

FOUNDATION⁺

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Class: VI, MATHEMATICS

4. MULTIPLICATION AND DIVISION OF ALGEBRAIC EXPRESSIONS

TEACHING TASK (JEE MAINS)

01. $(3x^2 - 2x + 1)(x - 4) = ax^3 + bx^2 + cx + d$
put $x = 1$

$$(3 - 2 + 1)(1 - 4) = a + b + c + d$$

$$\therefore a + b + c + d = 2 \times (-3) = -6$$

Ans: C

02 Commutative

Ans: A

03 $a^3 + b^3$

Ans: B

04 $(p+q)(p-q)(p^2+q^2) = k(p^4-q^4)$

$$\Rightarrow (p^4 - q^4) = k(p^4 - q^4)$$

$$\Rightarrow k = 1$$

Ans: B

05 $\frac{(x-y)(x^2-y^2)}{x+y} = \frac{(x-y)(x+y)(x-y)}{(x+y)} = (x-y)^2$

Ans: A

06 Please, discard this question.

07. $A \times \frac{2x}{3y} = 1 \Rightarrow A = \frac{3y}{2x}$

Ans: A

08 Conceptual

Ans: B

09 $\frac{4x^3 - 8x^2 + 6x}{2x} = \frac{2x(2x^2 - 4x + 3)}{2x}$

$$= 2x^2 - 4x + 3$$

Ans: C



10. $\frac{a^2 - b^2}{a - b} = k(a + b)$

$\Rightarrow \frac{(a+b)(\cancel{a-b})}{\cancel{a-b}} = k(\cancel{a+b})$

$\Rightarrow k = 1$

Ans = B

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JEE Advanced

11. $\frac{2x^3y}{x^2y^2} \times \frac{y}{4x} = \frac{2}{4} \cdot \frac{x^3}{x^3} \cdot \frac{y^2}{y^2} = \frac{1}{2} \text{ (or)}$

$= \frac{1}{2} \left(\frac{x}{y} \right) \left(\frac{y}{x} \right)$

Ans: A, D

12. $\frac{6x^2 - 12x}{3x} \times \frac{x}{2x - 4}$

$= \frac{6x(x-2)}{3x} \times \frac{1}{2(x-2)} = \cancel{6x} \text{ (or)} \frac{x(x-2)}{(x-2)}$

Ans: A, B

13. Statement I: $\frac{5x}{(x+2)} \times \frac{(x+2)}{x} = 5 \text{ (True)}$

Statement II: Conceptual (True)

Ans: A

14. Statement I: $\frac{3x^2y - 6xy^2}{3xy} = \frac{3xy(x - 2y)}{3xy} = x - 2y \text{ (True)}$

Statement II: Conceptual (True)

Ans: A

15. Assertion: $\frac{4x^2y^3}{2xy} = 2xy^2 \text{ (False)}$

Reason: Conceptual (True)

Ans: D

16. Assertion: $\frac{6x^2y - 3xy^2}{3xy} = \frac{6x^2y}{3xy} - \frac{3xy^2}{3xy}$ (3)
 $= 2x - y$ (True)
Reason: Conceptual (True) Ans: A

17. $T = \frac{(x^2 - 4)(x + 3)}{(x - 2)(x + 1)}$
 $= \frac{(x + 2)(\cancel{x - 2})(x + 3)}{(\cancel{x - 2})(x + 1)} = \frac{(x + 2)(x + 3)}{x + 1}$
Ans: A

18. $T = \frac{(x + 2)(x + 3)}{x + 1}$
When $x = 1$, $T = \frac{(1 + 2)(1 + 3)}{1 + 1} = \frac{3 \times 4}{2} = 6$
Ans: B

19. $\frac{R}{S} = \frac{x^2 + 5x + 6}{x + 2} = \frac{(x + 2)(x + 3)}{(x + 2)} = x + 3$
 $S = \frac{x^2 - 9}{x - 3} = \frac{(x + 3)(\cancel{x - 3})}{(\cancel{x - 3})} = x + 3$
 $\therefore \frac{R}{S} = 1$ Ans: D

