

FAST-NU Entry Test 2026 Basic Mathematics Test # 01 with Solution

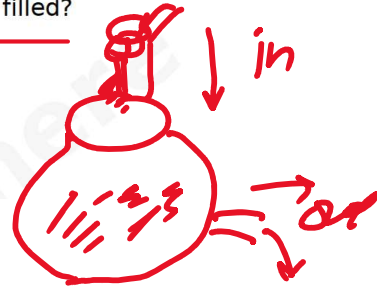
Q1) A tap fills a tank in 8 hours and another empties the full tank in 16 hours. If the tank is empty and both taps are opened, in how many hours will the tank be filled?

- a) 8
- b) 5
- c) 9
- d) 16
- e) 6

Trick

$$\text{Hours} = \frac{8 \times 16}{16 - 8}$$

$$= \frac{8 \times 16}{8} = 16 \text{ hrs}$$



$\frac{1 \text{ hr}}{16}$

2nd Method

It takes 8 hrs to fill the tank

1 hr

$$\longrightarrow \frac{1}{8} \text{ (filling)}$$

16 hr $\longrightarrow$ to empty Tank (1)

$$1 \text{ hr} \longrightarrow \frac{1}{16} \text{ (empty)}$$

Req work per hr = $\frac{1 \times 2}{8 \times 2} - \frac{1}{16} = \frac{2 - 1}{16} = \frac{1}{16}$

Hence = 16 hrs ✓

Q2) Six consecutive integers are given. The sum of the first three is 27. What is the sum of the last three?

- a) 33
- b) 29
- c) 36
- d) 32
- e) 30

$$\begin{aligned} & \text{Let the integers be } n, n+1, n+2, n+3, n+4, n+5 \\ & \text{Sum of first three: } n + n+1 + n+2 = 27 \\ & \Rightarrow 3n + 3 = 27 \Rightarrow 3n = 24 \Rightarrow n = 8 \\ & \text{Sum of last three: } n+3 + n+4 + n+5 = 3n + 12 \\ & = 3 \times 8 + 12 = 24 + 12 = 36 \end{aligned}$$

Variaunts

Q3) A can complete a job in 4 hours and B can complete it in 6 hours. How much time will they take together to finish the job?

- a) 2 hours
- b) 2 hours 24 minutes
- c) 3 hours
- d) 4 hours
- e) 4.5 hours

$$\text{Time} \Rightarrow \text{Time} = \frac{4 \times 6}{4 + 6} = \frac{24}{10} = 2.4 \text{ hours}$$

