $B^C = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10\} - \{0, 2, 4, 6, 8\}$
 $B^C = \{1, 3, 5, 7, 9, 10\}$ (1.5 marks)
 $A^C \cup B^C = \{0, 3, 4, 6, 8, 10\} \cup \{1, 3, 5, 7, 9, 10\}$
 $A^C \cup B^C = \{0, 1, 3, 4, 5, 6, 7, 8, 9, 10\}$ (1 mark)



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$$A \cap B = \{1, 2, 5, 7, 9\} \cap \{0, 2, 4, 6, 8\}$$

$$A \cap B = \{2\} \text{ (نمبر 2)}$$

$$(A \cap B)^C = U - A \cap B$$

$$(A \cap B)^C = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10\} - \{2\}$$

$$(A \cap B)^C = \{0, 1, 3, 4, 5, 6, 7, 8, 9, 10\} \text{ (نمبر 2)}$$

$$A^C = U - A$$

$$A^C = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10\} - \{1, 2, 5, 7, 9\}$$

$$A^C = \{0, 3, 4, 6, 8, 10\} \text{ (نمبر 1.5)}$$

$$B^C = U - B$$

$$B^C = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10\} - \{0, 2, 4, 6, 8\}$$

$$B^C = \{1, 3, 5, 7, 9, 10\} \text{ (نمبر 1.5)}$$

$$A^C \cup B^C = \{0, 3, 4, 6, 8, 10\} \cup \{1, 3, 5, 7, 9, 10\}$$

$$A^C \cup B^C = \{0, 1, 3, 4, 5, 6, 7, 8, 9, 10\} \text{ (نمبر 1)}$$

ANSWERS / RUBRICS

Question No: 11

سوال نمبر 11

a) Find the square root of 3364 by prime factorization. (5 marks)

مفرد تجزی کے ذریعے 3364 کا جذر معلوم کریں۔ (5 نمبر)

$$\sqrt{3364} = \sqrt{2 \times 2 \times 29 \times 29} \quad (1 \text{ mark})$$

$$= \sqrt{2^2 \times 29^2} \quad (1 \text{ mark})$$

$$= \sqrt{(2 \times 29)^2} \quad (1 \text{ mark})$$

$$= 2 \times 29 \quad (1 \text{ mark})$$

$$= 58 \quad (1 \text{ mark})$$



$$\sqrt{3364} = \sqrt{2 \times 2 \times 29 \times 29} \quad (1 \text{ نمبر})$$

$$= \sqrt{2^2 \times 29^2} \quad (1 \text{ نمبر})$$

$$= \sqrt{(2 \times 29)^2} \quad (1 \text{ نمبر})$$

$$= 2 \times 29 \quad (1 \text{ نمبر})$$

$$= 58 \quad (1 \text{ نمبر})$$

If one packet contains $5\frac{1}{4}$ liters of oil, then find the quantity of oil in 5 such packets. (5 marks)

اگر ایک پیکٹ میں $5\frac{1}{4}$ لٹر تیل ہو تو ایسے 5 پیکٹوں میں کتنا تیل ہوگا؟ (5 نمبر)

$$\text{Oil in 1 packet} = 5\frac{1}{4} \text{ l}$$

$$\text{Oil in 5 packets} = 5\frac{1}{4} \times 5 \quad (2 \text{ marks})$$

$$= \frac{21}{4} \times 5 \quad (1 \text{ mark})$$

$$5\frac{1}{4} \text{ لٹر} = \text{ایک پیکٹ میں تیل}$$

$$5\frac{1}{4} \times 5 = 5 \text{ پیکٹوں میں تیل} \quad (2 \text{ نمبر})$$

$$= \frac{21}{4} \times 5 \quad (1 \text{ نمبر})$$

$$= 27 \frac{3}{11} \text{ (نمبر 1)}$$

Question No: 13

سوال نمبر 13

a). Find the cube root of 2197. (7 marks)

