

11. ARITHMETIC - PROPORTION^①

Class: VII MATHEMATICS

INTEGRATED SOLUTIONS

TEACHING TASK

2025/26

JEE MAINS LEVEL

01.

$$\frac{1}{5} : \frac{1}{x} = \frac{1}{x} : \frac{1}{1.25}$$

$$\Rightarrow \frac{1}{x^2} = \frac{1}{5 \cdot 1.25} = \frac{1}{6.25}$$

$$\Rightarrow x^2 = 6.25 \Rightarrow x = 2.5$$

Ans: C

02.

$$\frac{x}{y} = \frac{5}{2}$$

$$\frac{8x+9y}{8x+2y} = \frac{8\left(\frac{x}{y}\right)+9}{8\left(\frac{x}{y}\right)+2} = \frac{8\left(\frac{5}{2}\right)+9}{8\left(\frac{5}{2}\right)+2} = \frac{29}{22}$$

Ans: C

03.

$$\frac{x}{y} = \frac{2}{1}$$

$$\frac{x^2-y^2}{x^2+y^2} = \frac{\left(\frac{x}{y}\right)^2-1}{\left(\frac{x}{y}\right)^2+1} = \frac{(2)^2-1}{(2)^2+1} = \frac{3}{5}$$

Ans: A

04.

$$57: x = 81: 85$$

$$\Rightarrow x = \frac{57 \times 85}{81} = \frac{4845}{81} = 59.81$$

Ans: A

05 $x^2 + 4y^2 = 4xy$

$$\Rightarrow \frac{x^2}{xy} + \frac{4y^2}{xy} = \frac{4xy}{xy}$$

$$\Rightarrow \left(\frac{x}{y}\right) + 4\left(\frac{y}{x}\right) = 4$$

$$= \text{let } \frac{x}{y} = a$$

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

$$\Rightarrow a^2 + 4 = 4a$$

$$\Rightarrow a^2 - 4a + 4 = 0 \quad (2)$$

$$\Rightarrow (a-2)^2 = 0$$

$$\Rightarrow a = 2$$

$$\Rightarrow \frac{x}{y} = 2$$

$$\Rightarrow x:y = 2:1$$

Ans. A

06 Given 14, 17, 34, 42

Let the number to be subtracted is x

$\therefore 14-x, 17-x, 34-x, 42-x \rightarrow$ proportional

$$\frac{14-x}{17-x} = \frac{34-x}{42-x}$$

$$\Rightarrow x = 2$$

Ans: C

07 $a = 3x, b = 4x, c = 7x$

$$\frac{a+b+c}{c} = \frac{3x+4x+7x}{7x} = \frac{14x}{7x} = 2$$

Ans. B

08 $x \propto (3y+1)$

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

$$\Rightarrow 9 = k(3 \cdot 1 + 1)$$

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

$$\therefore x = \frac{9}{4}(3y+1)$$

$$= \frac{9}{4}(3 \cdot 5 + 1)$$

$$x = 36$$

Ans.. D

09. $\frac{p+q}{p-q} = \frac{\left(\frac{p}{q}\right)+1}{\left(\frac{p}{q}\right)-1} = \frac{\frac{4}{3}+1}{\frac{4}{3}-1} = \frac{7}{1}$ (3)
Ans: B

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

$\Rightarrow \frac{5x+3}{2x-3} = \frac{23}{5} \quad (\text{let } \frac{a}{b} = x)$

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

Ans: A

11. $a:b = 3:4$
 $b:c = 2:5$
 $a:b:c = 3:4:10$
 $a:c = 3:10$

Ans: A

12. $m:n = 7:8$
 $n:p = 3:2$
 $m:n:p = 21:24:16$
 $m:p = 21:16$

Ans: A

13. $a:b = 2:3$
 $b:c = 5:4$
 $a:b:c = 10:15:12$

Ans: D

14. $x:y = 7:9$

$y:z = 4:5$

$x:y:z = 28:36:45$

Ans. B

15. $3:6 = 6:x \Rightarrow x = 12$

Ans: D

16. $a:b = 3:5$

$b:c = 4:7$

$a:b:c = 12:20:35$

Ans. A

ADVANCED LEVEL

01. Conceptual

Ans: A, D

02. Conceptual

Ans: A, C

03. $3:6 = 4:x$

$\Rightarrow x = \frac{24}{3} = 8$

Ans: A

~~04. $3:6 = 4:x$~~

~~$x = \frac{24}{3} = 8$~~

Ans:

04. $2:x = 3:15$

$3x = 2 \times 15$

$x = 10$

$3:15 = 4:y$

$3y = 15 \times 4$

$y = 20$

Ans: D

05. Conceptual

Ans: A, B, C

06 Assertion: Conceptual (True) (5)
Reason: Conceptual (True) Ans: A

07 Assertion: $x:y = y:z$
 $\Rightarrow y^2 = xz$ (False)
Reason: Mathematically (False) Ans: B

08 Assertion: $\frac{a}{b} = \frac{b}{c} \Rightarrow b^2 = ac$
Given $\frac{a+b}{c} = \frac{b}{a-c}$
 $\Rightarrow a^2 - ac + ba - bc = bc$ (False)
Reason: Conceptual (False) Ans: —

09 Assertion: Conceptual (True)
 a, b, c are in continued proportion $\Rightarrow a:b = b:c$
 $\Rightarrow c:b = b:a$ is also True
Reason: Conceptual (~~True~~) False) Ans: C
Since continued proportion defined for 3 quantities

10 Assertion: Conceptual (True)
Reason: Conceptual (True) Ans: A

11. Statement I: 15 maths $\rightarrow$ Rs 1500

$$1 \text{ book} \rightarrow \frac{1500}{15} = \text{Rs } 100$$

$$25 \text{ books} \rightarrow \text{Rs } 2500 \text{ (True)}$$

Statement II: Conceptual True

Ans: A

12. Conceptual

Ans: C

13. Conceptual

Ans: C

14. Conceptual

Ans: A

15. Conceptual

Ans: C

16. Conceptual

Ans: A

17. $x \propto y \Rightarrow x = Ky$
 $\Rightarrow 102 = K \cdot 170$

$$\Rightarrow K = \frac{102}{170} = 0.6$$

Ans: A

18. $x \propto \frac{1}{y} \Rightarrow x = \frac{K}{y} \Rightarrow 185 = \frac{K}{4}$

$$\Rightarrow K = 740$$

Now $xy = K \Rightarrow x \times 10 = 740 \Rightarrow x = 74$

Ans: C

19. 3, 6, x, 24 $\Rightarrow x = \frac{3 \times 24}{6} = 12$

Ans: 12

20

 $n, n+1, n+4$ are in continued proportion (7)

$$\Rightarrow (n+1)^2 = n(n+4)$$

$$\Rightarrow n^2 + 2n + 1 = n^2 + 4n$$

$$2n + 1 = 4n$$

$$\Rightarrow$$

$$\Rightarrow 2n = 1$$

Ans: 1

21

$$2, x, 8 \Rightarrow x^2 = 2 \times 8$$

$$\Rightarrow x = 4$$

$$\therefore \text{Sum} = 2 + 8 = 10$$

Ans: 4, 10

22

$$\text{Total food} = 760 \text{ men} \times 22 \text{ days} = 16,720 \text{ man-days}$$

$$\begin{aligned} \text{Food Consumed in 2 days} &= 760 \text{ men} \times 2 \\ &= 1520 \text{ man-days} \end{aligned}$$

$$\begin{aligned} \text{Remaining food} &= 16,720 - 1520 \\ &= 15,200 \text{ man-days} \end{aligned}$$

We need to find out how many men x can be supported for the next 19 days with the remaining food.

$$\begin{aligned} \text{Remaining food} &= x \text{ men} \times 19 \text{ days} \\ 15,200 &= x \times 19 \Rightarrow x = 800 \text{ (approx)} \end{aligned}$$

$$\therefore \text{Additional men} = 800 - 760 = 40$$

Ans: 40

23

population = 2000

30 days food available

$$\text{Total man-days of provision} = 2000 \times 30 \\ = 60000 \text{ man-days}$$

$$\text{In the provisions used in 10 days} \\ = 2000 \times 10 \\ = 20000 \text{ man-days}$$

$$\text{Remaining food} = 60000 - 20000 \\ = 40000.$$

After 10 days, 500 more men arrived

$$\text{Now, total men} = 2000 + 500 \\ = 2500$$

$$\text{Now, Days} = \frac{40000}{2500} = 16$$

Ans: 16

$$24 \text{ a) } \frac{2x+3y}{3y} = \frac{4}{3} \Rightarrow \frac{2}{3}\left(\frac{x}{y}\right) + 1 = \frac{4}{3} \Rightarrow \frac{x}{y} = 2 \quad (x)$$

$$b) a=4, b=6 \Rightarrow x = \frac{b^2}{a} = \frac{36}{4} = 9 \quad (p)$$

$$c) \text{ mean proportional} = \sqrt{a \times c} = \sqrt{9 \times 25} = 15 \quad (s)$$

$$d) a=5, b=15, c=25 \\ \text{fourth proportional} = \frac{b \cdot c}{a} = \frac{15 \cdot 25}{5} = 75 \quad (q)$$