$$\frac{0.4}{1} \times 60 = 24 \text{ min}$$

$$\frac{1}{T} = \frac{1}{A} + \frac{1}{B}$$

$$\frac{1}{T} = \frac{1}{4} + \frac{1}{6} = \frac{3+2}{12}$$

$$T = \frac{12}{5} \times \frac{2}{2} = \frac{24}{10} = 2.4 \text{ hours}$$

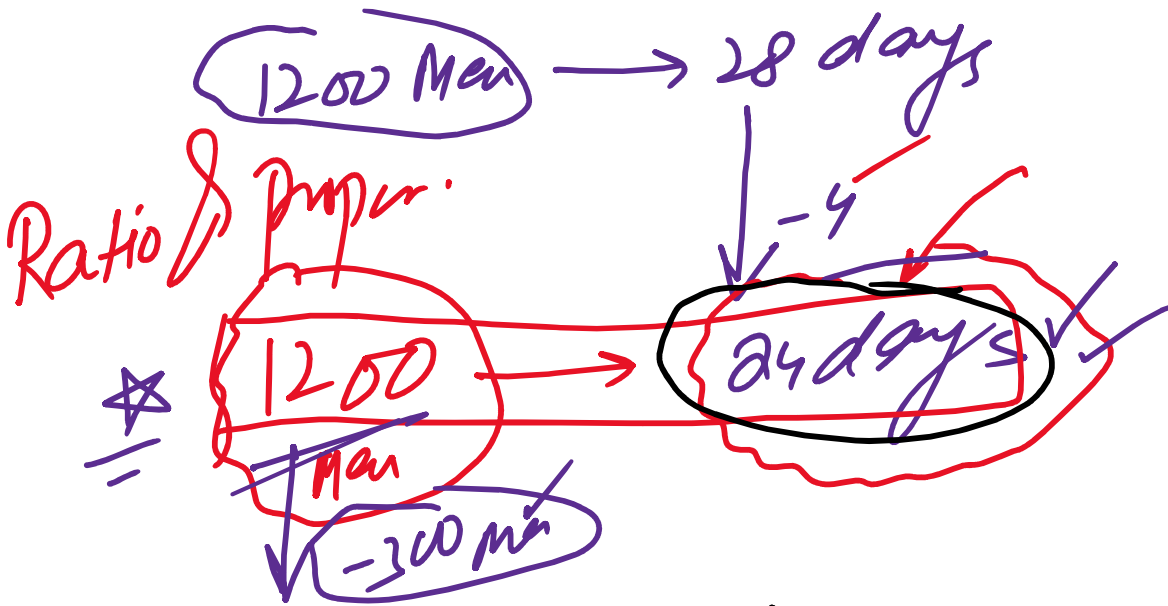
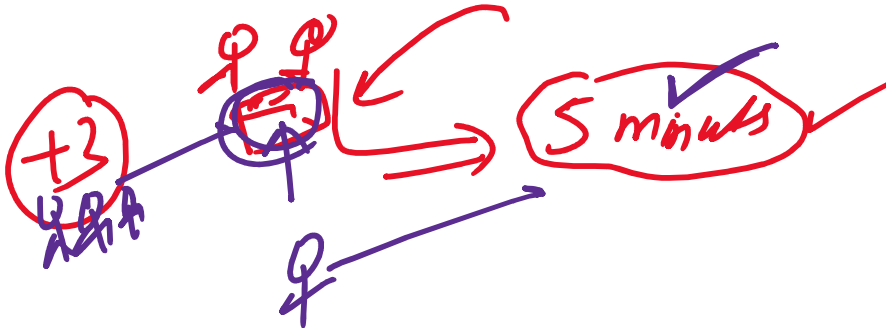
$$28 - 4 = 24$$

Q4) If 1200 men in a fort have provisions for 28 days. After 4 days 300 men leave the fort. How long will food last now?

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- a) 26
- b) 28
- c) 30
- d) 32
- e) 34

(*) $\frac{\text{Men}}{\text{Work}} \propto \frac{1}{\text{Time (days, hrs)}}$



i) $M_1 D_1 = M_2 D_2$

$1200 \times 24 = 900 \times x$

$x = \frac{1200 \times 24}{900} = 32 \text{ days}$

$\propto \frac{1}{x}$

Men $\xleftarrow{\text{inverse}} \dots \xrightarrow{\text{days}}$

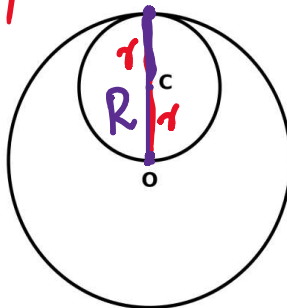
$\downarrow$
 1200
 $\downarrow$
 900

$\uparrow$
 24
 $\uparrow$
 x

$$\frac{x}{24} = \frac{4 \times 1200}{900} = \frac{12 \times 29}{9} = 32 \text{ days}$$

- Q5) A smaller circle with center C touches a larger circle internally and passes through the center O of the larger circle. If the area of the smaller circle is 200 cm², find the area of the larger circle.