$$2197 = 13 \times 13 \times 13 \text{ (1 mark)}$$

$$= 13^3 \text{ (1 mark)}$$

Taking cube root both sides

$$\sqrt[3]{2197} = \sqrt[3]{13^3} \text{ (2 marks)}$$

$$\sqrt[3]{2197} = (13^3)^{\frac{1}{3}} \text{ (2 marks)}$$

$$\sqrt[3]{2197} = 13 \text{ (1 mark)}$$



2197 کا جذرا لمعوب معلوم کریں۔ (7 نمبر)

$$2197 = 13 \times 13 \times 13 \text{ (نمبر 1)}$$

$$= 13^3 \text{ (نمبر 1)}$$

دونوں طرف جزرا لمعوب لینے سے

$$\sqrt[3]{2197} = \sqrt[3]{13^3} \text{ (نمبر 2)}$$

$$\sqrt[3]{2197} = (13^3)^{\frac{1}{3}} \text{ (نمبر 2)}$$

$$\sqrt[3]{2197} = 13 \text{ (نمبر 1)}$$

Verify: $(A \cap B)^C = A^C \cup B^C$, if $U = \{1, 2, 3, \dots, 10\}$, $A = \{1, 2, 4\}$, $B = \{3, 5, 7, 9\}$ (8 marks)

تصدیق کریں $(A \cap B)^C = A^C \cup B^C$ اگر $U = \{1, 2, 3, \dots, 10\}$, $A = \{1, 2, 4\}$, $B = \{3, 5, 7, 9\}$ (8 نمبر)

$$\begin{aligned}
 &= \{1, 2, 3, \dots, 10\} \cup \{2, 4, 6, 8\} \\
 &= \{1, 2, 3, \dots, 10\} \quad (2.5 \text{ marks}) \\
 \text{R.H.S.} &= B \cup A \\
 &= \{2, 4, 6, 8\} \cup \{1, 2, 3, \dots, 10\} \\
 &= \{1, 2, 3, \dots, 10\} \quad (2.5 \text{ marks}) \\
 \text{L.H.S.} &= \text{R.H.S.}
 \end{aligned}$$

$$\begin{aligned}
 &= \{1, 2, 3, \dots, 10\} \quad (\text{نمبر } 2.5) \\
 \text{R.H.S.} &= B \cup A \\
 &= \{2, 4, 6, 8\} \cup \{1, 2, 3, \dots, 10\} \\
 &= \{1, 2, 3, \dots, 10\} \quad (\text{نمبر } 2.5) \\
 \text{L.H.S.} &= \text{R.H.S.}
 \end{aligned}$$

Ahmad bought a house in Rs. 550000 and sold it in Rs. 700000. Find his profit percentage. (5 marks)

احمد نے ایک گھر 550000 روپے میں خریدا اور 700000 روپے میں فروخت کر دیا۔ اس کا نفع فیصد معلوم کریں۔ (5 نمبر)

Rubric:

cost price = Rs 550000 ✓

sale price = Rs 700000 ✓

Profit = sale price - cost price

$$\begin{aligned}
 &= 700000 - 550000 \\
 &= \text{Rs. } 150000 \quad (2 \text{ marks})
 \end{aligned}$$

Profit percentage = $\frac{\text{profit}}{\text{cost price}} \times 100$ ✓

$$= \frac{150000}{550000} \times 100 \quad (1 \text{ mark})$$

$$= \frac{300}{11} \quad (1 \text{ mark})$$

$$= 27\frac{3}{11} \% \quad (1 \text{ mark})$$



روپے 550000 = قیمت خرید

روپے 700000 = قیمت فروخت

قیمت خرید - قیمت فروخت = نفع

$$= 700000 - 550000$$

$$= 150000 \text{ روپے (نمبر } 2)$$

$$= (\text{قیمت خرید} / \text{نفع}) \times 100 = \text{نفع فیصد}$$

$$= \frac{150000}{550000} \times 100 \quad (\text{نمبر } 1)$$

$$= \frac{300}{11} \quad (\text{نمبر } 1)$$

$$= 27\frac{3}{11} \% \quad (\text{نمبر } 1)$$

اگر $U = \{0, 1, 2, \dots, 10\}$, $A = \{1, 2, 5, 7, 9\}$, $B = \{0, 2, 4, 6, 8\}$ ہو تو ثابت کریں: $(A \cap B)^C = A^C \cup B^C$ (8 نمبر)