20. $R = \frac{x^2 + 5x + 6}{x + 2}$, $x + 2 \neq 0 \Rightarrow x \neq -2$
Ans: A

21. $Q = \frac{x^2 - 16}{x - 4} \times \frac{x + 2}{x^2 - 4}$
 $= \frac{(x + 4)(\cancel{x - 4})}{\cancel{x - 4}} \times \frac{x + 2}{(x + 2)(x - 2)}$
 $= \frac{x + 4}{x - 2}$
When $x = 6$
 $= \frac{6 + 4}{6 - 2} = \frac{10}{4} = \frac{5}{2}$
 $= 2.5$
Integral value = 2

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$$T = \frac{(x^2-4)(x+3)}{(x-2)(x+1)} = \frac{(x+2)(\cancel{x-2})(x+3)}{(\cancel{x-2})(x+1)}$$

$$= \frac{(x+2)(x+3)}{x+1}$$

(24)

When $x=1$ $\therefore T = \frac{3 \times 4}{2} = 6$

Ans: 6

23

a) $\frac{8x^3y^4}{4x^2y^2} = 2xy^2 (P)$

b) $(x+3)(x^2-4) = x^3 + 3x^2 - 4x - 12 (Q)$

c) $(a-b)(2a+3b) = 2a^2 + 3ab - 2ab - 3b^2 (R)$

d) $\frac{x^2-36}{x-6} = \frac{(x+6)(\cancel{x-6})}{(\cancel{x-6})} = x+6 (S)$

Ans: P, Q, R, S

24

a) $\frac{6x^3y^2}{3x^2y} = 2xy (P)$

b) $(x^2+3x+2)(x-1) = x^3 + 3x^2 - x - 2 (Q)$

c) $(2a+5b)(a-b) = 2a^2 - 2ab + 5ab - 5b^2 (R)$

d) $\frac{x^2-49}{x-7} = \frac{(x+7)(\cancel{x-7})}{(\cancel{x-7})} = x+7 (S)$

Ans: P, Q, R, S

LEARNERS TASK (CQA'S)

01. Conceptual

Ans: A

02. Conceptual

Ans: B

03. Conceptual

Ans: B

04. Conceptual

Ans: C

05	Trinomial $\times$ binomial = maximum 6 terms (4)	Ans: C
06	Conceptual	Ans: A
07	Conceptual	Ans: A
08	$\frac{x-k}{R(x)} P(x) (Q(x)) \quad \therefore P(x) = (x-k)Q(x) + R(x)$	Ans: D
09	Conceptual	Ans: B
10	Conceptual	Ans: B

JEE MAINS

01.	$(x+2)(x+3) = x^2 + Kx + 6$ $\Rightarrow x^2 + 5x + 6 = x^2 + Kx + 6 \Rightarrow K = 5 \quad \text{Ans: B}$	
02	$(2x-3)(x-5) = 2x^2 + bx + c$ put $x=0$ $\therefore -3 \times -5 = c \Rightarrow \boxed{c=15}$ put $x=1$ $(-1)(-4) = 2 + b + 15 \Rightarrow \boxed{b=-13}$ Ans: A	
03	$\frac{(x+2)(x-2)}{x^2-4} = \frac{x^2-4}{x^2-4} = 1$	Ans: B
04	$(x-1)(x-2)(x-3)$ put $x=1$ $= \cancel{(1-1)}(1-2)(1-3) = 0$ $\therefore$ Sum of the coefficient = 0	Ans: A

05

$$\ln(x+a)(x+b)(x+c)$$

$$\text{Coefficient of } x^2 = a+b+c$$

$$\therefore \text{Coefficient of } x^2 \text{ in } (x+1)(x+2)(x+3) = 1+2+3 = 6$$