- a) 1000
- b) 800
- c) 400
- d) 600



$R = 2r$

$\frac{R}{r} = 2$

πr^2

πR^2

$\rightarrow \frac{R^2}{r^2} = \underline{\underline{4}}$

$\frac{R}{r} = 2 \Rightarrow R : r = 2 : 1$

$R^2 : r^2 = 4 : 1$

★ Q6) In covering a distance of 30 km, Amir takes 2 hours more than Hameed. If Amir doubles his speed, he would take 1 hour less than Hameed. Amir's speed is:

- a) 6 km/hr
- ☒ b) 5 km/hr
- c) 6.25 km/hr
- d) 7.5 km/hr

$$S = \cancel{V \times T} \Rightarrow \uparrow \text{Speed} = \frac{\text{Distance}}{\downarrow \text{Time}}$$

$$\text{Amir speed} = \frac{30 \text{ km}}{A} \rightarrow \textcircled{1}$$

$$\text{Time} \propto \frac{1}{\text{speed}} \downarrow 2 \times$$

$$A = H + 2 \rightarrow \textcircled{1} \Rightarrow H = A - 2$$

$$\frac{A}{2} = H - 1 = A - 2 - 1 = A - 3$$

$$\Rightarrow A = 2A - 6 \Rightarrow \boxed{A = 6}$$

$$\checkmark \text{ Amir's speed} = \frac{30}{6} = 5 \text{ km/hr}$$

$$\uparrow \quad \downarrow \text{ speed } \downarrow \text{ greater} \\ 3 - (1 - 1) = \textcircled{3} \text{ hr}$$

Short cut

$$2 - (-1) = 3 \text{ hr}$$

$$\text{Avg spe} = \frac{30 \text{ km}}{3} = 10 \text{ km/hr}$$

5 km/hr

$$H \rightarrow (T)$$

$$A \rightarrow T+2 \rightarrow (1)$$

$$\frac{T+2}{2} = T-1$$

$$\Rightarrow T+2 = 2(T-1)$$

$$T = 4 \text{ hr}$$

$$A = 6 \text{ hr} = \frac{30}{6} = 5 \text{ km/hr}$$

★ Paras

Q7) In an examination, a candidate has to score 40% of the marks to pass. If a candidate scores 190 marks and fails by 10 marks, the total number of marks in the examination is:

- a) 500
- b) 360
- c) 600
- d) 400

200 $\Rightarrow$ 40% of Total marks

$$\frac{40}{100} \times x = 200$$

$$x = \frac{200 \times (10)}{4} = 500$$

★

Q8) $\log(a^2 - b^2)$ equals:

- a) $\log(a^2/b^2)$
- b) $\log a^2 - \log b^2$
- c) $\log((a + b)/(a - b))$
- d) $2 \log a - 2 \log b$
- e) $\log(a + b) + \log(a - b)$

$\{(a-b)(a+b)\}$

$\log a^2 - \log b^2$
 $\Rightarrow \log\left(\frac{a^2}{b^2}\right)$

Q9) How many faces does an octahedron have?

- a) 8
- b) 6
- c) 12
- d) 4

$\log(a+b) \neq \log a + \log b$

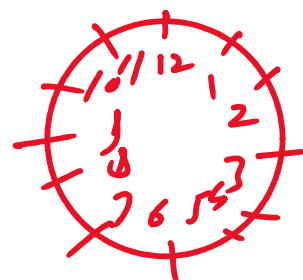
$$\log(a \cdot b) = \log a + \log b$$

$$\log\left(\frac{a}{b}\right) = \log a - \log b$$

$$\log_b a^x = x \log_b a$$

Q10) The set of numbers on a clock face is:

- a) {1, 2, 3, 4, 5, 6, 7, 8, 9, 12}
- b) {3, 9, 12}
- c) None of these
- d) {1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12} ✓
- e) {3, 4, 5}



Q11) If $x < y$, $z = (1/2)x$ and $a = (1/2)y$, then:

- a) $2a > y$
- b) $z > a$
- c) $2x > 2z$
- d) $a > z$

$$z = \frac{x}{2}$$

$$a = \frac{y}{2}$$

$$x < y$$

x is less than y .

