<div align="center">

مشق 1.1

</div>

حل کریں:

① اگر $P(x)=x^4+3x^2-5x+9$ ہوتو $P(x)$ کی قیمت $x = 1,\ x = 0$ کی قیمت معلوم کریں۔

حل: $P(x)$ میں بالترتیب $x=0$ اور $x = 1$ رکھتے ت

$P(0) = (0)^4 + 3\,(0)^2 - 5\,(0) + 9$

$P(0) = 0 + 3\,(0) - 5\,(0) + 9$

$\boxed{P(0) = 9}$

$P(1) = (1)^4 + 3\,(1)^2 - 5\,(1) + 9$

$\qquad = 1 + 3 - 5 + 9$

$\qquad = 13 - 5$

$\boxed{P(1) = 8}$

② اگر $P(x) = 2x^3 + 2x^2 + x - 1$ ہوتو $P(-2)$ معلوم کریں۔

حل: $P(x)$ میں $x = -2$ رکھتے سے

$P(-2) = 2\,(-2)^3 + 2(-2)^2 + (-2) - 1$

$\qquad = 2\,(-8) + 2\,(4) - 2 - 1$

$\qquad = -16 + 8 - 3$

$\qquad = -19 + 8$

$\qquad = -11$

$P(-2) = -11$

③ اگر $P(y) = 3y^2 + \dfrac{y}{4} + 9$ ہوتو $P(0)$ معلوم کریں۔

حل: $P(y)$ میں $y = 0$ رکھتے سے

$P(0) = 3\,(0)^2 + \dfrac{0}{4} + 9$

$\qquad = 0 + 0 + 9$

$P(0) = 9$

④ اگر $P(x) = 9x^3 - 2x^2 + 3x + 1$ ہوتو $P(1)$ اور $P(2)$ معلوم کریں۔

حل: $P(y)$ میں بالترتیب $x = 1$ اور $x = 2$ رکھتے سے

$P(1) = 9(1)^3 - 2\,(1)^2 + 3\,(1) + 1$

$$= 9 - 2 + 3 + 1$$
$$= 13 - 2$$
$$P(1) = 11$$

اور x = 2 رکھنے سے

$$P(2) = 9(2)^3 - 2(2)^2 + 3(2) + 1$$
$$= 9(8) - 2(4) + 6 + 1$$
$$= 72 - 8 + 6 + 1$$
$$= 79 - 8$$
$$\therefore \ P(2) = 71$$

⑤ اگر $P(x) = \dfrac{x^2 - 5x + 6}{x+1}$ ہو تو $P(1)$ اور $P(2)$ معلوم کریں۔

حل: $P(x)$ میں بالترتیب x=1 اور x=2 رکھنے سے

$$P(1) = \frac{1^2 - 5(1) + 6}{1+1}$$
$$= \frac{1 - 5 + 6}{2}$$
$$= \frac{7 - 5}{2}$$
$$= \frac{2}{2}$$
$$P(1) = 1$$

اور x = 2 رکھنے سے

$$P(2) = \frac{2^2 - 5(2) + 6}{2+1}$$
$$= \frac{4 - 10 + 6}{3}$$
$$= \frac{10 - 10}{3}$$
$$= \frac{0}{3}$$
$$P(2) = 0$$

⑥ اگر $P(r) = 2\pi r$ ہو تو $r = 3$ اور $\pi = \dfrac{22}{7}$ کے لیے $P(r)$ معلوم کریں۔

حل: $P(r)$ میں $r = 3$ اور $\pi = \dfrac{22}{7}$ رکھنے سے

$$P(3) = 2 \times \frac{22}{7} \times 3$$

$$= \frac{132}{7}$$

$$P(3) = 18\frac{6}{7} = 18.86$$

7 اگر $P(r) = 4\pi r^2$ ہو اور $r = 8$ اور $\pi = \frac{22}{7}$ تو $P(r)$ کے لیے معلوم کریں۔

حل: $P(r)$ میں $r = 8$ اور $\pi = \frac{22}{7}$ رکھنے سے

$$P(8) = 4 \times \frac{22}{7} \times 8^2$$

$$= 4 \times \frac{22}{7} \times 64$$

$$= \frac{5632}{7}$$

$$P(8) = 804\frac{4}{7}$$

$$= 804.57 \qquad \text{یا}$$

8 اگر $P(y) = y^4 + \frac{3y^3}{2} - y^2 + 1$ ہو اور $y = 2$ اور $y = -2$ کے لیے $P(y)$ معلوم کریں۔

