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CLASS VIII: Maths
Chapter 12: Factorisation

Questions and Solutions | Exercise 12.3 - NCERT Books

Q 1. Carry out the following divisions.

(i) $28x^4 \div 56x$

(ii) $-36y^3 \div 9y^2$

(iii) $66pq^2r^3 \div 11qr^2$

(iv) $34x^3y^3z^3 \div 51xy^2z^3$

(v) $12a^8b^8 \div (-6a^6b^4)$

Answer :

(i) $28x^4 = 2 \times 2 \times 7 \times x \times x \times x \times x \times x$

$56x = 2 \times 2 \times 2 \times 7 \times x$

$$28x^4 \div 56x = \frac{2 \times 2 \times 7 \times x \times x \times x \times x \times x}{2 \times 2 \times 2 \times 7 \times x} = \frac{x^3}{2} = \frac{1}{2}x^3$$

(ii) $36y^3 = 2 \times 2 \times 3 \times 3 \times y \times y \times y$

$9y^2 = 3 \times 3 \times y \times y$

$$-36y^3 \div 9y^2 = \frac{-2 \times 2 \times 3 \times 3 \times y \times y \times y}{3 \times 3 \times y \times y} = -4y$$

(iii) $66\, pq^2\, r^3 = 2 \times 3 \times 11 \times p \times q \times q \times r \times r \times r$

$11qr^2 = 11 \times q \times r \times r$

$$66\, pq^2 r^3 \div 11qr^2 = \frac{2 \times 3 \times 11 \times p \times q \times q \times r \times r \times r}{11 \times q \times r \times r} = 6pqr$$

(iv) $34\,x^3y^3z^3 = 2 \times 17 \times x \times x \times x \times y \times y \times y \times z \times z \times z$

$51\,xy^2z^3 = 3 \times 17 \times x \times y \times y \times z \times z \times z$

$$34\,x^3y^3z^3 \div 51\,xy^2z^3 = \frac{2 \times 17 \times x \times x \times x \times y \times y \times y \times z \times z \times z}{3 \times 17 \times x \times y \times y \times z \times z \times z}$$

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

(v) $12a^8b^8 = 2 \times 2 \times 3 \times a^8 \times b^8$

$6a^6b^4 = 2 \times 3 \times a^6 \times b^4$

$$12a^8b^8 \div \left(-6a^6b^4\right) = \frac{2 \times 2 \times 3 \times a^8 \times b^8}{-2 \times 3 \times a^6 \times b^4} = -2a^2b^4$$

Q2 :

Divide the given polynomial by the given monomial.

(i) $(5x^2 - 6x) \div 3x$

(ii) $(3y^8 - 4y^6 + 5y^4) \div y^4$

(iii) $8(x^3y^2z^2 + x^2y^3z^2 + x^2y^2z^3) \div 4x^2y^2z^2$

(iv) $(x^3 + 2x^2 + 3x) \div 2x$

(v) $(p^3q^6 - p^6q^3) \div p^3q^3$

Answer :

(i) $5x^2 - 6x = x(5x - 6)$

$$\left(5x^2 - 6x\right) \div 3x = \frac{x\left(5x-6\right)}{3x} = \frac{1}{3}\left(5x-6\right)$$

(ii) $3y^8 - 4y^6 + 5y^4 = y^4(3y^4 - 4y^2 + 5)$

$$\left(3y^8 - 4y^6 + 5y^4\right) \div y^4 = \frac{y^4\left(3y^4 - 4y^2 + 5\right)}{y^4} = 3y^4 - 4y^2 + 5$$

(iii) $8(x^3y^2z^2 + x^2y^3z^2 + x^2y^2z^3) = 8x^2y^2z^2(x + y + z)$

$$8\left(x^3y^2z^2 + x^2y^3z^2 + x^2y^2z^3\right) \div 4x^2y^2z^2 = \frac{8x^2y^2z^2\left(x+y+z\right)}{4x^2y^2z^2} = 2\left(x+y+z\right)$$

(iv) $x^3 + 2x^2 + 3x = x(x^2 + 2x + 3)$

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

(v) $p^3q^6 - p^6q^3 = p^3q^3(q^3 - p^3)$

$$\left(p^3q^6 - p^6q^3\right) \div p^3q^3 = \frac{p^3q^3\left(q^3 - p^3\right)}{p^3q^3} = q^3 - p^3$$

Q3 :

Work out the following divisions.

