Division Of Polynomials

Practice set 10.1

Q. 1. A. Divide. Write the quotient and the remainder.

$21m^2 \div 7m$

Answer :

$$21m^2 \div 7m = \frac{21m^2}{7m}$$

$$21m^2 \div 7m = \frac{7m(3m)}{7m}$$

$$21m^2 \div 7m = 3m + \frac{0}{7m}$$

Therefore, quotient = 3m, remainder = 0

Q. 1. B. Divide. Write the quotient and the remainder.

$40a^3 \div (-10a)$

Answer :

$$40a^3 \div (-10a) = \frac{40a^3}{-10a}$$

$$40a^3 \div (-10a) = \frac{-4a^2(-10a)}{-10a}$$

$$40a^3 \div (-10a) = -4a^2 + \frac{0}{-10a}$$

Therefore, quotient = $-4a^2$, remainder = 0.

Q. 1. C. Divide. Write the quotient and the remainder.

$(-48p^4) \div (-9p^2)$

Answer :

$$(-48p^4) \div (-9p^2) = \frac{-48p^4}{-9p^2}$$

$$(-48p^4) \div (-9p^2) = \frac{48p^2(p^2)}{9p^2}$$

$$(-48p^4) \div (-9p^2) = \frac{16}{3}p^2 + \frac{0}{-9p^2}$$

Therefore, quotient $= \frac{16}{3}p^2$, remainder $= 0$.

Q. 1. D. Divide. Write the quotient and the remainder.

$40m^5 \div 30m^3$

Answer :

$$40m^5 \div 30m^3 = \frac{40m^5}{30m^3}$$

$$40m^5 \div 30m^3 = \frac{40m^2(m^3)}{30m^3}$$

$$40m^5 \div 30m^3 = \frac{4}{3}m^2 + \frac{0}{30m^2}$$

Therefore, quotient $= \frac{4}{3}m^2$, remainder $= 0$.

Q. 1. E. Divide. Write the quotient and the remainder.

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

Answer :

$$(5x^3 - 3x^2) \div x^2 = \frac{(5x^3 - 3x^2)}{x^2}$$

$$(5x^3 - 3x^2) \div x^2 = \frac{(5x - 3)x^2}{x^2}$$

$$(5x^3 - 3x^2) \div x^2 = 5x - 3 + \frac{0}{x^2}$$

Therefore, quotient = 5x – 3, remainder = 0.

Q. 1. E. Divide. Write the quotient and the remainder.

$(8p^3 - 4p^2) \div 2p^2$

Answer :

$$(8p^3 - 4p^2) \div 2p^2 = \frac{(8p^3 - 4p^2)}{x^2}$$

$$(8p^3 - 4p^2) \div 2p^2 = \frac{(4p - 2)(2p^2)}{2p^2}$$

$$(8p^3 - 4p^2) \div 2p^2 = 4p - 2 + \frac{0}{2p^2}$$

Therefore, quotient = 4p – 2, remainder = 0.

Q. 1. G. Divide. Write the quotient and the remainder.

$(2y^3 + 4y^2 + 3) \div 2y^2$

Answer :

$$(2y^3 + 4y^2 + 3) \div 2y^2 = \frac{(2y^3 + 4y^2 + 3)}{2y^2}$$

$$(2y^3 + 4y^2 + 3) \div 2y^2 = \frac{(y + 2)(2y^2) + 3}{2y^2}$$

$$(2y^3 + 4y^2 + 3) \div 2y^2 = y + 2 + \frac{3}{2y^2}$$

Therefore, quotient = y + 2, remainder = 3.

Q. 1. H. Divide. Write the quotient and the remainder.

$(21x^4 - 14x^2 + 7x) \div 7x^3$

Answer :

$$(21x^4 - 14x^2 + 7x) \div 7x^3 = \frac{(21x^4 - 14x^2 + 7x)}{7x^3}$$

$$(21x^4 - 14x^2 + 7x) \div 7x^3 = \frac{7x^3(3x) + (-14x^2 + 7x)}{7x^3}$$

$$(21x^4 - 14x^2 + 7x) \div 7x^3 = 3x + \frac{-14x^2 + 7x}{7x^3}$$

Therefore, quotient = 3x, remainder = $-14x^2 + 7x$.

Q. 1. I. Divide. Write the quotient and the remainder.

$(6x^5 - 4x^4 + 8x^3 + 2x^2) \div 2x^2$

Answer :

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

$$(6x^5 - 4x^4 + 8x^3 + 2x^2) \div 2x^2 = \frac{2x^2(3x^3 - 2x^2 + 4x + 1)}{2x^2}$$

$$(6x^5 - 4x^4 + 8x^3 + 2x^2) \div 2x^2 = 3x^3 - 2x^2 + 4x + 1 + \frac{0}{2x^2}$$

Therefore, quotient = $3x^3 - 2x^2 + 4x + 1$, remainder = 0.

Q. 1. J. Divide. Write the quotient and the remainder.

$(25m^4 - 15m^3 + 10m + 8) \div 5m^3$

Answer : $$(25m^4 - 15m^3 + 10m + 8) \div 5m^3 = \frac{(25m^4 - 15m^3 + 10m + 8)}{5m^3}$$

$$(25m^4 - 15m^3 + 10m + 8) \div 5m^3 = \frac{5m^3(5m - 3) + 10m + 8}{5m^3}$$

$$(25m^4 - 15m^3 + 10m + 8) \div 5m^3 = 5m - 3 + \frac{10m + 8}{5m^3}$$

Therefore, quotient = 5m – 3, remainder = 10m + 8.

