# IMO

## Measurements

**Do You Know**

What topics we will cover in this chapter?

**Yes! The topics are:**

- Conversion of units from one unit to another
- Word problems on measuring units (Temperature, Time, Length, Wright, Capacity and Money)

## MATHEMATICAL REASONING

**1.** 4 cups of sugar of the same weight weighs 920 g. 1 glass of sugar weighs 300 g. How much heavier Is 1 glass of sugar than 1 cup of sugar?

(a) 230 g (b) 530 g
(c) 620 g (d) 70 g

**2.** Which temperature is the coldest?

(a) $1°C$ (b) $0°C$
(c) $4°C$ (d) $32°C$

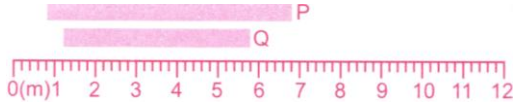
**3.** How long did Mohit drove the car?


(a) 100 minutes (b) 41 minutes
(c) 1 hour (d) 1 hour 41 minutes

**4.** 'Tank A contains 5 times as much water as Tank B. How much water must be transfer from Tank A to Tank B so that each tank contains 45 litres of water?

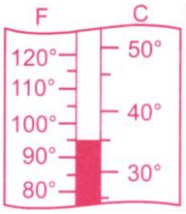
(a) 30 litres (b) 60 litres
(c) 75 litres (d) 45 litres

**5.** The given figure shows two ribbons. What is the difference in length of both the ribbons?




(a) 1.8m (b) 1.6m
(c) 1.7 m (d) 1.4 m

**6.** What temperature does the given thermometer Shows?




(a) $35°C$ (b) $77°F$
(c) $95°C$ (d) $122°F$

**7.** A pole is painted red and white. The red portion is 1.8 m long and the white portion is three times as long as the red portion. How long is the pole?

(a) 5.4 m (b) 7.2 m
(c) 3.6m (d) None of these

**8.** A car petrol tank is $\frac{3}{8}$ full. After that, the petrol tank is filled with 30 litres of petrol and the tank is full. What is the capacity of the tank?

(a) 30 litres (b) 36 litres
(c) 42 litres (d) 48 litres

**9.** At breakfast, the outside temperature was $35°C$. At lunch time, it had gone up by $5°C$, and then at dinner time it had gone down by $2°C$. What was the temperature: at dinner time?

(a) $32°C$ (b) $39°C$
(c) $38°C$ (d) $40°C$

**10.** Express $5\frac{2}{3}$ hrs in minutes.

(a) 235 mins (b) 320 mins
(c) 340 mins (d) 523 mins

**DIRECTION (11-12):** The following time was seen on Samrat and Varun's watch when the actual time was 1:28 p.m.

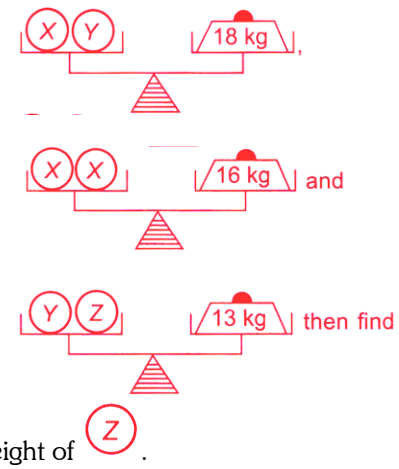

**11.** Calculate the time shown on Varun's watch, when the actual time was half past 6 in the evening.

(a) 5:30 p.m. (b) 6:55 p,m.
(c) 6:30 p.m. (d) 5:55 p.m.

**12.** Calculate the time shown on Samrat's watch when the time on Varun's watch was 5 minutes to midnight.
(a) 11:30 p.m. (b) 12:17 p.m.
(c) 11:55 p.m. (d) 11:17 p.m.