Ans: x, p, s, q

LEARNERS TASK (CUA'S) ⑨

01	Conceptual	Ans: A
02	Conceptual	Ans: B
03	c) $\frac{3}{4} = \frac{6}{8}$	Ans: C
04	mean proportional = $\sqrt{16 \times 9} = 4 \times 3 = 12$	Ans: C
05	$a, b, c, x \Rightarrow bc = ax \Rightarrow x = \frac{bc}{a}$	Ans: D
06	Conceptual	Ans: B
07	$a^2 = 4 \times 36 \Rightarrow a = 2 \times 6 = 12$	Ans: B
08	Conceptual	Ans: C
09	Conceptual	Ans: B
10	conceptual	Ans: A

JEE MAINS LEVEL

01	A) 16, 28, 4, 7 $16 \times 7 = 112$; $28 \times 4 = 112$ ✓	Ans: A
02	$18, x, 27, 36 \Rightarrow x = \frac{18 \times 36}{27}$	Ans: C
03	$\frac{3}{7} \times x = \frac{12}{7} \times \frac{6}{7} \Rightarrow x = \frac{24}{7}$	Ans: B

034 24, 18, 12, x
 $\Rightarrow x = \frac{18 \times 12}{24} = 9$

(10)

Ans. A

045 $5:30 = 12:x$
 $\Rightarrow x = \frac{30 \times 12}{5} = 72$

Ans. C

06 ~~1025 = 20~~
 Total work = men $\times$ days
 $= 12 \times 25$
 $= 300 \text{ man-days}$

If For 20 men

Days = $\frac{\text{Total work}}{\text{No. of men}} = \frac{300}{20} = 15 \text{ days}$
 Ans. C

07 Total No. of pencils = $25 \times 12 = 300 \text{ pencils}$
 cost of 1 pencil = $\frac{750}{300} = \text{Rs } 2.50$
 30 packets of 8 pencils = $30 \times 8 = 240 \text{ pencils}$
 : cost of 240 pencils = 240×2.50
 $= \text{Rs } 600$
 Ans. A

08 16, 24, x , 54
 $\Rightarrow x = \frac{16 \times 54}{24} = 36$

Ans. D

09 Third proportional = $\frac{(x-y)^2}{x^2-y^2} = \frac{x-y}{x+y}$
 Ans. A

10

$$x:y = 2:3$$

$$y:z = 4:5$$

$$x:y:z = 8:12:15$$

$$\therefore x:z = 8:15$$

Ans: C

(11)

11

$$p:q = 5:6$$

$$q:r = 3:2$$

$$p:q:r = 5:6:4$$

$$\therefore p:r = 5:4$$

Ans: A

12

$$p:q = 3:4$$

$$q:r = 2:5$$

$$p:q:r = 3:4:10$$

Ans: A

13

$$m:n = 5:6$$

$$n:p = 8:9$$

$$m:n:p = 40:48:54 = 20:24:27 \quad \text{Ans: C}$$

14

$$x^2 = 5 \cdot 25 \Rightarrow x = 5\sqrt{5}$$

Ans: B

15

$$x:y = 2:3$$

$$y:z = 5:4$$

$$x:y:z = 10:15:12$$

Ans: C

16

$$6, 18, x, 75 \Rightarrow x = \frac{6 \times 75}{18} = 25 \quad \text{Ans: A}$$



17. 60% $\rightarrow$ per 100 $\Rightarrow$ 60 students

(12)

$$100 : 60 = 35 : x$$

$$\Rightarrow x = \frac{60 \times 35}{100} = 21$$

Ans. B

18. 100 people $\rightarrow$ 40 prefer brand A
500 people $\rightarrow$ 200 prefer brand A
750 people $\rightarrow$ x

$$\therefore x = \frac{750}{500} \times 200 = 300$$

Ans. D

JEE ADVANCED

01. $G : B = 2 : 5$
Given $5x = 225$
 $\Rightarrow x = 45$

$$\begin{aligned} \text{No. of girls} &= 2x \\ &= 2 \times 45 \\ &= 90 \end{aligned}$$

$$\begin{aligned} \text{Total} &= 225 + 90 \\ &= 315 \quad \text{Ans. A, B} \end{aligned}$$

