INTEGRATED+

Class: VI, MATHEMATICS.

7. PROPORTIONS

TEACHING TASK

01. Weight per bag = $\frac{405}{9}$ = 45kg.

Weight of 7 bags = 7 × 45 = 315kg

Ans: C

02. Work is inversely proportional to No. of days.

Given total work = 12 × 15 = 180.

Work needed for 9 days = $\frac{180}{9}$ = 20

Ans: C

03. Original speed = $\frac{180}{3}$ = 60 km/hr

Reduced speed = 60 − 20 = 40 km/hr

Time required = $\frac{180}{40}$ = 4.5 hours

Ans: C

04. Units produced by 1 macline in 1 hour

$= \frac{900}{15 \times 5} = 12$

Units by 9 maclines in 3 hours = 12 × 9 × 3

= 324

Ans: B

05 Pages per typist in 6 hours $= \frac{240}{4} = 60$

Pages typed by 3 typists $= 60 \times 3 = 180$

Ans: B

06 Let the number be x.

Now, $14-x$, $17-x$, $34-x$, $42-x$

Given these are in proportion.

$\therefore \frac{14-x}{17-x} = \frac{34-x}{42-x} \Rightarrow x = \frac{10}{47} = 0$ (approximates)

Ans: A

07 Given $\frac{a}{3} = \frac{b}{4} = \frac{c}{7}$

Now $\frac{a+b+c}{c} = \frac{3k+4k+7k}{7k} = 2$

Ans: B

08 $x \propto 3y+1$

$\Rightarrow x = k(3y+1)$

Given $x=9$, $y=1$

$\Rightarrow 9 = k(3.1+1)$

$\Rightarrow k = \frac{9}{4}$

Now, $y=5$

$x = \frac{9}{4}(3.5+1)$

$x = 36$

Ans: D

9. $\frac{p+q}{p-q} = \frac{\frac{p}{q}+1}{\frac{p}{q}-1} = \frac{\frac{4}{3}+1}{\frac{4}{3}-1} = \frac{7}{1} = 7$

Ans: B

10. $\frac{5a+2b}{2a-3b} = \frac{23}{5}$

$\Rightarrow \frac{5\left(\frac{a}{b}\right)+2}{2\left(\frac{a}{b}\right)-3} = \frac{23}{5}$

$\Rightarrow \frac{5x+2}{2x-3} = \frac{23}{5}$

$\Rightarrow x = 4$

$\Rightarrow \frac{a}{b} = 4$

Ans: A

JEE ADVANCED LEVEL

11. ~~opt: A~~: Total work = workers × Days

$5 \times 12 = 60$ worker-days

opt: A : $3 \times 2 = 60$ ✓

opt B: $16 \times 6 = 60$ ✓

opt D: Conceptual (True)

Ans: A, B, D

12. Distance = $60 \times 6 = 360$ km

~~A~~ption A: $\frac{360}{90} = 4$ hrs ✓

option B: $\frac{360}{120} = 3$ hrs ✓

option C: $\frac{360}{30} = 12$ hrs

Ans: A, B, C

13. Statement I: 5 workers finish work in 5 days.

$5 \times 17 = 75$.

for 15 workers $\frac{75}{5} = 5$ days (True)

Statement II Conceptual (True)

Ans: A

14. Statement I: 12 workers × 15 days

$12 \times 15 = 180$.

for 20 workers: $\frac{180}{20} = 9$ days

∴ Statement I (True)

Statement II: Conceptual (True)

Ans A

15. Assertion: If (Given) 5 kg costs Rs 250, then 10 kg costs Rs 100.

∴ cost of 1 kg $= \frac{250}{5} = Rs\ 50$.

cost of 10 kg $= 10 \times 50 = Rs\ 500$. (False)

Reason: Conceptual (True)

Ans: D

16 Assertion: We know, speed $= \frac{\text{Distance}}{\text{Time}}$.

i.e. Time $\propto \frac{1}{\text{speed}}$.

If speed becomes 2 times, time becomes $\frac{1}{2}$.

∴ Assertion is true

Reason: Conceptual (True)

Ans: A

17 Cost $\propto$ Quantity.

Given 5 kg apples cost Rs 400.

cost per 1 kg $= \frac{400}{5} = 80$.

cost per 8 kg $= 8 \times 80 = Rs\ 640$.