Ans: B

06

$$\frac{x^2-1}{x-1} = \frac{(x+1)(x-1)}{(x-1)} = x+1$$

$$\text{When } x=2, 2+1=3$$

Ans: C

07

$$\frac{x^2-9}{x+3} = \frac{(x+3)(x-3)}{(x+3)} = x-3$$

$$\text{When } x=6, 6-3=3$$

Ans: A

08

$$\frac{x^2-16}{x-4} = \frac{(x+4)(x-4)}{(x-4)} = x+4$$

$$\text{When } x=4, 4+4=8$$

Ans: B

09.

$$\frac{y^2-25}{y-5} = \frac{(y+5)(y-5)}{(y-5)} = y+5$$

$$\text{When } y=5, 5+5=10$$

Ans: C

10

$$\frac{a^2-b^2}{a-b} = \frac{(a+b)(a-b)}{(a-b)} = a+b = 8$$

$$\therefore a+b=8$$

$$6+b=8 \Rightarrow b=2$$

Ans: B

JEE ADVANCED

11.

$$\frac{3x^2y - 9xy^2}{3xy} = \frac{3xy(x-3y)}{3xy} = x-3y = -(3y-x)$$

Ans: A, D



$$12. \frac{x^2-4}{x+2} = \frac{(x+2)(x-2)}{(x+2)} = x-2 \quad \textcircled{B}$$

$$\text{Also, } \frac{x^3-8}{x^2+2x+4} = \frac{(x-2)(x^2+2x+4)}{(x^2+2x+4)} = x-2$$

Ans: A, D

$$13. \text{Statement I: } \frac{6x^3y^2}{2xy} = 3x^2y \text{ (True)}$$

$$\text{Statement II: Conceptual (True)} \quad \text{Ans: A}$$

$$14. \text{Statement I: Mathematically (True)}$$

$$\text{Statement II: Conceptual (True)} \quad \text{Ans: A}$$

$$15. \text{Assertion: Mathematically (True)}$$

$$\text{Reason: Conceptual (True)} \quad \text{Ans: B}$$

$$16. \text{Assertion: Mathematically (True)}$$

$$\text{Reason: Conceptual (True)} \quad \text{Ans: B}$$

$$17. \frac{P}{Q} = \frac{2a^2b^3}{4ab} \times \frac{6a^2b^3}{3a^2b^2}$$

$$= ab^3$$

Ans: D

$$18. P \times Q = \frac{2a^2b^3}{4ab} \times \frac{3a^2b^2}{6a^2b^3}$$

$$= \frac{1}{4} \cdot a \cdot b$$

$$\text{When } a=2, b=3$$

$$= \frac{1}{4} \cdot 2 \cdot 3 = \frac{3}{2} = 1.5$$

Ans: B

$$19. A = \frac{x^2-4}{x-2} = \frac{(x+2)(\cancel{x-2})}{(\cancel{x-2})} = x+2$$

$$B = \frac{x^2-9}{x+3} = \frac{(x+3)(\cancel{x-3})}{\cancel{x+3}} = x-3$$

$$A \times B = (x+2)(x-3)$$

Ans: A

$$20. A \times B = (x+2)(x-3).$$

$\therefore A \times B$ is defined for all $x \in \mathbb{R}$

Ans: D

$$21. E = \frac{(3x^2y)(4xy^3)}{6x^3y^2} = 2y^2$$

$$\text{When } y=3, 2y^2 = 2 \cdot 3^2 = 18$$

Ans: 18

$$22. B = \frac{(2x^2y^3)(3xy^2)}{6x^3y^4} = 1$$

$\therefore$ when $y=1$

Ans: 1

$$23. \begin{array}{l|l} a) 3x (p) & b) x+2 (q) \\ b) x^2-x-6 (r) & d) 6x^3y^3 (s) \end{array}$$

Ans: p, r, s

$$24. a) \frac{x^2-9}{x+3} = x-3 (p)$$

$$b) a^2-b^2 (q)$$

$$c) \frac{x^2y}{2} (r)$$

$$d) 24x^3y^4 (s)$$

Ans: p, q, r, s

$\Rightarrow$ THE END $\Leftarrow$