حل: $P(y)$ میں بالترتیب $y = 2$ اور $y = -2$ رکھنے سے

$$P(2) = (2)^4 + \frac{3(2)^3}{2} - (2)^2 + 1$$

$$= 16 + \frac{3 \times 8}{2} - 4 + 1$$

$$= 16 + 12 - 4 + 1$$

$$= 29 - 4$$

$$P(2) = 25$$

اور $y = -2$ رکھنے سے

$$P(-2) = (-2)^4 + \frac{3(-2)^3}{2} - (-2)^2 + 1$$

$$= 16 + \frac{3(-8)}{2} - 4 + 1$$

$$= 16 - 12 - 4 + 1$$

$$= 17 - 16$$

$$P(-2) = 1$$

⑨ $\dfrac{8x^2y^2}{12x^4y}$

حل:

$\dfrac{8x^2y^2}{12x^4y}$

$= \dfrac{4 \times 2 \times x^2 \times y \times y}{4 \times 3 \times x^2 \times x^2 \times y}$

$= \dfrac{4x^2y \times 2y}{4x^2y \times 3x^2}$

$= \dfrac{2y}{3x^2}$

⑩ $\dfrac{25a^3b^2}{14a^2b^4}$

حل:

$\dfrac{25a^3b^2}{14a^2b^4}$

$= \dfrac{25 \times a^2 \times a \times b^2}{14 \times a^2 \times b^2 \times b^2}$

$= \dfrac{25 \times a^2b^2 \times a}{14 \times a^2b^2 \times b^2}$

$= \dfrac{25a}{14b^2}$

⑪ $\dfrac{16a^6b^7}{12a^3b^5 + 20a^5b^4}$

حل:

$\dfrac{16a^6b^7}{12a^3b^5 + 20a^5b^4}$

$= \dfrac{16a^6b^7}{4 \times 3 \times a^3 \times b^4 \times b + 4 \times 5 \times a^3 \times a^2 \times b^4}$

$= \dfrac{16a^6b^7}{4a^3b^4 \times 3b + 4a^3b^4 \times 5a^2}$

اب مخرج میں سے $4a^3b^4$ مشترک لینے سے

$= \dfrac{16a^6b^7}{4a^3b^4(3b + 5a^2)}$

$= \dfrac{4 \times 4 \times a^3 \times a^3 \times b^4 \times b^3}{4a^3b^4(3b + 5a^2)}$

$$= \frac{\cancel{4a^3b^4} \times 4a^3b^3}{\cancel{4a^3b^4}(3b + 5a^2)}$$

$$= \frac{4a^3b^3}{3b + 5a^2} = \frac{4a^3b^3}{5a^2 + 3b}$$

⑫ $\dfrac{18m^5x^3}{27m^4x^8 - 36m^6x^6}$

حل:

$$\frac{18m^5x^3}{27m^4x^8 - 36m^6x^6}$$

$$= \frac{18m^5x^3}{9 \times 3 \times m^4 \times x^6 \times x^2 - 9 \times 4 \times m^4 \times m^2 \times x^6}$$

$$= \frac{18m^5x^3}{9m^4x^6 \times 3x^2 - 9m^4x^6 \times 4m^2}$$

مخرج میں سے $9m^4x^6$ مشترک لینے سے

$$= \frac{18m^5x^3}{9m^4x^6(3x^2 - 4m^2)}$$

$$= \frac{9 \times 2 \times m^4 \times m \times x^3}{9m^4x^6(3x^2 - 4m^2)}$$

$$= \frac{9m^4x^3 \times 2m}{9m^4x^3 \times x^3(3x^2 - 4m^2)}$$

$$= \frac{2m}{x^3(3x^2 - 4m^2)}$$

$$= \frac{2m}{3x^5 - 4m^2x^3} \qquad یا$$

⑬ $\dfrac{5c - 5d}{c^2 - d^2}$

حل:

$$\frac{5c - 5d}{c^2 - d^2}$$

$$= \frac{5(c \cancel{-} d)}{(c \cancel{-} d)(c + d)}$$

$$= \frac{5}{c + d}$$

⑭ $\dfrac{x^2 - y^2}{3y - 3x}$

حل:

$$\frac{x^2 - y^2}{3y - 3x}$$

$$= \frac{(x-y)(x+y)}{3(y-x)}$$

$$= \frac{-(x+y)(y-x)}{3(y-x)}$$

$$= \frac{x+y}{-3}$$

⑮ $\dfrac{x}{x-y} + \dfrac{x^2}{x^2+y^2}$

حل:

$$\frac{x}{x-y} + \frac{x^2}{x^2+y^2}$$

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

$$= \frac{x^3 + xy^2 + x^3 - x^2y}{x^3 + xy^2 - x^2y - y^3}$$

$$= \frac{2x^3 - x^2y + xy^2}{x^3 - x^2y + xy^2 - y^3}$$

⑯ $\dfrac{x^2+2x}{x^2+x-2} + \dfrac{3x}{x+1}$

حل:

$$\frac{x^2+2x}{x^2+x-2} + \frac{3x}{x+1}$$

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

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

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

$$= \frac{x}{x-1} + \frac{3x}{x+1}$$

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

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

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

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

⑰ $\dfrac{x+2}{x^2+3x+2} - \dfrac{x-5}{x^2-x-6}$

حل:

مخرج میں موجود رقموں کی تجزی کرنے سے

$$\frac{x+2}{x^2+3x+2} - \frac{x-5}{x^2-x-6}$$

$$= \frac{x+2}{x^2+2x+x+2} - \frac{x-5}{x^2-3x+2x-6}$$

$$= \frac{x+2}{x(x+2)+1(x+2)} - \frac{x-5}{x(x-3)+2(x-3)}$$

$$= \frac{\cancel{(x+2)}}{\cancel{(x+2)}(x+1)} - \frac{x-5}{(x-3)(x+2)}$$

$$= \frac{1}{(x+1)} - \frac{x-5}{(x-3)(x+2)}$$

ذواضعاف اقل لینے سے

$$= \frac{(x-3)(x+2) - (x-5)(x+1)}{(x+1)(x-3)(x+2)}$$

$$= \frac{x^2 - x - 6 - (x^2 - 4x - 5)}{(x+1)(x-3)(x+2)}$$

$$= \frac{x^2 - x - 6 - x^2 + 4x + 5}{(x+1)(x-3)(x+2)}$$

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

$$= \frac{3x - 1}{x^3 - 7x - 6} \qquad یا$$

⑱ $\dfrac{8x^2 + 18y^2}{4x^2 - 9y^2} - \dfrac{2x+3y}{2x-3y}$

حل:

$$\frac{8x^2 + 18y^2}{4x^2 - 9y^2} - \frac{2x+3y}{2x-3y}$$

$$= \frac{8x^2 + 18y^2}{(2x-3y)(2x+3y)} - \frac{2x+3y}{2x-3y}$$

$$= \frac{8x^2 + 18y^2 - (2x+3y)(2x+3y)}{(2x-3y)(2x+3y)}$$

$$= \frac{8x^2 + 18y^2 - (4x^2 + 9y^2 + 12xy)}{(2x-3y)(2x+3y)}$$

$$= \frac{8x^2 + 18y^2 - 4x^2 - 9y^2 - 12xy}{(2x-3y)(2x+3y)}$$

$$= \frac{4x^2 + 9y^2 - 12xy}{(2x-3y)(2x+3y)}$$

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

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

$$= \frac{2x-3y}{2x+3y}$$

⑲ $\dfrac{x}{x^2+xy} - \dfrac{y}{x^2-y^2}$

حل:

$$\frac{x}{x^2+xy} - \frac{y}{x^2-y^2}$$

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

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

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

$$= \frac{x-2y}{x^2-y^2}$$

⑳ $\dfrac{x+y}{xy+y^2} - \dfrac{x}{x^2-xy}$

حل:

$$\frac{x+y}{xy+y^2} - \frac{x}{x^2-xy}$$

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

$$= \frac{1}{y} - \frac{1}{(x-y)}$$

$$= \frac{x-y-y}{y(x-y)}$$

$$= \frac{x-2y}{xy-y^2}$$

㉑ $\dfrac{(x+1)^2}{x^2-1} - \dfrac{x^2+1}{x^2+1}$

حل:

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

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

زواضعاف اقل لینے سے

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

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

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

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

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

㉒ $\dfrac{5x}{x-9} + \dfrac{x^2-2x+1}{x^2-12x+27} - \dfrac{6x}{x-3}$

حل:

$$\frac{5x}{x-9} + \frac{x^2-2x+1}{x^2-12x+27} - \frac{6x}{x-3}$$

$x^2 - 12x + 27 = x^2 - 9x - 3x + 27 = x(x-9) -3(x-9) = (x-9)\,(x-3)$

$$= \frac{5x}{x-9} + \frac{x^2-2x+1}{(x-9)(x-3)} - \frac{6x}{x-3}$$

زواضعاف اقل لینے سے

$$= \frac{5x(x-3)+x^2-2x+1-6x(x-9)}{(x-9)(x-3)}$$

$$= \frac{5x^2-15x+x^2-2x+1-6x^2+54x}{(x-9)(x-3)}$$

$$= \frac{6x^2-6x^2-17x+54x+1}{(x-9)(x-3)}$$

$$= \frac{37x+1}{(x-9)(x-3)}$$

$$= \frac{37x+1}{x^2-12x+27} \qquad \text{یا}$$

$$\text{②③} \quad \frac{x^2-4x+4}{x^2-4} \div \frac{x}{x-2}$$

حل:

$$\frac{x^2-4x+4}{x^2-4} \div \frac{x}{x-2}$$

$$= \frac{x^2-4x+4}{x^2-4} \times \frac{x-2}{x}$$

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

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

$$= \frac{x^2-4x+4}{x^2+2x} \qquad \text{یا}$$

$$\text{②④} \quad \frac{x^2-36}{x^2-1} \div \frac{x-6}{1-x}$$

حل:

$$\frac{x^2-36}{x^2-1} \div \frac{x-6}{1-x}$$

$$= \frac{\cancel{(x-6)}(x+6)}{(x-1)(x+1)} \times \frac{(1-x)}{\cancel{(x-6)}}$$

$$= \frac{-(x-1)(x+6)}{(x-1)(x+1)}$$

$$= \frac{-(x+6)}{(x+1)}$$

$$\text{25} \quad \frac{x^2 - 5x}{x - 1} \div \frac{x^2 - 25}{x^2 + x + 20}$$

حل:

$$\frac{x^2 - 5x}{x - 1} \div \frac{x^2 - 25}{x^2 + x + 20}$$

$$= \frac{x^2 - 5x}{x - 1} \times \frac{x^2 + x + 20}{x^2 - 25}$$

$$= \frac{x\,(x - 5)}{x - 1} \times \frac{x^2 + x + 20}{(x - 5)(x + 5)}$$

$$= \frac{x(x^2 + x + 20)}{(x - 1)(x + 5)}$$

$$= \frac{x^3 + x^2 + 20x}{x^2 + 4x - 5}$$

$$\text{26} \quad \frac{2x^2 - 5x - 12}{4x^2 + 4x - 3} \div \frac{2x^2 - 7x - 4}{6x^2 + 5x - 4}$$

حل:

$$\frac{2x^2 - 5x - 12}{4x^2 + 4x - 3} \div \frac{2x^2 - 7x - 4}{6x^2 + 5x - 4}$$

چونکہ

$$2x^2 - 5x - 12 = 2x^2 - 8x + 3x - 12$$
$$= 2x\,(x - 4) + 3\,(x - 4)$$
$$= (x - 4)\,(2x + 3)$$
$$4x^2 + 4x - 3 = 4x^2 + 6x - 2x - 3$$
$$= 2x\,(2x + 3) - 1\,(2x + 3)$$
$$= (2x + 3)\,(2x - 1)$$
$$2x^2 - 7x - 4 = 2x^2 - 8x + x - 4$$
$$= 2x\,(x - 4) + 1\,(x - 4)$$
$$= (x - 4)\,(2x + 1)$$

اور

$$6x^2 + 5x - 4 = 6x^2 + 8x - 3x - 4$$
$$= 2x\,(3x + 4) - 1\,(3x + 4)$$
$$= (3x + 4)\,(2x - 1)$$