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Shaping Future

✓ $A \cap B = \{1, 2, 5, 7, 9\} \cap \{0, 2, 4, 6, 8\}$

$A \cap B = \{2\}$ (2 marks)

$(A \cap B)^C = U - A \cap B$

$(A \cap B)^C = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10\} - \{2\}$

$(A \cap B)^C = \{0, 1, 3, 4, 5, 6, 7, 8, 9, 10\}$ (2 marks)

$A^C = U - A$

$A^C = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10\} - \{1, 2, 5, 7, 9\}$

$A^C = \{0, 3, 4, 6, 8, 10\}$ (1.5 marks)

$B^C = U - B$

$B^C = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10\} - \{0, 2, 4, 6, 8\}$

$B^C = \{1, 3, 5, 7, 9, 10\}$ (1.5 marks)

$A \cap B = \{1, 2, 5, 7, 9\} \cap \{0, 2, 4, 6, 8\}$

$A \cap B = \{2\}$ (2 نمبر)

$(A \cap B)^C = U - A \cap B$

$(A \cap B)^C = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10\} - \{2\}$

$(A \cap B)^C = \{0, 1, 3, 4, 5, 6, 7, 8, 9, 10\}$ (2 نمبر)

$A^C = U - A$

$A^C = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10\} - \{1, 2, 5, 7, 9\}$

$A^C = \{0, 3, 4, 6, 8, 10\}$ (1.5 نمبر)

$B^C = U - B$

Prime factorization of 1728

$$= 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 3 \quad (2 \text{ marks})$$

$$= 2^3 \times 2^3 \times 3^3$$

Taking cube root both sides

$$\sqrt[3]{1728} = \sqrt[3]{2^3 \times 2^3 \times 3^3} \quad (2 \text{ marks})$$

$$= (2^3 \times 2^3 \times 3^3)^{\frac{1}{3}} \quad (2 \text{ marks})$$

$$= (2^{2 \times \frac{1}{3}} \times 2^{2 \times \frac{1}{3}} \times 3^{1 \times \frac{1}{3}})$$

$$= 2 \times 2 \times 3 = 12 \quad (1 \text{ mark})$$

$$\sqrt[3]{1728}$$

$$\sqrt[3]{2^3 \times 2^3 \times 3^3}$$

$$(2^3 + 2^3 + 3^3)^{\frac{1}{3}}$$

$$= 2^3 \times 2^3 \times 3^3$$

دونوں طرف جزر المکعب لینے سے

$$\sqrt[3]{1728} = \sqrt[3]{2^3 \times 2^3 \times 3^3} \quad (2 \text{ نمبر})$$

$$= (2^3 \times 2^3 \times 3^3)^{\frac{1}{3}} \quad (2 \text{ نمبر})$$

$$= (2^{3 \times \frac{1}{3}} \times 2^{3 \times \frac{1}{3}} \times 3^{3 \times \frac{1}{3}})$$

$$= 2 \times 2 \times 3 = 12 \quad (1 \text{ نمبر})$$

If $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$, $A = \{1, 3, 5\}$ and $B = \{2, 4, 6\}$ then verify that $(A \cup B)^C = A^C \cap B^C$ (8 marks)

