Question 1: Write the degree of each of the following polynomials:

Soln:

(i)
$$2x^3+5x^2-7$$

It is $2x^3+5x^2-7$ instead of $2x^2+5x^2-7$

The degree of the polynomial 2x3+5x2-7 is 3

(ii)
$$5x^2-35x+2$$

The degree of the polynomial $5x^2-35x+2$ is 2

The degree of the polynomial 2x+x²-8 is 2

(iv)
$$\frac{1}{2}y^7 - 12y^6 + 48y^5 - 10$$

The degree of the polynomial $rac{1}{2}y^7-12y^6+48y^5-10$ is 7

$$(v) 3x^3+1$$

The degree of the polynomial 3x3+1 is 3

(vi) 5

5 is a constant polynomial and its degree is 0.

(vii)
$$20x^3+12x^2y^2-10y^2+20$$

The degree of the polynomial $20x^3+12x^2y^2-10y^2+20$ is 4

Question 2

Which of the following expressions are not polynomials:

Soln:

(i) x^2+2x^{-2}

 x^2+2x^{-2} is not a polynomial because -2 is the power of variable x is not a non negative integer.

(ii)
$$\sqrt{ax} + x^2 - x^3$$

 $\sqrt{ax}+x^2-x^3$ is not a polynomial because $\frac{1}{2}$ is the power of variable x is not a non negative integer.

(iii)
$$3y^3 - \sqrt{5}y + 9$$

 $3y^3-\sqrt{5}y+9$ is a polynomial because the powers of variable y are non negative integers.

(iv)
$$ax^{\frac{1}{2}} + ax + 9x^2 + 4$$

 $ax^{\frac{1}{2}}+ax+9x^2+4$ is not a polynomial because $\frac{1}{2}$ is the power of variable x is not a non negative integer.

(v) $3x^{-2}+2x^{-1}+4x+5$

3x⁻²+2x⁻¹+4x+5 is not a polynomial because -2 and -1 are the powers of variable x are not non negative integers.

Question 3

Write each of the following polynomials in the standard form. Also, write their degree:

Soln:

(i)
$$(x^2+3+6x+5x^4)$$

The standard form of the given polynomial can be expressed as:

$$(5x^4+x^2+6x+3)$$
 or $(3+6x+x^2+5x^4)$

The degree of the polynomial is 4

(ii)
$$a^2+4+5a^6$$

The standard form of the given polynomial can be expressed as:

$$(5a^6+a^2+4)$$
 or $(4+a^2+5a^6)$

The degree of the polynomial is 6

(iii)
$$(x^3-1)(x^3-4)$$

 $(x^3-1)(x^3-4) = x^6-5x^3+4$

The standard form of the given polynomial can be expressed as: (x^6-5x^3+4) or $(4-5x^3+x^6)$

The standard form of the given polynomial can be expressed as:

 $(v) \left(a^3 - \frac{3}{8}\right) \left(a^3 + \frac{16}{17}\right) \left(a^3 - \frac{3}{8}\right) \left(a^3 + \frac{16}{17}\right) = a^3 + \frac{77}{136}a^3 - \frac{6}{17}$

(iv)
$$(y^3-2)(y^3+11)$$

 $(v^3-2)(v^3+11) = v^6+9v^3-22$

The degree of the polynomial is 6

$$(a^3 + \frac{77}{136}a^3 - \frac{6}{17}) \text{ or } (-\frac{6}{17} + \frac{77}{136}a^3 + a^3)$$

The degree of the polynomial is 6.

(vi)
$$\left(a + \frac{3}{4}\right)\left(a + \frac{4}{3}\right)\left(a + \frac{3}{4}\right)\left(a + \frac{4}{3}\right) = a^2 + \frac{25}{12}a + 1$$