**13.** The height of a cupboard is thrice the height of bookshelf. If the height of the cupboard is 2 m 43 cm, find the height of the bookshelf.
(a) 0.81 m (b) 8.1 m
(c) 81 m (d) 0.81 cm

**14.** If




The weight of Z.
(a) 8kg (b) 10kg
(c) 3 kg (d) 5 kg

**15.** ★ is the difference between 7.50 kg and 2.75 kg. ● is twice of ★. What is the value of ●?
(a) 8.3 kg (b) 4.75 kg
(c) 5 kg (d) 9.5 kg

## EVERYDAY MATHEMATICS

**16.** Mrs Sharma made 5.4 L of lemonade. Mrs Goyal made thrice as much lemonade as Mrs Sharma made. How much lemonade did they make altogether?
(a) 20.3 L (b) 21.6 L
(c) 33.5 L (d) 18.6 L

**17.** The given table shows the prices of 3 different types of eggs. $\frac{1}{4}$ of the eggs 4 Priyanka bought were chicken eggs. $\frac{1}{8}$ of them were century eggs and the rest were quail eggs. If Priyanka spent a total amount of ₹ 6.50 on the chicken and century eggs, how much did she spend on the quail eggs?

| | |
|---|---|
| Chicken eggs | 20 Paise each |
| Century eggs | 90 Paise each |
| Quail eggs | 5 Paise each |

(a) ₹ 1.25 (b) ₹ 1.40
(c) ₹ 1.65 (d) ₹ 1.80

**18.** Reema pours 2 L 250 mL of juice equally into 9 glasses. How much juice is there in each glass?
(a) 600 mL (b) 300 mL
(c) 250 mL (d) 150 mL

**19.** Shalini's car has 15 L 315 mL of petrol in its tank, while her scooter has 2 L 945 mL of petrol in its tank. How much petrol is there in both the vehicles altogether?
(a) 18 L 370 mL (b) 18 L 260 mL
(c) 13 L 945 mL (d) 13 L 370 mL

**20.** Shreya had 480 kg of rice. She poured $\frac{3}{8}$ of it into a rice container and packed $\frac{3}{5}$ of the remainder into 6 bags. How much rice was there in each bag?
(a) 40 kg (b) 20 kg
(c) 30 kg (d) 50 kg

**21.** A shirt costs ₹ 12 more than the belt. The total cost of 2 such shirts and 5 such belts Is ₹ 164. What is the cost of one belt?
(a) ₹ 20 (b) ₹ 22
(c) ₹ 32 (d) ₹ 34

**22.** Mrs. Sapna had 17.85 m of ribbon. She cut 9 smaller pieces each of length 0.35 m from it. How many metres of ribbon were left ?
(a) 3.15 m (b) 14.7 m
(c) 8.85 m (d) 17.5 m

**23.** 520 g of tiny pink pebbles are mixed with 580 g of tiny purpie pebbles. Vihan packed the mixture of tiny pebbles into 5 equal packets. How many grams of the mixture are there in each packet?
(a) 220 g (b) 330 g
(c) 230 g (d) 150g

**24.** A tailor had a piece of cloth. He cut 3 smaller pieces of cloth each $\frac{3}{4}$ m from it. If he had left with $5\frac{3}{4}$ m of cloth, then find the total length of the cloth.

(a) 3 m (b) 6 m
(c) 8 m (d) 5 m

**25.** Chinki can cycle from point A to point B and return to point A in 10 minutes. She can cycle there and walk back in 20 minutes. it will take _____ mins for her to walk there and walk back.

(a) 10 (b) 20
(c) 30 (d) 40

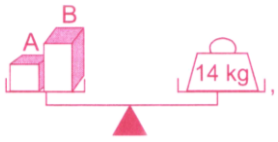
**26.** Nisha made 16.5 L of rose drink for a Children's Funfair. Sakshi made 3.5 L more rose drink than Nisha. At the end of the day, Sakshi had sold $\frac{3}{4}$ of her rose drink. Also, Sakshi had twice as much rose drink as Nisha had left. How much rose drink did Nisha sell?

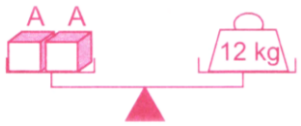
(a) 14 L (b) 14.5 L
(c) 18 L (d) 18.3 L

**27.** A blue ribbon 2 m 98 cm long, was half as long as a red ribbon. Jyoti used $1\frac{2}{5}$ m of the red ribbon to tie a parcel. She then cut the rest of the red ribbon into 4 equal pieces. Calculate the length of each remaining piece of red ribbon.

(a) 114 m (b) 0.28 m
(c) 1.14 m (d) 28 m

**28.** If

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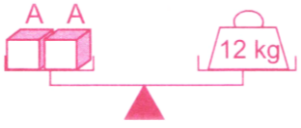



then


what is the weight of ?