$(A \cup B)^C = A^C \cap B^C$ کو تصدیق کریں کہ $B = \{2, 4, 6\}$, $A = \{1, 3, 5\}$, $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$ اگر

$$A \cup B = \{1, 3, 5\} \cup \{2, 4, 6\}$$

$$A \cup B = \{1, 2, 3, 4, 5, 6\} \quad (2 \text{ نمبر})$$

$$(A \cup B)^C = U - A \cup B$$

$$(A \cup B)^C = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\} - \{1, 2, 3, 4, 5, 6\}$$

$$(A \cup B)^C = \{7, 8, 9, 10\} \quad (2 \text{ نمبر})$$

$$A^C = U - A$$

$$A^C = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\} - \{1, 3, 5\}$$

$$A^C = \{2, 4, 6, 7, 8, 9, 10\} \quad (1.5 \text{ نمبر})$$

$$B^C = U - B$$

$$A \cup B = \{1, 3, 5\} \cup \{2, 4, 6\}$$

$$A \cup B = \{1, 2, 3, 4, 5, 6\} \quad (2 \text{ marks})$$

$$(A \cup B)^C = U - A \cup B$$

$$(A \cup B)^C = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\} - \{1, 2, 3, 4, 5, 6\}$$

L.H.S $(A \cup B)^C = \{7, 8, 9, 10\} \quad (2 \text{ marks})$

$$A^C = U - A$$

$$A^C = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\} - \{1, 3, 5\}$$

$$\rightarrow A^C = \{2, 4, 6, 7, 8, 9, 10\} \quad (1.5 \text{ marks})$$

$$B^C = U - B$$

$$B^C = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\} - \{2, 4, 6\}$$

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Shaping Futures

$$\begin{aligned}
 \text{L.H.S} &= (A \cap B)^C \\
 (A \cap B) &= \{1, 2, 4\} \cap \{3, 5, 7, 9\} \\
 &= \{\} \quad (02 \text{ marks}) \\
 (A \cap B)^C &= U - (A \cap B) \\
 &= \{1, 2, 3, \dots, 10\} - \{\} \\
 &= \{1, 2, 3, \dots, 10\} \quad (02 \text{ marks}) \\
 \text{R.H.S} &= A^C \cup B^C \\
 A^C &= U - A \\
 &= \{1, 2, 3, \dots, 10\} - \{1, 2, 4\} \\
 &= \{3, 5, 6, \dots, 10\} \quad (1.5 \text{ marks}) \\
 B^C &= U - B \\
 &= \{1, 2, 3, \dots, 10\} - \{3, 5, 7, 9\} \\
 &= \{1, 2, 4, 6, 8, 10\} \quad (1.5 \text{ marks}) \\
 A^C \cup B^C &= \{3, 5, 6, \dots, 10\} \cup \{1, 2, 4, 6, 8, 9, 10\} \\
 &= \{1, 2, 3, \dots, 10\} \quad (1 \text{ mark})
 \end{aligned}$$



$$\begin{aligned}
 \text{L.H.S} &= (A \cap B)^C \\
 (A \cap B) &= \{1, 2, 4\} \cap \{3, 5, 7, 9\} \\
 &= \{\} \quad (نمبر 2) \\
 (A \cap B)^C &= U - (A \cap B) \\
 &= \{1, 2, 3, \dots, 10\} - \{\} \\
 &= \{1, 2, 3, \dots, 10\} \quad (نمبر 2) \\
 \text{R.H.S} &= A^C \cup B^C \\
 A^C &= U - A \\
 &= \{1, 2, 3, \dots, 10\} - \{1, 2, 4\} \\
 &= \{3, 5, 6, \dots, 10\} \quad (نمبر 1.5) \\
 B^C &= U - B \\
 &= \{1, 2, 3, \dots, 10\} - \{3, 5, 7, 9\} \\
 &= \{1, 2, 4, 6, 8, 10\} \quad (نمبر 1.5)
 \end{aligned}$$

$$\text{L.H.S} = (A \cap B)^C$$

$$(A \cap B) = \{1, 2, 4\} \cap \{3, 5, 7, 9\}$$

$$= \{\}$$
 (02 marks)

$$(A \cap B)^C = U - (A \cap B)$$

$$= \{1, 2, 3, \dots, 10\} - \{\}$$

$$= \{1, 2, 3, \dots, 10\}$$
 (02 marks)