Practice set 10.2

Q. 1. A. Divide and write the quotient and the remainder.

$(y^2 + 10y + 24) \div (y + 4)$

Answer :

$$(y^2 + 10y + 24) \div (y + 4) = \frac{(y^2 + 10y + 24)}{(y + 4)}$$

$$= \frac{y^2 + 6y + 4y + 24}{(y + 4)}$$

$$= \frac{y(y + 6) + 4(y + 6)}{(y + 4)}$$

$$= \frac{(y + 6)(y + 4)}{(y + 4)}$$

$$= y + 6 + \frac{0}{y + 4}$$

Therefore, quotient = y + 6, remainder = 0.

Q. 1. B. Divide and write the quotient and the remainder.

$(p^2 + 7p - 5) \div (p + 3)$

Answer :

$$(p^2 + 7p - 5) \div (p + 3) = \frac{(p^2 + 7y - 5)}{(p + 3)}$$

$$= \frac{p^2 + 3p + 4p - 5}{(p + 3)}$$

$$= \frac{p(p + 3) + 4p + 12 - 12 - 5}{(p + 3)}$$

$$= \frac{p(p+3)+4(p+3)-17}{(p+3)}$$

$$= \frac{(p+4)(p+3)-17}{(p+3)}$$

$$= p+4-\frac{17}{y+3}$$

Therefore, quotient = p + 4, remainder = -17.

Q. 1. C. Divide and write the quotient and the remainder.

$(3x + 2x^2 + 4x^3) \div (x - 4)$

Answer :

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

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

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

$$= \frac{4x^3-16x^2+16x^2+2x^2+3x}{(x-4)}$$

$$= \frac{4x^2(x-4)+18x^2+3x}{(x-4)}$$

$$= \frac{4x^2(x-4)+18x^2-72x+72x+3x}{(x-4)}$$

$$= \frac{4x^2(x-4)+18x(x-4)+75x}{(x-4)}$$

$$= \frac{4x^2(x-4)+18x(x-4)+75x-300+300}{(x-4)}$$

$$= \frac{4x^2(x-4) + 18x(x-4) + 75(x-4) + 300}{(x-4)}$$

$$= 4x^2 + 18x + 75 + \frac{300}{(x-4)}$$

Therefore, quotient = $4x^2 + 18x + 75$, remainder = 300.

Q. 1. D. Divide and write the quotient and the remainder.

$(2m^3 + m^2 + m + 9) \div (2m - 1)$

Answer :

$$(2m^3 + m^2 + m + 9) \div (2m - 1) = \frac{(2m^3 + m^2 + m + 9)}{(2m - 1)}$$

$$= \frac{2m^3 - m^2 + m^2 + m^2 + m + 9}{(2m - 1)}$$

$$= \frac{m^2(2m-1) + 2m^2 + m + 9}{(2m - 1)}$$

$$= \frac{m^2(2m-1) + 2m^2 - m + m + m + 9}{(2m - 1)}$$

$$= \frac{m^2(2m-1) + m(2m-1) + 2m + 9}{(2m - 1)}$$

$$= \frac{m^2(2m-1) + m(2m-1) + 2m - 1 + 1 + 9}{(2m - 1)}$$

$$= \frac{m^2(2m-1) + m(2m-1) + (2m-1) + 10}{(2m - 1)}$$

$$= m^2 + m + 1 + \frac{10}{(2m - 1)}$$

Therefore, quotient = $m^2 + m + 1$, remainder = 10.

Q. 1. E. Divide and write the quotient and the remainder.

$(3x - 3x^2 - 12 + x^4 + x^3) \div (2 + x^2)$

Answer :

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

Rearranging the terms we get,

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

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

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

$$= \frac{x^2(x^2 + 2) - 5x^2 + x(x^2 + 2) + x - 12}{(x^2 + 2)}$$

$$= \frac{x^2(x^2 + 2) + x(x^2 + 2) - 5x^2 + x - 12}{(x^2 + 2)}$$

$$= \frac{x^2(x^2 + 2) + x(x^2 + 2) + x - 5x^2 - 10 - 2}{(x^2 + 2)}$$

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

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

Therefore, quotient = $x^2 + x - 5$, remainder = $x - 2$

Q. 1. F. Divide and write the quotient and the remainder.

$(6^*)(a^4 - a^3 + a^2 - a + 1) \div (a^3 - 2)$

Answer :

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

Rearranging the terms we get,

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

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

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

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

Therefore, quotient = a – 1, remainder = $a^2 + a - 1$

Q. 1. G. Divide and write the quotient and the remainder.

(7*)$(4x^4 - 5x^3 - 7x + 1) \div (4x - 1)$

Answer :

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

Factorising the numerator we get,

$$= \frac{(4x^4 - x^3 - 4x^3 - 7x + 1)}{(4x - 1)}$$

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

$$= \frac{\left(x^3(4x - 1) - x^2(4x - 1) - x^2 + \frac{x}{4} - \frac{x}{4} - 7x + 1\right)}{(4x - 1)}$$

$$= \frac{\left(x^3(4x-1) - x^2(4x-1) - \frac{x}{4}(4x-1) - \frac{29}{4}x + 1\right)}{(4x-1)}$$

$$= \frac{\left(x^3(4x-1) - x^2(4x-1) - \frac{x}{4}(4x-1) - \frac{29}{4}x + \frac{29}{16} - \frac{29}{16} + 1\right)}{(4x-1)}$$

$$= \frac{\left(x^3(4x-1) - x^2(4x-1) - \frac{x}{4}(4x-1) - \frac{29}{16}(4x-1) - \frac{13}{16}\right)}{(4x-1)}$$

$$= \left(x^3 - x^2 - \frac{x}{4} - \frac{29}{16}\right) - \frac{\frac{13}{16}}{(4x-1)}$$