لہٰذا

$$\frac{2x^2 - 5x - 12}{4x^2 + 4x - 3} \div \frac{2x^2 - 7x - 4}{6x^2 + 5x - 4} = \frac{(x - 4)(2x + 3)}{(2x + 3)(2x - 1)} \div \frac{(x - 4)(2x + 1)}{(3x + 4)(2x - 1)}$$

$$= \frac{x - 4}{2x - 1} \div \frac{(x - 4)(2x + 1)}{(3x + 4)(2x - 1)}$$

$$= \frac{(x - 4)}{(2x - 1)} \times \frac{(3x + 4)(2x - 1)}{(x - 4)(2x + 1)}$$

$$= \frac{3x+4}{2x+1}$$

㉗ $\dfrac{x(2x-1)^2}{2x^2-1} \div \dfrac{4x^2-1}{4x^2+4x+1}$

حل:

$\dfrac{x(2x-1)^2}{2x^2-1} \div \dfrac{4x^2-1}{4x^2+4x+1}$

$4x^2 - 1 = (2x - 1)(2x + 1)$

$4x^2 + 4x + 1 = (2x + 1)^2$

$\dfrac{x(2x-1)^2}{2x^2-1} \div \dfrac{4x^2-1}{4x^2+4x+1} = \dfrac{x(2x-1)^2}{2x^2-1} \div \dfrac{(2x-1)(2x+1)}{(2x+1)^2}$

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

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

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

$$= \frac{x(4x^2-1)}{2x^2-1}$$

$$= \frac{4x^3-x}{2x^2-1}$$

㉘ $\dfrac{x^2+x}{x^2-1} \times \dfrac{x+1}{x^3+1}$

حل:

چونکہ

$\dfrac{x^2+x}{x^2-1} \times \dfrac{x+1}{x^3+1}$

$x^2 - 1 = (x - 1)(x + 1)$

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

$x^2 + x = x(x + 1)$

$\dfrac{x^2+x}{x^2-1} \times \dfrac{x+1}{x^3+1} = \dfrac{x\,\cancel{(x+1)}}{(x-1)\cancel{(x+1)}} \times \dfrac{\cancel{(x+1)}}{\cancel{(x+1)}(x^2-x+1)}$

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

$$= \frac{x}{x^3 - x^2 - x^2 + x + x - 1}$$

$$= \frac{x}{x^3 - 2x^2 + 2x - 1} \qquad \text{یا}$$

$$\text{-29} \quad \frac{x^2 - 9}{x^2 - 6x + 9} \times \frac{x}{3x + 9}$$

حل:

چونکہ

اور

اس لیے

$$\frac{x^2 - 9}{x^2 - 6x + 9} \times \frac{x}{3x + 9}$$

$$x^2 - 9 = x^2 - 3^2$$
$$= (x - 3)(x + 3)$$

$$x^2 - 6x + 9 = x^2 - 2 \times 3 \times x + 3^2$$
$$= (x - 3)^2$$

$$\frac{x^2 - 9}{x^2 - 6x + 9} \times \frac{x}{3x + 9} = \frac{(x - 3)(x + 3)}{(x - 3)^2} \times \frac{x}{3(x + 3)}$$

$$= \frac{x}{3(x - 3)}$$

$$= \frac{x}{3x - 9}$$

$$\text{-30} \quad \frac{x + 5}{x^2 + 6x} \times \frac{x^3 + 6x^2}{x + 5}$$

حل:

$$\frac{x + 5}{x^2 + 6x} \times \frac{x^3 + 6x^2}{x + 5}$$

$$= \frac{x + 5}{x(x + 6)} \times \frac{x^2(x + 6)}{x + 5}$$

پس $$= x$$

$$\text{-31} \quad \frac{x^2 - 2x + 1}{x^2 - 1} \times \frac{x + 1}{x - 1}$$

حل:

چونکہ

اس لیے

$$\frac{x^2 - 2x + 1}{x^2 - 1} \times \frac{x + 1}{x - 1}$$

$$x^2 - 2x + 1 = (x - 1)^2$$

$$x^2 - 1 = (x - 1)(x + 1) \quad \text{اور}$$

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

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

$$= 1$$

$$\frac{x^2+4x+3}{x+3} \times \frac{x^2-2x+1}{x^2-1} \quad \text{-32}$$

حل:

$$\frac{x^2+4x+3}{x+3} \times \frac{x^2-2x+1}{x^2-1}$$

چونکہ

$$x^2 + 4x + 3 = x^2 + 3x + x + 3$$
$$= x(x+3) + 1(x+3)$$
$$= (x+3)(x+1)$$

$$x^2 - 2x + 1 = (x-1)^2$$

اور $\quad x^2 - 1 = (x-1)(x+1)$

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

$$= x - 1$$