$$\text{R.H.S} = A^C \cup B^C$$

$$A^C = U - A$$

$$= \{1, 2, 3, \dots, 10\} - \{1, 2, 4\}$$

$$= \{3, 5, 6, \dots, 10\}$$
 (1.5 marks)

$$B^C = U - B$$

$$= \{1, 2, 3, \dots, 10\} - \{3, 5, 7, 9\}$$

$$= \{1, 2, 4, 6, 8, 10\}$$
 (1.5 marks)

$$A^C \cup B^C = \{3, 5, 6, \dots, 10\} \cup \{1, 2, 4, 6, 8, 9, 10\}$$

$$= \{1, 2, 3, \dots, 10\}$$
 (1 mark)

$$\text{L.H.S} = \text{R.H.S}$$



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Shaping Futures

$$\text{L.H.S} = (A \cap B)^C$$

$$(A \cap B) = \{1, 2, 4\} \cap \{3, 5, 7, 9\}$$

$$= \{\}$$
 (نمبر 2)

$$(A \cap B)^C = U - (A \cap B)$$

$$= \{1, 2, 3, \dots, 10\} - \{\}$$

$$= \{1, 2, 3, \dots, 10\}$$
 (نمبر 2)

$$\text{R.H.S} = A^C \cup B^C$$

$$A^C = U - A$$

$$= \{1, 2, 3, \dots, 10\} - \{1, 2, 4\}$$

$$= \{3, 5, 6, \dots, 10\}$$
 (نمبر 1.5)

$$B^C = U - B$$

$$= \{1, 2, 3, \dots, 10\} - \{3, 5, 7, 9\}$$

$$= \{1, 2, 4, 6, 8, 10\}$$
 (نمبر 1.5)

$$A^C \cup B^C = \{3, 5, 6, \dots, 10\} \cup \{1, 2, 4, 6, 8, 9, 10\}$$

$$= \{1, 2, 3, \dots, 10\}$$
 (نمبر 1)

$$\text{L.H.S} = \text{R.H.S}$$

$$= \sqrt{2^2 \times 29^2} \quad (1 \text{ mark})$$

$$= \sqrt{(2 \times 29)^2} \quad (1 \text{ mark})$$

$$= 2 \times 29 \quad (1 \text{ mark})$$

$$= 58 \quad (1 \text{ mark})$$

$$\begin{array}{r} 29 \overline{) 841} \\ \underline{58} \\ 261 \\ \underline{261} \\ 0 \end{array}$$

$$= \sqrt{2^2 \times 29^2} \quad (1 \text{ mark})$$

$$= \sqrt{(2 \times 29)^2} \quad (1 \text{ mark})$$

$$= 2 \times 29 \quad (1 \text{ mark})$$

$$= 58 \quad (1 \text{ mark})$$

If one packet contains $5\frac{1}{4}$ liters of oil, then find the quantity of oil in 5 such packets. (5 marks)

$$\text{Oil in 1 packet} = 5\frac{1}{4} \text{ l}$$

$$\text{Oil in 5 packets} = 5\frac{1}{4} \times 5 \quad (2 \text{ marks})$$

$$= \frac{21}{4} \times 5 \quad (1 \text{ mark})$$

$$= \frac{105}{4} \quad (1 \text{ mark})$$

$$= 26\frac{1}{4} \text{ l} \quad (1 \text{ mark})$$

$$5\frac{1}{4}$$



اگر ایک پیکٹ میں $5\frac{1}{4}$ لٹر تیل ہو تو ایسے 5 پیکٹوں میں کتنا تیل ہوگا؟ (5 نمبر)

$$5\frac{1}{4} \text{ لٹر} = \text{ایک پیکٹ میں تیل}$$

$$5 \text{ پیکٹوں میں تیل} = 5\frac{1}{4} \times 5 \quad (2 \text{ نمبر})$$

$$= \frac{21}{4} \times 5 \quad (1 \text{ نمبر})$$

$$= \frac{105}{4} \quad (1 \text{ نمبر})$$

$$26\frac{1}{4} \text{ لٹر} \quad (1 \text{ نمبر})$$

Question No: 12

سوال نمبر 12

a). Verify $A \cup B = B \cup A$ if $A = \{1, 2, 3, \dots, 10\}$ and $B = \{2, 4, 6, 8\}$. (5 Marks)