$y > x$

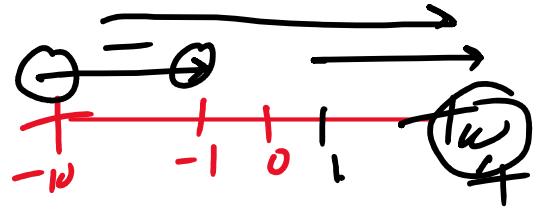
$$\frac{y}{2} > \frac{x}{2} \Rightarrow a > z$$

$$x < y \Rightarrow \frac{1}{x} > \frac{1}{y}$$

$$x < y \Rightarrow -x > -y$$

$$1 < \frac{10}{1} \Rightarrow 1 < 10$$

Reciprocal



$$1 > 0.1$$

$$10 > 1$$

$$-10 < -1$$

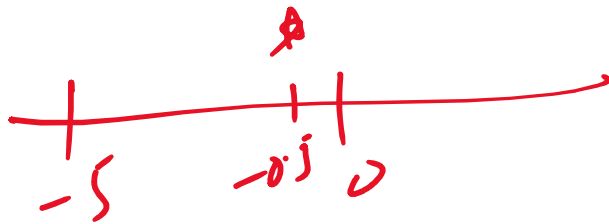
$$(-1) \times$$

$$(-2) \cdot$$

$$10 > 1$$

$$\frac{10}{-2} = -5$$

$$-5 < -0.5$$



$$10 > 1$$

$$(x2) \quad 20 > 2$$

(x2)

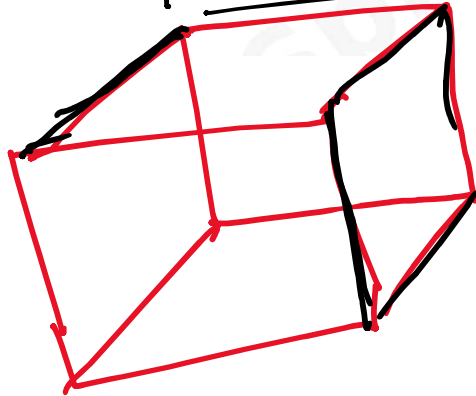
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Q12) A water tank in the shape of a cube is half filled with water. What is the volume of the water in the tank if the surface area of the water is 16 cm^2 ?

- a) 32 cm^3
- b) 44 cm^3
- c) 30 cm^3
- d) 18 cm^3
- e) 26 cm^3

$s = \text{side of a cube}$

$$s^2 = 16 \Rightarrow s = 4 \text{ cm}$$

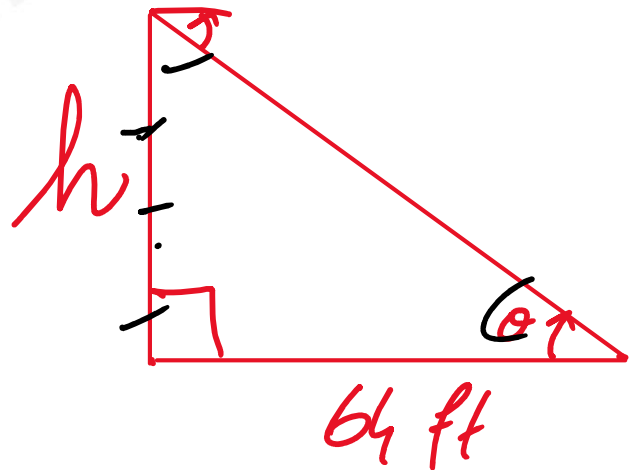
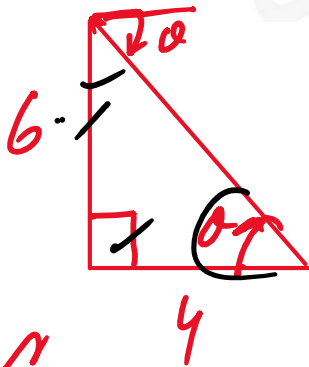


$$V = s^3 = 4^3 = 64 \text{ cm}^3$$
$$\frac{2}{2} = 32 \text{ cm}^3$$

Q13) A vertical pole 6 feet high casts a shadow 4 feet long. At the same time, a tree makes a shadow 64 feet long. What is the height of the tree?