Standard form of the given polynomial can be expressed as:

$$(a^2 + \frac{25}{12}a + 1)$$
 or $(1 + \frac{25}{12}a + a^2)$

The degree of the polynomial is 2

$6x^3y^2z^2$ by $3x^2yz$

Divide: Question 1

Soln:
$$6x^3y^2z^2$$

$$= \frac{6 \times x \times x \times x \times y \times y \times z \times z}{3 \times x \times x \times y \times z}$$

$$= 2x^{(3-2)}y^{(2-1)}z^{(2-1)}$$
$$= 2xyz$$

Soln:
$$\frac{15n^3m^2}{5m^2n^2}$$

$$15 \times n \times n \times n \times m \times n$$

$$= 3m^{(2-2)}n^{(3-2)}$$
$$= 3m^0n^1$$

=3n

24a³b³ by -8ab

$$\frac{24a^3b^3}{-8ab}$$

$$= \frac{24{\times}a{\times}a{\times}a{\times}b{\times}b{\times}b}{-8{\times}a{\times}b}$$

$$= -3a^2b^2$$

-21abc² by
$$7$$
abc

Soln:
$$\frac{-21abc^2}{7ab}$$

$$= \frac{-21 \times a \times b \times c \times c}{7 \times a \times b \times c}$$

$$= -3a^{(1-1)}b^{(1-1)}c^{(2-1)}$$

$$= -3a^{0}b^{0}c^{1}$$

= 3c

$$\frac{72xyz^2}{-9xz}$$

$$=\frac{72 \times x \times y \times z \times z}{-9 \times x \times z}$$

$$=\frac{12\times2\times9\times2\times2}{-9\times2\times2}$$

 $= -8x^{(1-1)}yz^{(2-1)}$

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= -8yz
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$-72a^4b^5c^8$ by $-9a^2b^2c^3$ Soln:

$\frac{-72a^4b^5c^8}{-9a^2b^2c^3}$

 $-9 \times a \times a \times b \times b \times c \times c \times c$

- $= 8a^{(4-2)}b^{(5-2)}c^{(8-3)}$
- $= 8a^2b^3c^5$
- Simplify:

- Question 7
- $\frac{16m^3y^2}{4m^2y}$

$$\frac{16m^3y^2}{4m^2y}$$

$$= \frac{16 \times m \times m \times y \times y}{4 \times m \times m \times y}$$

$32m^2n^3p^2$ 4mnpSoln:

$32m^2n^3p^2$ 4mnp

- $32{\times}m{\times}m{\times}n{\times}n{\times}n{\times}p{\times}p$ $4 \times m \times n \times p$

 $= 8mn^2p$

- $= 8m^{(2-1)}n^{(3-1)}p^{(2-1)}$

Divide: Question 1

$$x+2x^2+3x^4-x^5$$
 by $2x$

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

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

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

Question 2

$$y^4-3y^3+\frac{1}{2}y^2$$
 by 3y

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

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

$$= \frac{1y^{4-1}}{3} - y^{3-1} + \frac{1y^{2-1}}{6}$$

 $=\frac{1y^3}{3}-y^2+\frac{1y^1}{6}$

Question 3

 $\frac{-4a^3+4a^2+a}{2a}$

$$-4a^3+4a^2+a$$
 by 2a

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

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

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

 $-x^6+2x^4+4x^3+2x^2$ by $\sqrt{2}x^2$

$$\frac{-x^6 + 2x^4 + 4x^3 + 2x^2}{\sqrt{2}x^2}$$

$$= \frac{-x^6}{\sqrt{2}x^2} + \frac{2x^4}{\sqrt{2}x^2} + \frac{4x^3}{\sqrt{2}x^2} + \frac{2x^2}{\sqrt{2}x^2}$$

$$= \frac{-1x}{\sqrt{6}}^{6-2} + \sqrt{2}x^{4-2} + 2\sqrt{2}x^{3-2} + \sqrt{2}x^{2-2}$$

$$= \frac{-1x}{\sqrt{6}}^4 + \sqrt{2}x^2 + 2\sqrt{2}x^1 + \sqrt{2}x^0$$

$$= \frac{-1x}{\sqrt{6}}^4 + \sqrt{2}x^2 + 2\sqrt{2}x + \sqrt{2}$$

$5z^3-6z^2+7z$ by 2z

Question 5

$$= \frac{5z^3}{2z} - \frac{6z^2}{2z} + \frac{7z}{2z}$$

$$= \frac{5z^{3-1}}{2} - 3z^{2-1} + \frac{7}{2}$$

$$= \frac{5z^2}{2} - 3z + \frac{7}{2}$$

Question 6
$$\sqrt{3}a^4+2\sqrt{3}a^3+3a^2-6a$$
 by 3a

Soln:
$$\frac{\sqrt{3}a^4 + 2\sqrt{3}a^3 + 3a^2 - 6a}{3a}$$

$$\sqrt{3}a^4 + 2\sqrt{3}a$$
 $3a$

$$=\frac{\sqrt{3}a^4}{3a}+\frac{2\sqrt{3}a^3}{3a}+\frac{3a^2}{3a}-\frac{6a}{3a}$$