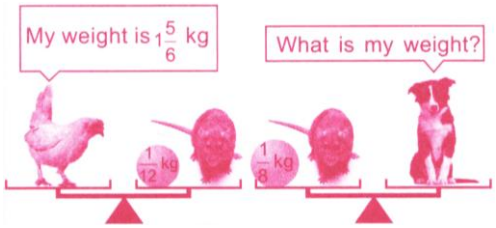
(a) 6 kg (b) 8 kg
(c) 9 kg (d) 7 kg

**29.** The given table shows the weights of some marbles. What is the weight of marble P?

| Marbles | PQQ | QRS | PSR |
|---|---|---|---|
| Weight (in g) | 660 | 600 | 540 |

(a) 150 g (b) 280 g
(c) 180 g (d) 240 g

**30.**




(a) $1\frac{5}{4}$ kg (b) $1\frac{7}{8}$ kg
(c) $\frac{5}{4}$ kg (d) $\frac{8}{9}$ kg

| ANSWER KEY | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **1.** | **D** | **2.** | B | **3.** | D | **4.** | A | **5.** | D |
| **6.** | **A** | **7.** | B | **8.** | D | **9.** | C | **10.** | C |
| **11.** | **B** | **12.** | D | **13.** | A | **14.** | C | **15.** | D |
| **16.** | **B** | **17.** | A | **18.** | C | **19.** | B | **20.** | C |
| **21.** | **A** | **22.** | B | **23.** | A | **24.** | C | **25.** | C |
| **26.** | **A** | **27.** | C | **28.** | D | **29.** | D | **30.** | B |

**1.** (d) : Weight of 4 cups of sugar = 920 $g$
$\therefore$ Weight of 1 cup of sugar
$= (920-4)\ g = 230\ g$
Weight of 1 glass of sugar = 300 $g$
Required difference $= (300\ 230)\ g = 70\ g$

**2.** (b) Not Available

**3.** (d) : Starting time = 8 : 38
Ending time = 10 : 19
$\therefore$ Duration = 1 hour 41 minutes

**4.** (a): Let quantity of water in tank B be X litres.
$\therefore$ Quantity of water in tank A = 5X litres
Total water in both the tanks = X+5X
= 90 litres
$\Rightarrow 6X = 90 \Rightarrow X = 15$
$\therefore$ Water in tank B = 15 litres
$\Rightarrow$ Water in tank A $= 15 \times 5 = 75$ litres
So, quantity of water to be transferred from tank A to tank B, so that each tank contains
45 litres $= 75 - \boxed{30} = 45$ litres

Therefore, 30 litres of water should be transferred.

**5.** (d) : Length of ribbon P = 6 m
Length of ribbon Q = 4.6 m
$\therefore$ Required difference $= (6 - 4.6)$ m = 1.4 m

**6.** (a) Not Available

**7.** (b) : Length of pole painted red -= 1.8 m
$\therefore$ Length of pole painted white $= 3 \times 1.8$
$= 5.4\ m$
So, total length of pole $= (1.8 + 5.4)\ m = 7.2\ m$

**8.** (d) : Fraction of tank which is empty
$= 1 - \frac{3}{8} = \frac{5}{8}$
According to question,
$\frac{5}{8} \times$ Capacity of tank $= 30$ litres
Capacity og tank $= 30 \times \frac{8}{5}$ litres $= 48$ litres

**9.** (c) Outside temperature at breakfast time
$= 35°C$
Outside temperature at lunch time
$= (35 + 5)°C = 40°C$
Outside temperature at dinner time
$= (40 - 2)°C = 38°C$

**10.** (c) : $5\frac{2}{3}$ hrs $= \frac{17}{3}$ hrs
1 hr = 60 mins
$\therefore$ $\frac{17}{3}$ hrs $= \frac{17}{3} \times 60$ mins $= 340$ mins

**11.** (b): Actual time is 1: 28 p.m. /-e,, 13 : 28
So. Samrat's watch is 13 mins slow
And, Varun's watch is 25 mins fast
Half past, 6 p.m. means 6 30 p.m.
So, time on Varun's watch at 6:30 p.m.
=6:55 p.m.