- a) 192 feet
- b) 72 feet
- c) 80 feet
- d) 96 feet

Di:



Similar
Triangles

$$\frac{h}{64} = \frac{6}{4}$$

$$\frac{h}{64} = \frac{6}{4}$$
$$\frac{h}{64} = \frac{3}{2}$$
$$h = \frac{3}{2} \times 64$$

$$h = \frac{3}{2} \times 64 = 96 \text{ ft}$$

64

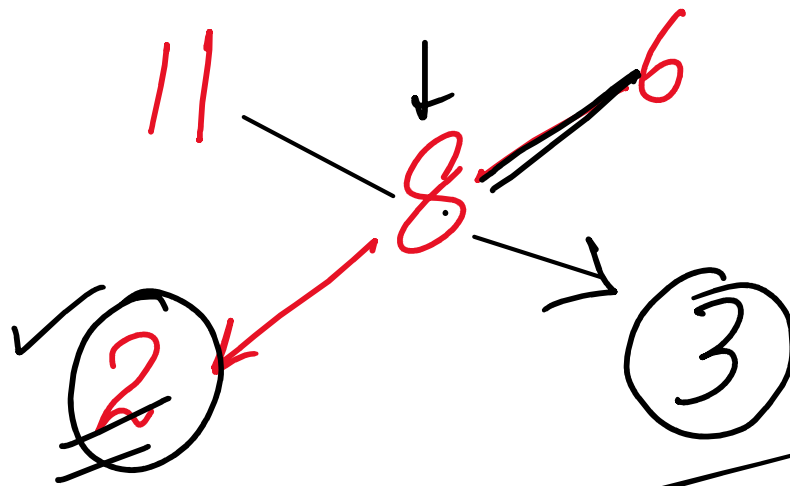
$$h = \frac{100}{64} \times (6) = 10 \checkmark$$

Q14) In what proportion must a man mix milk at Rs. 11 a litre with milk at Rs. 6 a litre, so that the mixture may be worth Rs. 8 a litre?

- a) 5 : 6
- ☒ b) 2 : 3
- c) 3 : 2
- d) 5 : 2

Alligation Cross Method

Dearer Milk
Cheaper Milk



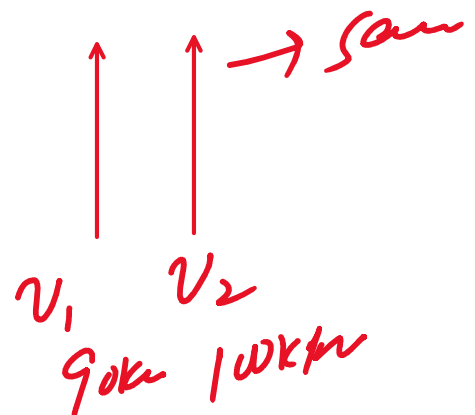
$2 : 3 \Rightarrow$ Dearer : Cheaper

Q15) Two cars start towards each other from points 400 miles apart. One car travels at 40 miles an hour and the other travels at 35 miles an hour. How far apart, in miles, will the two cars be after 4 hours of continuous travelling?