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

$$\frac{7}{3a} + \frac{3a}{3a}$$

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

$$^{2-1}$$

pivide.

$$\frac{5x^{3}-15x^{2}+25x}{5x} = \frac{5x^{3}}{5x} + \left(\frac{-15}{5}\right) \cdot \frac{x^{2}}{x} + \frac{25}{5} \cdot \frac{x}{5}$$

2. 423 + 622 - 2 by -1 2

3. 9x2y-6xy+12xy2 by -3xy.

 $\frac{4z^3+6z^2-z}{\frac{-1}{2}z} = \frac{4z^3.(a)}{-2} - \frac{6z^2.a}{2} + \frac{z.2}{2}$

= -822-122+2.

 $\frac{9x^{2}y-6xy+12xy^{2}}{-\frac{3}{2}xy} = \frac{9x^{2}y}{-3x\cdot y} \cdot 2 + \frac{6xy \cdot 2}{3\cdot x\cdot y} + \frac{12x\cdot y^{2}\cdot 1}{-3xy}$

= -6x+4-83.



4. 323.92+222.9+1529 by 329.

$$\frac{3x^{3} \cdot y^{2} + 2x^{2} \cdot y + 15xy}{3xy} = \frac{3 \cdot x^{3} \cdot y^{2}}{3xy} + \frac{2x^{4} \cdot y}{3xy} + \frac{15xy}{3xy}$$
$$= x^{2}y + \frac{2}{3}x + 5.$$

5. x2+7x+1R by x+4.

we divide the first term x. 2 of the divisor

and obtain $\frac{x^2}{x} = x$ as the first term of the quotient.

step-2:
we multiply the divisor x+4 by the first term

a of the quotient and subtract the result from

the dividend x2+7x+12. We obtain 3x+12 as

the remainder

(0)

Now we treat 3x+12 as the new dividend and divide the first lerm. 3x by the first

term a of the divisor to obtain 33 = 3 as the third term of the quotient. step- IV:we multiply the divisor 214 and the third tem 3 of the quotient and subtract the resur 3x+12 from the new dividence, we obtain o as the remainder. Thus, we can say that $\frac{x^2 + 7x + 12}{x + 4} = x + 3.$ Solution-06: 452+39+1 bo Rof1 89+1 492+39+1 492+89 9+1 9+1 solution-07. 3x3+4x2+5x+18 by x+2. 3x2-2x+9
3x3+4x2+5x+18
3x+6x2
-2x2+5x
-2x2+5x
-2x2+5x
-2x2+54x

Solution - 09.

$$-(-21+712-31x^{2}-24x^{3})$$

$$-(3-8x)$$

$$= 21-71x+31x^{2}+24x^{3}$$

$$= 21-71x+31x^{2}+24x^{3}$$

$$= 8x-3$$

$$= 21-71x+31x^{2}+24x^{3}$$

$$= 21-71x+$$

Solution-10:-

344-343-492-49 69 92-29

$$39^{2} - 39^{3} - 49^{2} - 49$$

$$39^{4} - 69^{3}$$

$$- +$$

$$39^{3} - 69^{2}$$

$$29^{2} - 49$$

$$29^{2} + 49$$

$$(9^{2} - 29)(39^{2} + 39 + 2) = 39^{4} - 39^{3} - 49^{2} - 49$$

$$3^{3}+1$$

$$3^{3}+1$$

$$3^{5}+103^{7}+63^{3}+3^{2}+59+3$$

$$3^{5}+0+0+3^{2}$$

$$103^{7}+63^{3}+0+59$$

$$103^{7}+0+0\pm59$$

$$63^{3}+0+0+3$$

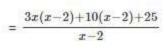
$$63^{3}+0+0+3$$

Question 1: Divide the first polynomial by the second polynomial in each of the following. Also, write the quotient and remainder:

(i)
$$\frac{3x^2+4x+5}{x-2}$$

Soln:

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



 $= \frac{3x(x-2)+10(x-2)+25}{x-2}$





(ii) $\frac{10x^2-7x+8}{5x-3}$

 $=(3x+10)+\frac{25}{x-2}$

Soln:
$$2x(5x)$$

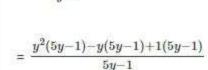
$$\frac{2x(5x-3)-\frac{1}{5}(5x-3)+\frac{47}{5}}{5x-3}$$

$$=\frac{(5x-3)(2x-\frac{1}{5})(5x-3)+\frac{47}{5}}{5x-3}$$

(iii)
$$\frac{5y^3-6y^2+6y-1}{5u-1}$$

Soln:

 $\frac{5y^3-6y^2+6y-1}{5y-1}$



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

- $=(2x-\frac{1}{5})+\frac{\frac{47}{5}}{5x-3}$
- Therefore , quotient= $(2x-rac{1}{5})$ and remainder = $rac{47}{5}$

Therefore quotient = y^2-y+1

And remainder = 0

(iv)
$$\frac{x^4 - x^3 + 5x}{x - 1}$$

Soln:

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

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

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

Therefore, quotient = x^3+5 and remainder= 5

(v)
$$\frac{(y^4+y^2)}{y^2-2}$$

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

$$=\frac{y^2(y^2-2)+3(y^2-2)+6}{y^2-2}$$

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

$$(y^2+3)+rac{6}{y^2-2}$$

Therefore, quotient = y^3+3 and remainder = 6



Soln:

(i) $\frac{2x^2+5x+4}{x+1}$

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

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

Therefore, (x+1) is not a factor of 2x2+5x+4

(ii)
$$\frac{3y^3+5y^2+5y+2}{y-2}$$

$$= (3y^2 + 11y + 27) + \frac{56}{y-2}$$

 $=\frac{3y^2(y-2)+11y(y-2)+27(y-2)+56}{y-2}$

 $=\frac{(y-2)(3y^2+11y+27)+56}{y-2}$

(iii) $\frac{4x^4+12x^2+15}{4x^2-5}$

$=\frac{x^2(4x^2-5)+3(4x^2-5)+30}{4x^2-5}$

Therefore,
$$(4x^2-5)$$
 is not a factor of $4x^4+7x^2+15$

 $= (x^2+3) + \frac{30}{4x^2-5}$

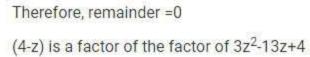
(iv) $\frac{3z^2-13z+4}{4-z}$

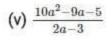
$$\frac{3z^2-13z+4}{4-z}$$

$$=\frac{3z(z-4)-1(z-4)}{4-z}$$

$$= \frac{(z-4)(3z-1)}{4-z}$$

 $= \frac{(4-z)(1-3z)}{4-z}$





 $\frac{10a^2 - 9a - 5}{2a - 3}$

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

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

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

(4y+1) is not a factor of 8y2-2y+1

(2a-3) is not a factor of the equation 10a2-9a-5

(vi)
$$\frac{8y^2-2y+1}{4y+1}$$

Soln:
=
$$\frac{2y(4y+1)-1(4y+1)+2}{4y+1}$$

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

=
$$2y-1 + \frac{2}{4y+1}$$

Therefore, remainder = 2

Question 1: $x^2 - 5x + 6$ by (x - 3)

Soln:

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

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

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

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

Question 2: ax2-ay2 by (ax+ay)

$$\frac{ax^2-ay^2}{ax+ay}$$

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

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

Question 3: x4-y4 by x2-y2

Soln:

$$\frac{x^4 - y^4}{x^2 - y^2}$$

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

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

Question 4: acx2+(bc+ad)x+bd by (ax+b)

$$\frac{acx^2 + (bc + ad)x + bd}{ax + b}$$

$$= \frac{acx^2 + bcx + adx + bd}{ax + b}$$

$$=\frac{cx(ax+b)+d(ax+b)}{ax+b}$$

$$= \frac{(ax+b)(cx+d)}{ax+b} = CX+d$$

Question 5: (a2+2ab+b2)-(a2+2ac+c2) by (2a+b+c)

Soln:

$$\frac{(a^2+2ab+b^2)-(a^2+2ac+c^2)}{2a+b+c}$$

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

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

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

Question 6:
$$(\frac{1}{4}x^2 - \frac{1}{2}x - 12)$$
 by $(\frac{1}{2}x - 4)$

$$\frac{\frac{1}{4}x^2 - \frac{1}{2}x - 12}{\frac{1}{2}x - 4}$$

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

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