ثابت کریں $A \cup B = B \cup A$ اگر $A = \{1, 2, 3, \dots, 10\}$ اور $B = \{2, 4, 6, 8\}$ ہے۔ (5 نمبر)

ANSWERS / RUBRICS

Question No: 11

سوال نمبر 11

a) Find the square root of $\frac{81}{144}$ by prime factorization. (5 Marks)

کسر $\frac{81}{144}$ کا جذر المربع بذریعہ منفرد تجزی معلوم کریں۔ (5 نمبر)

$$\begin{aligned}\sqrt{\frac{81}{144}} &= \frac{\sqrt{3 \times 3 \times 3 \times 3}}{\sqrt{2 \times 2 \times 2 \times 2 \times 3 \times 3}} \text{ (1 Mark)} \\ &= \frac{\sqrt{3^2 \times 3^2}}{\sqrt{2^2 \times 2^2 \times 3^2}} \text{ (1 Mark)} \\ &= \frac{\sqrt{(3 \times 3)^2}}{\sqrt{(2 \times 2 \times 3)^2}} \text{ (1 Mark)} \\ &= \frac{3 \times 3}{2 \times 2 \times 3} \text{ (1 Mark)} \\ &= \frac{9}{12} \text{ (1 Mark)}\end{aligned}$$

$$\begin{array}{r} 2 \overline{) 144} \\ \underline{2 72} \\ 3 \overline{) 81} \\ \underline{3 27} \\ 3 \overline{) 9} \\ \underline{3 3} \\ 3 \overline{) 3} \\ \underline{3} \\ 1 \end{array}$$

$$\begin{aligned}\sqrt{\frac{81}{144}} &= \frac{\sqrt{3 \times 3 \times 3 \times 3}}{\sqrt{2 \times 2 \times 2 \times 2 \times 3 \times 3}} \text{ (نمبر 1)} \\ &= \frac{\sqrt{3^2 \times 3^2}}{\sqrt{2^2 \times 2^2 \times 3^2}} \text{ (نمبر 1)} \\ &= \frac{\sqrt{(3 \times 3)^2}}{\sqrt{(2 \times 2 \times 3)^2}} \text{ (نمبر 1)} \\ &= \frac{3 \times 3}{2 \times 2 \times 3} \text{ (نمبر 1)} \\ &= \frac{9}{12} \text{ (نمبر 1)}\end{aligned}$$

$27\frac{1}{2}$ kg rice is to be packed equally in $2\frac{3}{4}$ kg packets. Find the number of packets. (5 Marks)

$27\frac{1}{2}$ کلو گرام چاول کو $2\frac{3}{4}$ کلو گرام کے پیکٹوں میں برابر پیک کیا گیا ہے۔ پیکٹوں کی تعداد معلوم کریں۔ (5 نمبر)

$$= \frac{105}{4} \checkmark (1 \text{ mark})$$

$$= 26\frac{1}{4} (1 \text{ mark})$$

$$= \frac{105}{4} (1 \text{ نمبر})$$

$$26\frac{1}{4} (1 \text{ نمبر})$$

Question No: 12

سوال نمبر 12

a) Verify $A \cup B = B \cup A$ if $A = \{1, 2, 3, \dots, 10\}$ and $B = \{2, 4, 6, 8\}$. (5 Marks)

ثابت کریں $A \cup B = B \cup A$ اگر $A = \{1, 2, 3, \dots, 10\}$ اور $B = \{2, 4, 6, 8\}$ ہے۔ (5 نمبر)