Ans: C

18 Quantity $= \frac{250}{80} = 3.125$. Ans: C (5)

19. We know, workers × Days = Constant

Now, $20 \times 12 = 240$.

Total work = 240 worker days

If 30 workers are employed

Days $= \frac{240}{30} = 8$. Ans: C

20 If only 15 workers are available

Days $= \frac{240}{15} = 16$. Ans: C

21. Food Lasts 36 days for 120 people.

We know, Food $\propto \frac{1}{\text{people}}$.

Total food $120 \times 36 = 4320$.

for 90 people $\rightarrow$ Days $= \frac{4320}{90} = 48$ days

Ans: 48

22 Initial population, Food Lasts for 30 days.

Total food $2000 \times 30 = 60000$

Food Consumed in first 10 days $2000 \times 10 = 20000$

Remaing food $60000 - 20000 = 40000$

New Population $2000 + 500 = 2500$.

Remaing days $\frac{40000}{2500} = 16$. Ans: 16

23 a) 6 workers can do a work in 20 days

Total work $6 \times 20 = 120$.

10 workers $\rightarrow$ 12 days. i.e $10 \times 12 = 120$ (P)

b) 8 workers can do a work in 15 days.

$\therefore$ Total work $8 \times 15 = 120$.

10 workers $\rightarrow$ 12 days i.e $10 \times 12 = 120$ (P)

c) 5 workers can do a work in 30 days

Total work $5 \times 30 = 150$.

(S) $\rightarrow$ $5 \times 30 = 150$ (S)

d) 10 workers can do a work in 15 days.

$10 \times 15 = 150$.

$\therefore r \rightarrow 10 \times 15 = 150$ Ans: P, P, S, r

24 a) $a = 4, \; c = 36$ $\therefore b = 12$ (P)

$\therefore b^2 = ac$

$b^2 = 4 \times 36 = 144$

b) $\frac{2}{4} = \frac{4}{8}$ (Tow) $\rightarrow$ Q

c) $\frac{3}{10} \neq \frac{10}{27}$ (False) $\rightarrow$ r

d) (conceptual (S)

Ans: P, Q, r, S

Conceptual Understanding Questions

01.	Conceptual	Ans.: B
02	Conceptual	Ans.: B
03	Conceptual	Ans.: A
04	Conceptual	Ans.: A
05	Conceptual	Ans.: A
06	Conceptual	Ans.: B
07	$4, 9, 9, 36 \rightarrow$ Proportion $\frac{4}{a} = \frac{9}{36} \Rightarrow a = 12$	Ans.: B
08	Conceptual	Ans.: C
09	Conceptual	Ans.: B
10	Conceptual	Ans.: A

JEE MAINS LEVEL

01.	Given $3:9 :: x:27$ $\Rightarrow 9 \times x = 3 \times 27$ $\Rightarrow x = 9$	Ans.: C

02 $4:6 = 8:12$

$\Rightarrow 6 \times 8 = 4 \times 12$

$\Rightarrow 48 = 48$ (True)

A $\rightarrow$ $4 \times 12 = 6 \times 8$

Ans. A

03 $a:b = 2:3$, $b:c = 4:5$

$2:3$
$4:5$ $\Rightarrow$ $8:12:15$

$\therefore a:c = 8:15$

Ans. A

04 cost of 1 pencil $\rightarrow \frac{25}{5} = 5$

cost of 1 pencil $\rightarrow 9 \times 5 = Rs\ 45$

Ans: C

05 cost of 1kg $\rightarrow \frac{245}{7} = Rs\ 35$

cost of 3kg $\rightarrow 35 \times 3 = 105$

Ans: C

06 $12 \times 25 = 20 \times x \Rightarrow x = 15$ days

Ans: C

07 Total pencils $25 \times 12 = 300$

Cost of 1 pencil $\rightarrow \frac{750}{300} = 2.5$

Now, pencils in 30 packets of 8 $\rightarrow 30 \times 8 = 240$.