02. Total provisions = 60 pupils $\times$ 18 days
 $= 1080$ pupil-days

$$\begin{aligned} \text{Number of days} &= \frac{\text{Total provisions}}{\text{New No. of pupils}} \\ &= \frac{1080}{72} \end{aligned}$$

$$= 15 \text{ days} = 3 \times 5 \quad \text{Ans. B, C}$$

$$03 \quad \frac{a}{b} = \frac{2}{4} = \frac{1}{2} ; \quad \frac{c}{d} = \frac{3}{6} = \frac{1}{2} \Rightarrow d = 6 \quad (13)$$

$$\frac{e}{f} = \frac{6}{12} = \frac{1}{2} \Rightarrow f = 12$$

Ans: B

$$04 \quad A) \frac{2}{4} = \frac{8}{16} \checkmark \quad B) \frac{3}{6} = \frac{12}{24} \checkmark \quad D) \frac{1}{3} = \frac{9}{27} \checkmark$$

Ans: A, B, D

05 Conceptual

Ans: A, B, C

06 Assertion: Conceptual (False)

Reason: Conceptual (True)

Ans: D

07 Assertion: Conceptual (True)

Reason: Conceptual (False)

Ans: C

08 Assertion: Conceptual (True)

Reason: $\frac{a}{b} = \frac{b}{c}$ means a, b, c are in

Continued proportion.

~~Let~~ $\Rightarrow a, b, c$ are in G.P

$\Rightarrow$ let $a = a, b = ar, c = ar^2$

$$\Rightarrow \frac{c}{a} = \frac{ar^2}{a} = r^2 \Rightarrow r = \sqrt{\frac{c}{a}}$$

$\therefore$ Common ratio is $\sqrt{\frac{c}{a}}$ not $\sqrt{\frac{a}{c}}$

(False)

Ans: C

09. Assertion: Conceptual (True) (14)
Reason: 2, 4, 8 are in continued proportion
 But $\frac{1}{2} \neq \frac{1}{4} + \frac{1}{8}$ (False) Ans: C

10. Assertion: Conceptual (True)
Reason: 2, 4, 8 are in continued proportion
 Let $a=2, b=4, c=8$
 $\frac{b}{a} = \frac{4}{2} = 2 \quad \left| \quad \frac{a+c}{c} = \frac{2+8}{8} = \frac{10}{8} = \frac{5}{4}$
 $\therefore \frac{b}{a} \neq \frac{a+c}{c}$ (False) Ans: C

11. Statement I: Conceptual (True)
Statement II: Conceptual (False) Ans: C

12. Conceptual Ans: B

13) A) 6, 12, 24 C) 1, 3, 9, 27
 $\frac{6}{12} = \frac{12}{24} \checkmark \quad \left| \quad \frac{1}{3} = \frac{9}{27} \checkmark \right|$ Ans: A, C

14. Conceptual Ans: C

15. Conceptual Ans: C

16 A) 2, 4, 8, 16 B) 3, 6, 12, 24 C) 1, 4, 16, 64 D) 5, 10, 20, 40
 $\frac{2}{4} = \frac{8}{16} \checkmark \quad \left| \quad \frac{3}{6} = \frac{12}{24} \right| \quad \left| \quad \frac{1}{2} = \frac{4}{8} \checkmark \right| \quad \left| \quad \frac{5}{10} = \frac{20}{40} \checkmark \right|$

Ans: —

17. $x \propto y \Rightarrow x = ky$
 $\Rightarrow 20 = k \cdot 15$
 $\Rightarrow k = \frac{4}{3}$

$\therefore x = \frac{4}{3} \cdot y$
 $\Rightarrow 4 = \frac{4}{3} \cdot y$
 $\Rightarrow y = 3$

(15)

Ans: B

18 $484 : 11 = 264 : x$
 $\Rightarrow x = \frac{11 \times 264}{484} = 6$

Ans: C

19 $2, x, 18 \Rightarrow x^2 = 2 \times 18$
 $\Rightarrow x = \sqrt{2 \times 18} = 6$

Ans: 6

~~20 $\frac{4}{8} = \frac{8}{16} = \frac{1}{2}$~~

~~Ans: $\frac{1}{2}$~~

Ans: 2

20 $\frac{8}{4} = \frac{16}{8} = \frac{32}{16} = 2$

21 $3, x, 24 \Rightarrow x^2 = 3 \times 24 \Rightarrow x = 6\sqrt{2}$

Ans: $6\sqrt{2}$

22 $9, x, 8, 24 \Rightarrow x = \frac{9 \times 24}{8} = 27$

Ans: 27

23 $6 : 1.260 = x : 3.150 \Rightarrow x = 15$

Ans: 15

24 a) $x = \frac{6 \times 25}{5} \Rightarrow x = 30 (q)$

b) $x = \frac{0.75 \times 8}{5} \Rightarrow x = 1.20 (r)$

c) $x = \frac{4 \times 30}{5} \Rightarrow x = 24 (s)$

d) $x = \frac{57 \times 85}{51} \Rightarrow x = 95 (p)$

Ans: q, r, s, p

$\rightarrow$ THE END $\Leftarrow$