- a) 70
- b) 75
- ☒ c) 50
- d) 100

Relative speed

$$V_r = v_1 + v_2 = 100 \text{ km/hr}$$

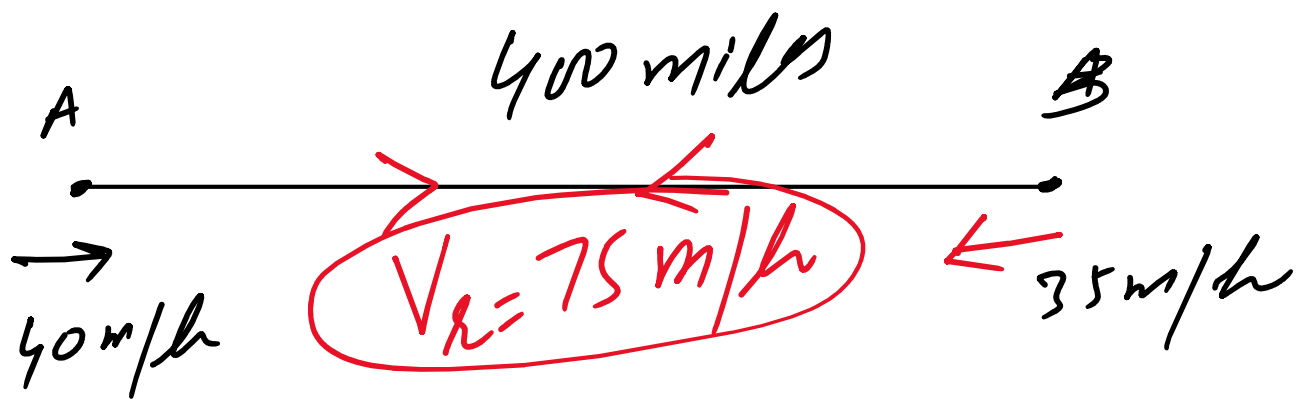


90km 100km

v_1 v_2

$v_r = v_1 - (-v_2)$
 $= v_1 + v_2$ ✓

→ different direction (opposite direction)



$S = vt = 4 \times v_r = 4 \times 75$
 covered $= 300 \text{ miles}$

Remaining distance = $400 - 300 = 100 \text{ miles}$

Q16) The value of x satisfying $\log_{32} x = 0.8$ is:

- a) 16
- b) 25.6
- c) 10
- d) 12.8

$$\log x = 0.8$$

$$\log x = 0.8$$

$$\log 10 = 1$$

$$\log 10 = 1$$

$$\frac{0.8}{1.0} = \frac{4}{5}$$

$$\log_{32} x = 0.8$$

$$x = 32^{\frac{4}{5}} = (2^5)^{\frac{4}{5}} = 2^4 = 16$$

$$\log_{32} 16 ?$$

$$\log_{32} 2^4 = \frac{4}{5}$$

$$\frac{4}{5} = \frac{8}{10} = 0.8$$

$$\log_m (a^n) = \frac{n}{m}$$

$$\log_{25} = ?$$

$$\log x$$

$$\frac{1}{2} m v^2 = 2 m g h$$

✓

Q17) A train 20 meters long is running at a speed of 45 km/hour in the same direction in which a man who is 240 meters ahead of the engine of the train is running at a speed of 9 km/hour. In how much time will the train pass the man?

- a) 36 seconds
- b) 30 seconds
- c) 24 seconds
- d) 15 seconds

e) 26 sec ✓

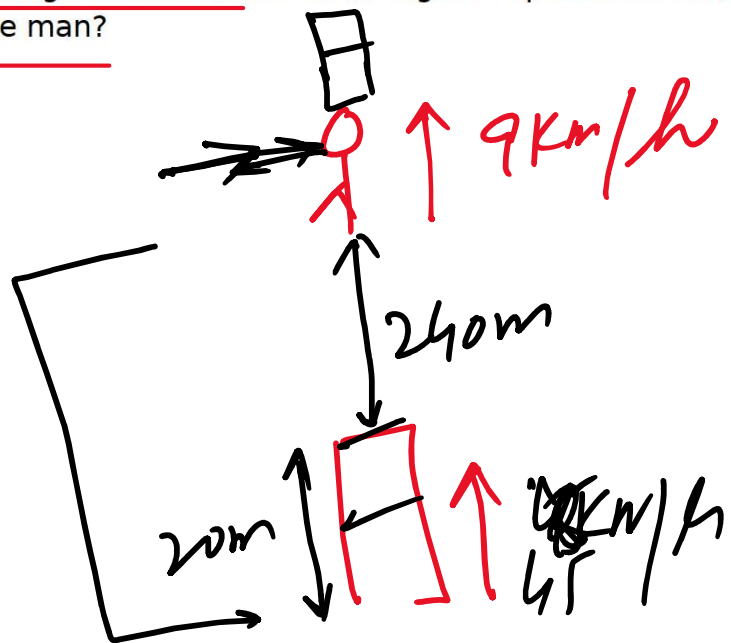
$$d = 240 + 20 = 260 \text{ m}$$

$$s = vt$$

$$t = \frac{s}{v_{\text{man}}} = \frac{260}{v_r} \rightarrow ?$$

$$v_r = 36 \text{ km/h} = \frac{36 \times 1000}{3600}$$

$$= 10 \text{ m/s}$$



$$t = \frac{260}{10} = 26 \text{ sec}$$

$$\frac{244}{19} = 12.84$$

Q18) Solve $10^{-2x} = 10$.