$\therefore$ cost $\rightarrow 240 \times 2.5 = Rs\ 600$

Ans: A

08 Let third term $= x$

$16:24 = x:54$

$\Rightarrow x = 36$

Ans: D

09 Third proportion $\rightarrow a : b = b : c$

Given $a = x^2 - y^2$, $b = x - y$

We have $c = \frac{b^2}{a} = \frac{(x^2 - y^2)^2}{x^2 - y^2} = \frac{(x-y)^2}{(x+y)(x-y)}$

$= \frac{x-y}{x+y}$ Ans. A

10 Let the third $= x$

Now, $6 : 8 = x : 75 \rightarrow x = 25$ Ans. A

11 Advanced.

Given $4 : 6 :: 10 : x \Rightarrow x = 15$

A) $x = 15$ ✓, B) $4 \times x = 6 \times 10$ ✓

C) $4 : 6 :: 10 : x$ ✓ D) $\frac{4}{6} = \frac{10}{x}$ ✓

Ans. A, B, C, D

12 We know, $\text{Pupils}_1 \times \text{Days}_1 = \text{Pupils}_2 \times \text{Days}_2$

$\Rightarrow 60 \times 18 = 72 \times x$

$\Rightarrow x = 15$

∴ The provision will last for 15 days

Option B ✓, option C $= 3 \times 5 = 15$ ✓

Ans. B, C

13 Statement I: Total work $\rightarrow 8 \times 12 = 96$ man|Days

If 4 men do the same work ∴ Days $= \frac{96}{4} = 24$

(False)

Statement II: Conceptual (True)

Ans: D

14. Statement I:

Given $a:b = c:d$

$\Rightarrow \frac{a}{b} = \frac{c}{d}$

$\Rightarrow \frac{a}{b} + 1 = \frac{c}{d} + 1$

$\frac{a+b}{b} = \frac{c+d}{d}$

$\Rightarrow (a+b) : b = (c+d) : d$

(True)

(10)

Statement II: $\frac{a}{b} = \frac{c}{d}$

$\Rightarrow \frac{a+b}{a-b} = \frac{c+d}{c-d}$ (Componendo & Dividendo)

(True)

Ans: A

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15 Assertion: We know, men × Days = Constant

$8 \times 12 = 96$

If men = 4 $\Rightarrow 4 \times d = 96$

$\Rightarrow d = 24$. (True)

Reason: Conceptual (True)

Ans: A

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16 Assertion: $a = 2$, $c = 50$, $b = 10$

$b^2 = ac$

$= 2 \times 50$

$= 100$

$b = 10$ (True)

Reason: Conceptual (True)

Ans: A

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17. We know, in inverse proportion

$$W_1 \times D_1 = W_2 \times D_2$$

$$\Rightarrow 8 \times 15 = 10 \times D$$

$$\Rightarrow D = 12$$

Ans: B

18 more workers → less time Ans. B

19 Daily wage $= \frac{500}{5} = 100$.

for 12 days → $100 \times 12 = ₹1200$ Ans. B

20 Daily wage = ₹100.

$$\text{Days} = \frac{2500}{100} = 25 \text{ days}$$ Ans. B

21. Cost of 1 kg → $\frac{315}{7} = ₹45$

Cost of 5 kg → $45 \times 5 = ₹225$ Ans. 25

22 Weight × No. of books

Weight of 1 book → $\frac{1.260}{6} = 0.21$ kg.

No. of books in 3.150 kg → $\frac{3.150}{0.21} = 15$

Ans: 15

23 a) Given cost of 3 kg = Rs 150 (12)

cost of 1 kg = $\frac{150}{3}$ = Rs 50.

Cost of 5 kg = 50 × 5 = Rs 250. (P)

b) Work = workers × Days

= 5 × 12 = 60 workers/days

For 10 workers $\frac{60}{10}$ = 6 days (q)

c) Speed = $\frac{180}{3}$ = 60 km/hr

Distance in 5 hrs → 60 × 5 = 300 km (s)

d) 8 pens cost Rs. 96.

cost of 1 pen → $\frac{96}{8}$ = 12

cost of 5 pens → 5 × 12 = 60 (r)

Ans. p, q, s, r

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24 a) 12, 18, 20, 30 → 12 × 30 = 18 × 20 (Rule). (P)

b) mean proportion = $\sqrt{\text{product}}$ = $\sqrt{9 \times 25}$ = 15 (q)

c) a : b = 2 : 3, b : c = 3 : 4 ⇒ a : c = 2 : 4 (s)

d) 8 : 12 = 20 : 30 → Extreems 8, 30 (r)

Ans : p, q, s, r

⇒ THE END ⇐