(i) $(10x - 25) \div 5$

(ii) $(10x - 25) \div (2x - 5)$

(iii) $10y(6y + 21) \div 5(2y + 7)$

(iv) $9x^2y^2(3z - 24) \div 27xy(z - 8)$

(v) $96abc(3a - 12)(5b - 30) \div 144(a - 4)(b - 6)$

Answer :

(i) $(10x - 25) \div 5 = \dfrac{2 \times 5 \times x - 5 \times 5}{5} = \dfrac{5(2x - 5)}{5} = 2x - 5$

(ii) $(10x - 25) \div (2x - 5) = \dfrac{2 \times 5 \times x - 5 \times 5}{(2x - 5)} = \dfrac{5(2x - 5)}{2x - 5} = 5$

(iii) $10y(6y + 21) \div 5(2y + 7) = \dfrac{2 \times 5 \times y[2 \times 3 \times y + 3 \times 7]}{5(2y + 7)}$

$= \dfrac{2 \times 5 \times y \times 3(2y + 7)}{5(2y + 7)} = 6y$

(iv) $9x^2y^2(3z - 24) \div 27xy(z - 8) = \dfrac{9x^2y^2[3 \times z - 2 \times 2 \times 2 \times 3]}{27xy(z - 8)}$

$= \dfrac{xy \times 3(z - 8)}{3(z - 8)} = xy$

(v) $96\ abc(3a - 12)(5b - 30) \div 144(a - 4)(b - 6)$

$= \dfrac{96abc(3 \times a - 3 \times 4)(5 \times b - 2 \times 3 \times 5)}{144(a - 4)(b - 6)}$

$= \dfrac{2abc \times 3(a - 4) \times 5(b - 6)}{3(a - 4)(b - 6)} = 10abc$

Q4 :

Divide as directed.

(i) $5(2x + 1)(3x + 5) \div (2x + 1)$

(ii) 26*xy*(*x* + 5) (*y* - 4) ÷ 13*x*(*y* - 4)

(iii) 52*pqr* (*p* + *q*) (*q* + *r*) (*r* + *p*) ÷ 104*pq*(*q* + *r*) (*r* + *p*)

(iv) 20(*y* + 4) (*y*² + 5*y* + 3) ÷ 5(*y* + 4)

(v) *x*(*x* + 1) (*x* + 2) (*x* + 3) ÷ *x*(*x* + 1)

Answer :

(i) $5(2x+1)(3x+5) \div (2x+1) = \dfrac{5(2x+1)(3x+1)}{(2x+1)}$

= 5(3*x* + 1)

(ii) $26xy(x+5)(y-4) \div 13x(y-4) = \dfrac{2 \times 13 \times xy(x+5)(y-4)}{13x(y-4)}$

= 2*y* (*x* + 5)

(iii) 52*pqr* (*p* + *q*) (*q* + *r*) (*r* + *p*) ÷ 104*pq* (*q* + *r*) (*r* + *p*)

$$= \frac{2 \times 2 \times 13 \times p \times q \times r \times (p+q) \times (q+r) \times (r+p)}{2 \times 2 \times 2 \times 13 \times p \times q \times (q+r) \times (r+p)}$$

$$= \frac{1}{2} r(p+q)$$

(iv) 20(*y* + 4) (*y*² + 5*y* + 3) = 2 × 2 × 5 × (*y* + 4) (*y*² + 5*y* + 3)

$20(y+4)(y^2+5y+3) \div 5(y+4) = \dfrac{2 \times 2 \times 5 \times (y+4) \times (y^2+5y+3)}{5 \times (y+4)}$

$$= 4(y^2 + 5y + 3)$$

(v) $x(x+1)(x+2)(x+3) \div x(x+1) = \dfrac{x(x+1)(x+2)(x+3)}{x(x+1)}$

= (*x* + 2) (*x* + 3)

Q5 :

Factorise the expressions and divide them as directed.