- a) 10
- b) -0.5
- c) -2
- d) -1

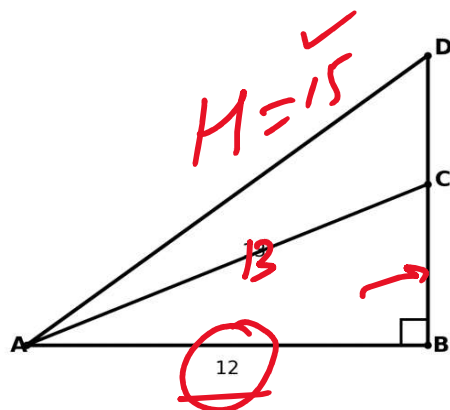
$$10^{-2x} = 10^1$$

$$-2x = 1$$

$$x = -\frac{1}{2} = -0.5$$

Q19) In the figure, $\angle ABD = 90^\circ$, $AB = 12$ cm, $AC = 13$ cm and $CD = 4$ cm. Calculate AD .

- a) $\sqrt{200}$
- b) 9
- c) 15
- d) 5



$$\sqrt{12^2 + 9^2}$$

$$h^2 = r^2 + p^2 \rightarrow$$

$$(3, 4, 5)$$

$$10, 24, 26$$

$$5, 12, 13$$

$$H^2 = B^2 + P^2 \Rightarrow$$

$$(3, 4, 5)$$

$$\times 2: 6, 8, 10$$

$$\times 3: (9, 12, 15)$$

$$(5, 12, 13)$$

$$(169 = 25 + 144)$$

Q20) The volume of a wooden block is 280 cm^3 . What is its height if the length is 8 cm and the breadth is 5 cm?

- a) 9 cm
- b) 7 cm ✓
- c) 10 cm
- d) 14 cm

$$V = 280 = h \times 8 \times 5$$

$$h = \frac{280}{5 \times 8} = 7 \text{ cm}$$

Q21) If $X + \begin{bmatrix} 0 & -9 \\ 6 & 2 \end{bmatrix} = \begin{bmatrix} -1 & 0 \\ 4 & 6 \end{bmatrix}$, then X is equal to:

- a) $\begin{bmatrix} -2 & 9 \\ -1 & 4 \end{bmatrix}$
- b) $\begin{bmatrix} -1 & 4 \\ 2 & 9 \end{bmatrix}$
- c) $\begin{bmatrix} 4 & -2 \\ -9 & 2 \end{bmatrix}$
- d) $\begin{bmatrix} -1 & 9 \\ -2 & 4 \end{bmatrix}$ ✓

$$X + \begin{bmatrix} 0 & -9 \\ 6 & 2 \end{bmatrix} = \begin{bmatrix} -1 & 0 \\ 4 & 6 \end{bmatrix}$$

$$X = \begin{bmatrix} -1 & 9 \\ -2 & 4 \end{bmatrix} = \begin{bmatrix} -1 & 0 \\ 4 & 6 \end{bmatrix} + \begin{bmatrix} 0 & 9 \\ -6 & -2 \end{bmatrix}$$

Q22) Let $A = \{1, 2, 3, 4, 5\}$, $B = \{2, 4, 6, 8\}$ and $C = \{3, 4, 5, 6\}$ then $(A \cup B) \cap C$ is:

- a) $\{1, 2, 3, 4, 6, 8\}$
- b) $\{3, 4, 5, 6\}$
- c) $\{4, 6\}$
- d) $\{3, 4\}$

$$A \cup B = \{1, 2, 3, 4, 5, 6, 8\}$$

$$(A \cup B) \cap C = \{3, 4, 5, 6\}$$

Q23) An equation equivalent to the quadratic equation $x^2 - 6x + 5 = 0$ is:

- a) $|x - 3| = 2$
- b) $x^2 - 5x + 6 = 0$
- c) $6x^2 - 5x + 1 = 0$
- d) $5x^2 - 6x + 1 = 0$

$$|x| = \begin{cases} +x, & x \geq 0 \\ -x, & x < 0 \end{cases}$$

$$|x - 3| = 2$$

$$x - 3 = +2$$

$$x = 5$$

$$x - 3 = -2$$

$$x = 3 - 2$$

$$x = 1$$

$$\begin{pmatrix} < \\ < \\ < \\ < \\ < \end{pmatrix}$$

$$\pi \rightarrow \checkmark \quad | \quad \pi \rightarrow \text{circled } n=1 \checkmark$$

Q24) The number of times a particular item occurs in a given data is called its:

- a) variation
- ☒ b) frequency
- c) cumulative frequency
- d) time period
- e) none of these

Q25) Area of a sector with a central angle of 1 radian in a circular region whose radius is 2 m is:

- a) 1 m^2
- b) 0.5 m^2
- ☒ c) 2 m^2
- d) $\pi/6 \text{ m}^2$



Area! = $\frac{1}{2} r^2 \theta$
 (sector) = $\frac{1}{2} \times 4$

2 m^2

$r = \frac{l}{\theta}$

$l = r\theta$
 $s = r\theta$

Q26) After deducting a commission of 5%, a TV costs Rs. 15200. Its gross value, in rupees, is:

- a) 16400
- b) 14440
- ☒ c) 15960
- d) 15860

c) 16,000 ✓✓

$100\% - 5\% = 95\%$

$95\% \text{ of } (x) = 15,200$

$95 \times x = 15,200$

$$\frac{45}{100} \times x = 15,200$$

$$x = \frac{15,200 \times 100}{45}$$

$$x = \frac{80000}{5} = 16000 \text{ Rs}$$

$$1, (5, 19)$$

$$\begin{array}{r} 19 \\ 8 \\ \hline 152 \end{array}$$

Q27) If your daily income increases from \$60 to \$72, what is the percentage increase?

- a) 12%
- b) 16%
- c) 120%
- d) 84%
- ☒ e) 20%

$$\therefore \uparrow = \frac{12}{60} \times 100\% = 20\%$$

$$\% \text{ increase} = \frac{\text{Change}}{\text{Original}} \times 100$$

$$\% \text{ increase} = \frac{12\$}{72\$} \times 100$$

X

Q28) If $U = \{11, 12, 13, 14, 15\}$, $C = \{15, 14\}$, then $C' = ?$

- a) $\{11, 12, 13\}$
- b) $\{14, 15, 13\}$
- c) $\{11, 12, 14\}$
- d) ϕ
- e) $\{11, 14, 15\}$

$\begin{matrix} \text{X} \\ \text{X} \end{matrix} \Rightarrow C'$

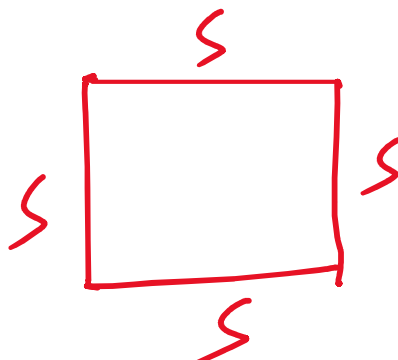
$$C' = U - C$$

$$= \{11, 12, 13\}$$

Q29) The perimeter of a square is 8 cm. What is its area?

- a) 4 cm^2
- b) 16 cm^2
- c) 32 cm^2
- d) 2 cm^2

$4s = 8$



$s = 2 \text{ cm}$

$\text{Area} = s^2 = 4 \text{ cm}^2$

Q30) In the given function, y is directly proportional to k and inversely proportional to h . Which of the following is an equation that satisfies these conditions if x is a proportionality constant?

- a) None of these
- b) hx/k
- c) $y = hkx$
- d) $y = kx/h$
- e) $x/(hk)$

$y \propto k \Rightarrow y \propto \frac{k}{h}$

$$y \propto \frac{1}{h} \quad 0 \cdot h$$

$$y = \frac{Kx}{h}$$