AL-RIAZ ACADEMY
Shaping Futures

$$\text{L.H.S} = A \cup B \checkmark$$

$$= \{1, 2, 3, \dots, 10\} \cup \{2, 4, 6, 8\}$$

$$= \{1, 2, 3, \dots, 10\} (2.5 \text{ marks})$$

$$\text{R.H.S} = B \cup A$$

$$= \{2, 4, 6, 8\} \cup \{1, 2, 3, \dots, 10\}$$

$$= \{1, 2, 3, \dots, 10\} (2.5 \text{ marks})$$

$$\text{L.H.S} = \text{R.H.S}$$

$$\text{L.H.S} = A \cup B$$

$$= \{1, 2, 3, \dots, 10\} \cup \{2, 4, 6, 8\}$$

$$= \{1, 2, 3, \dots, 10\} (2.5 \text{ نمبر})$$

$$\text{R.H.S} = B \cup A$$

$$= \{2, 4, 6, 8\} \cup \{1, 2, 3, \dots, 10\}$$

$$= \{1, 2, 3, \dots, 10\} (2.5 \text{ نمبر})$$

$$\text{L.H.S} = \text{R.H.S}$$

Ahmad bought a house in Rs. 550000 and sold it in Rs. 700000. Find his profit percentage. (5 marks)

احمد نے ایک گھر 550000 روپے میں خریدا اور 700000 روپے میں فروخت کر دیا۔ اس کا نفع فیصد معلوم کریں۔ (5 نمبر)

$$= (2^2 \times 13^1)$$

$$= 2 \times 13 = 26 \quad (1 \text{ mark})$$

$$= (2^{3 \times \frac{1}{3}} \times 13^{3 \times \frac{1}{3}})$$

$$= 2 \times 13 = 26 \quad (\text{نمبر 1})$$

Verify: $(A \cap B)^C = A^C \cup B^C$ if $U = \{0, 1, 2, \dots, 10\}$, $A = \{1, 2, 5, 7, 9\}$ and $B = \{0, 2, 4, 6, 8\}$ (8 marks)

(نمبر 8) $(A \cap B)^C = A^C \cup B^C$: $U = \{0, 1, 2, \dots, 10\}$, $A = \{1, 2, 5, 7, 9\}$, $B = \{0, 2, 4, 6, 8\}$



$$A \cap B = \{1, 2, 5, 7, 9\} \cap \{0, 2, 4, 6, 8\}$$

$$A \cap B = \{2\} \quad (2 \text{ marks})$$

$$(A \cap B)^C = U - A \cap B$$

$$(A \cap B)^C = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10\} - \{2\}$$

$$(A \cap B)^C = \{0, 1, 3, 4, 5, 6, 7, 8, 9, 10\} \quad (2 \text{ marks})$$

$$A^C = U - A$$

$$A^C = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10\} - \{1, 2, 5, 7, 9\}$$

$$A^C = \{0, 3, 4, 6, 8, 10\} \quad (1.5 \text{ marks})$$

$$B^C = U - B$$

$$B^C = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10\} - \{0, 2, 4, 6, 8\}$$

$$B^C = \{1, 3, 5, 7, 9, 10\} \quad (1.5 \text{ marks})$$

$$A^C \cup B^C = \{0, 3, 4, 6, 8, 10\} \cup \{1, 3, 5, 7, 9, 10\}$$

$$A \cap B = \{1, 2, 5, 7, 9\} \cap \{0, 2, 4, 6, 8\}$$

$$A \cap B = \{2\} \quad (\text{نمبر 2})$$

$$(A \cap B)^C = U - A \cap B$$

$$(A \cap B)^C = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10\} - \{2\}$$

$$(A \cap B)^C = \{0, 1, 3, 4, 5, 6, 7, 8, 9, 10\} \quad (\text{نمبر 2})$$

$$A^C = U - A$$

$$A^C = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10\} - \{1, 2, 5, 7, 9\}$$

$$A^C = \{0, 3, 4, 6, 8, 10\} \quad (\text{نمبر 1.5})$$

$$B^C = U - B$$

$$B^C = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10\} - \{0, 2, 4, 6, 8\}$$