**12.** (d) : Time on Varun's watch = 5 mins 10
midnight = 11 : 55 p.m.
Actual time when Varun s watch shows
11:55 p.m, =11 : 30 p.m.
$\therefore$ Time on Samrat's watch =11:17 p.m.

**13.** (a) : Height of cupboard = 2 m 43 cm
=2.43 m
$\therefore$ Height of bookshelf $= (2.43 \div 3)$ in
=0.81 m

**14.** (c) : Weight of 2 (X) =16 kg
$\Rightarrow$ Weight of 1 (X) $= \frac{16}{2}$ Kg = 8 kg
Also, Weight of (X) + Weight of (Y)
= 18 kg
$\Rightarrow$ 8 kg + Weight of (Y) =18 kg
$\Rightarrow$ Weight of (Y) = 10 kg
Now, weight of (Y) + weight of (Z) = 13 kg
$\Rightarrow$ 10 kg + Weight of (Z) = 13 kg
$\Rightarrow$ Weight of (Z) = 3 kg

**15.** (d) : According to question, we have
(★) $= 7.50 - 2.75 = 4.75$ kg
$\therefore$ (●) =2 (★) $= 2 \times 4.75 = 9.5$ kg

**16.** (b) : Quantity of lemonade Mrs Sharma made = 5.4 L
$\therefore$ Quantity of lemonade Mrs Goyal made
$= 3 \times 5.4\ L = 16.2\ L$
So, total quantity of lemonade they made altogether $= (5.4 + 16.2)\ L = 21.6\ L$

**17.** (a): Let the total number of eggs be X.
$\therefore$ Number of chicken eggs $= \frac{1}{4}X$
Number of century eggs $= \frac{1}{8}X$
And number of quail eggs
$= X - \left(\frac{1}{4}X + \frac{1}{8}X\right) = \frac{5}{8}X$
Now, $\frac{1}{4} \times X \times 20 + \frac{1}{8} \times X \times 90 = 6.50 \times 100$ paise
$\Rightarrow$ $\frac{40X + 90X}{8} = 650$
$\Rightarrow$ $130X = 5200 \Rightarrow X = 40$
$\therefore$ Number of quail eggs $= \frac{5}{8} \times 40 = 25$
So, money spent on quail eggs
$= (25 \times 5)$ paise = 125 paise = ₹ 1.25.

**18.** (c) : Total quantity of juice = 2 L 250 mL
= 2.250 L
Number of glasses = 9
$\therefore$ Quantity of juice in 1 glass

$= (2.250 \div 9)\,L = 0.250\,L = 250\,mL$

**19.** (b) : Quantity of petro! in car = 15 L 315 mL
Quantity of petrol in scooter = 2L 945 mL
$\therefore$ Total quantity of petrol
= 15 L 315 mL + 2 L 945 mL
= 18 L260 mL

**20.** (c) : Total quantity of rice Shreya has
$= 480\ kg$
Quantity of rice poured into container
$= \frac{3}{8} \times 480 = 180\ kg$
$\therefore$ Quantity of rice left $= 480 - 180$
$= 300\ kg$
So, quantity of rice to be packed in bags
$= \frac{3}{5} \times 300 = 180\ kg$
Number of bags = 6
$\therefore$ Quantity of rice in each bag
$= 180 - 6 = 30\ kg$

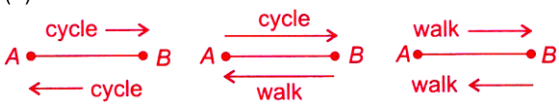
**21.** (a): Cost of one shirt is ₹ 12 more than the belt.
Cost of two shirts and 5 belts = ₹ 164
$\therefore$ Cost of (2 × shirts + 5 × belts) = ₹ 164
$\Rightarrow$ Cost of [2(₹ 12+1 belt) + 5 belts]
=₹164
$\Rightarrow$ ₹ 24 + Cost of (2 belts + 5 belts)
= ₹ 164
$\Rightarrow$ Cost of 7 belts = ₹ (164 - 24) = ₹ 140
$\therefore$ Cost of 1 belt = ₹ $(140 \div 7) =$ ₹ 20.