(i) $(y^2 + 7y + 10) \div (y + 5)$

(ii) $(m^2 - 14m - 32) \div (m + 2)$

(iii) $(5p^2 - 25p + 20) \div (p - 1)$

(iv) $4yz(z^2 + 6z - 16) \div 2y(z + 8)$

(v) $5pq(p^2 - q^2) \div 2p(p + q)$

(vi) $12xy(9x^2 - 16y^2) \div 4xy(3x + 4y)$

(vii) $39y^3(50y^2 - 98) \div 26y^2(5y + 7)$

Answer :

(i) $(y^2 + 7y + 10) = y^2 + 2y + 5y + 10$

$= y (y + 2) + 5 (y + 2)$

$= (y + 2) (y + 5)$

$$\left(y^2 + 7y + 10\right) \div \left(y + 5\right) = \frac{\left(y + 5\right)\left(y + 2\right)}{\left(y + 5\right)} = y + 2$$

(ii) $m^2 - 14m - 32 = m^2 + 2m - 16m - 32$

$= m (m + 2) - 16 (m + 2)$

$= (m + 2) (m - 16)$

$$\left(m^2 - 14m - 32\right) \div \left(m + 2\right) = \frac{\left(m + 2\right)\left(m - 16\right)}{\left(m + 2\right)} = m - 16$$

(iii) $5p^2 - 25p + 20 = 5(p^2 - 5p + 4)$

$= 5[p^2 - p - 4p + 4]$

$= 5[p(p - 1) - 4(p - 1)]$

$= 5(p - 1) (p - 4)$

$$\left(5p^2 - 25p + 20\right) \div (p-1) = \frac{5(p-1)(p-4)}{(p-1)} = 5(p-4)$$

(iv) $4yz(z^2 + 6z - 16) = 4yz\ [z^2 - 2z + 8z - 16]$

$= 4yz\ [z(z - 2) + 8(z - 2)]$

$= 4yz(z - 2)\ (z + 8)$

$$4yz\left(z^2 + 6z - 16\right) \div 2y(z+8) = \frac{4yz(z-2)(z+8)}{2y(z+8)} = 2z(z-2)$$

(v) $5pq(p^2 - q^2) = 5pq\ (p - q)\ (p + q)$

$$5pq\left(p^2 - q^2\right) \div 2p(p+q) = \frac{5pq(p-q)(p+q)}{2p(p+q)} = \frac{5}{2}q(p-q)$$

(vi) $12xy(9x^2 - 16y^2) = 12xy[(3x)^2 - (4y)^2] = 12xy(3x - 4y)\ (3x + 4y)$

$$12xy\left(9x^2 - 16y^2\right) \div 4xy(3x+4y) = \frac{2 \times 2 \times 3 \times x \times y \times (3x-4y) \times (3x+4y)}{2 \times 2 \times x \times y \times (3x+4y)}$$

$$= 3(3x - 4y)$$

(vii) $39y^3(50y^2 - 98) = 3 \times 13 \times y \times y \times y \times 2[(25y^2 - 49)]$

$= 3 \times 13 \times 2 \times y \times y \times y \times [(5y)^2 - (7)^2]$

$= 3 \times 13 \times 2 \times y \times y \times y\ (5y - 7)\ (5y + 7)$

$26y^2(5y + 7) = 2 \times 13 \times y \times y \times (5y + 7)$

$39y^3(50y^2 - 98)\ \tilde{A}f\hat{A}\cdot 26y^2\ (5y + 7)$

$$= \frac{39y^3 \times 2\left(25y^2 - 49\right)}{26y^2(5y+7)}$$

$$= \frac{3y(5y+7)(5y-7)}{(5y+7)}$$

$$= 3y(5y - 7)$$