**22.** (b) : Total length of the ribbon = 17.85
Length of 1 small piece of ribbon = 0.35 m
$\Rightarrow$ Length of 9 small pieces of ribbon
$= 9 \times 0.35 = 3.15\ m$
$\therefore$ Length of the remaining piece of ribbon
$= (17.85 - 3.15)\ m = 14.7\ m$

**23.** (a) : Weight of mixture $= (520 + 580)\,g$
$= 1100\ g$
Number of packets = 5
$\therefore$ Weight of mixture in each packet
$= (1100 - 5)\ g = 220g$

**24.** (c) : Length of 1 small piece $= \frac{3}{4}$ rn
$\therefore$ Length of 3 small pieces
$= \left(\frac{3}{4} \times 3\right) m = \frac{9}{4}$ m
Length of cloth left $= 5\frac{3}{4} m\ \frac{23}{4}$ m
So, total length of cloth
$= \frac{9}{4} + \frac{23}{4} = \frac{32}{4} = 8m$

**25.** (c) :




Total time taken to cycle from A to B and B to A
= 10 minutes
$\therefore$ Time taken to cycle from A to B =5 minutes
Total time taken to cycle from A to B and
to walk back from B to A = 20 minutes
i.e. 5 + Time taken to walk from B to A = 20
$\Rightarrow$ Time taken to walk from B to
A = $20 - 5 = 15$ minutes
$\therefore$ Total time taken to walk from A to B and
to walk back from B to A $= 15 + 15 = 30$ mins.

**26.** (a) : Quantity of rose drink Nisha made = 16.5L
Quantity of rose drink Sakshi made
$= (3.5 + 16.5)\,L = 20\ L$
Quantity of rose drink Sakshi sold
$= \frac{3}{4} \times 20 = 15L$
$\therefore$ Quantity of rose drink left with Sakshi
$= (20 - 15)\,L = 5\ L$
So, quantity of rose drink left with Nisha
$= \frac{5}{2} L = 2.5L$
$\therefore$ Quantity of rose drink Nisha sold
$= (16.5 - 2.50)L = 14L$

**27.** (c) : Length of blue ribbon $= 2m98$ m
$= 2.98$ m
$\therefore$ Length of red ribbon $= 2 \times 2.98$ m
=5.96 m
Length of red ribbon Jyoti used
$= 1\frac{2}{5} m = 1.4m$
So. Length of red ribbon left $= (5.96 - 1.4)$ m
=4.56 m
Number of pieces: -= 4
$\therefore$ Length of each piece $= (4.56 \div 4)$ m
= 1.14 m

**28.** (d) : Weight of two A blocks = 12 kg
$\therefore$ Weight of 1 block $A = \frac{12}{2} = 6$ kg
Now, Weight of block A + Weight of block B
=14 kg
$\therefore$ Weight of block B = $(14 - 6)$ kg = 8 kg
Weight of block B + Weight of block C=15kg
$\Rightarrow$ Weight of block C = $(15 - 8)$ kg =7 kg

**29.** (c) : Weight of Ⓟ + Ⓢ + Ⓡ = 540 g

Weight of Ⓠ + Ⓡ + Ⓢ = 600 g

$\Rightarrow$ Weight of Ⓠ + (540 - Weight of Ⓟ)
= 600

$\Rightarrow$ Weight of Ⓠ = 600 - 540 + Weight of Ⓟ

$\Rightarrow$ Weight of Ⓠ60 + Weight of Ⓟ

Also, Weight of (Ⓟ + Ⓠ + Ⓠ) = 660 g

$\Rightarrow$ Weight of (Ⓟ + (60 + Ⓟ) + (60 + Ⓟ))
= 660 g

$\Rightarrow$ Weight of 3 Ⓟ + 120 = 660 g

$\Rightarrow$ Weight of 3 Ⓟ = (660 - 120) g = 540 g

$\Rightarrow$ Weight of Ⓟ = $(540 \div 3)$ g = 180 g

**30.** (d) : Weight of  $= 1\frac{5}{6}$ kg = $\frac{11}{6}$ kg

$\frac{1}{12}$ kg + Weight of  = $\frac{11}{6}$ kg

$\Rightarrow$ Weight of  = $\left(\frac{11}{6} - \frac{1}{12}\right)$ kg = $\frac{7}{4}$ kg

Now, $\frac{1}{8}$ kg + Weight of 

$\Rightarrow$ Weight of 

$\Rightarrow$ Weight of  = $\left(\frac{1}{8} + \frac{7}{4}\right)$ kg

= $\frac{15}{8}$ kg = $1\frac{7}{8}$ kg