We know that the coefficient is the number which multiplies the variable.

Here, the number that multiplies the variable $x^2$ is 1

Hence, the coefficient of $x^2$ in $2+x^2+x$ is 1.

**(ii) $2–x^2+x^3$**

Solution:

The equation $2–x^2+x^3$ can be written as $2+(–1)x^2+x^3$

We know that the coefficient is the number (along with its sign, i.e. – or +) which multiplies the variable.

Here, the number that multiplies the variable $x^2$ is -1

Hence, the coefficient of $x^2$ in $2–x^2+x^3$ is -1.

**(iii) $(\pi/2)x^2+x$**

Solution:

The equation $(\pi/2)x^2+x$ can be written as $(\pi/2)x^2 + x$

We know that the coefficient is the number (along with its sign, i.e. – or +) which multiplies the variable.

Here, the number that multiplies the variable $x^2$ is $\pi/2$.

Hence, the coefficient of $x^2$ in $(\pi/2)x^2+x$ is $\pi/2$.

**(iii)$\sqrt{2}x-1$**

Solution:

The equation $\sqrt{2}x-1$ can be written as $0x^2+\sqrt{2}x-1$ [Since $0x^2$ is 0]

We know that the coefficient is the number (along with its sign, i.e. – or +) which multiplies the variable.

Here, the number that multiplies the variable $x^2$ is 0

Hence, the coefficient of $x^2$ in $\sqrt{2}x-1$ is 0.



**3. Give one example each of a binomial of degree 35, and of a monomial of degree 100.**

Solution:

Binomial of degree 35: A polynomial having two terms and the highest degree 35 is called a binomial of degree 35.

For example, $3x^{35}+5$

Monomial of degree 100: A polynomial having one term and the highest degree 100 is called a monomial of degree 100.

For example, $4x^{100}$

**4. Write the degree of each of the following polynomials:**

**(i) $5x^3+4x^2+7x$**

Solution:

## Exercise 2.2 Page: 34

**1. Find the value of the polynomial $(x)=5x-4x^2+3$.**

**(i) x = 0**

**(ii) x = – 1**

**(iii) x = 2**

Solution:

Let $f(x) = 5x-4x^2+3$

(i) When x = 0

$f(0) = 5(0)-4(0)^2+3$

$= 3$

(ii) When x = -1

$f(x) = 5x-4x^2+3$

$f(-1) = 5(-1)-4(-1)^2+3$

$= -5-4+3$

$= -6$

(iii) When x = 2

$f(x) = 5x-4x^2+3$

$f(2) = 5(2)-4(2)^2+3$

$= 10-16+3$

$= -3$



**2. Find p(0), p(1) and p(2) for each of the following polynomials:**

**(i) $p(y)=y^2-y+1$**

Solution:

$p(y) = y^2-y+1$

$\therefore p(0) = (0)^2-(0)+1 = 1$

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

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

**(ii) $p(t)=2+t+2t^2-t^3$**

Solution:

$p(t) = 2+t+2t^2-t^3$

$\therefore p(0) = 2+0+2(0)^2-(0)^3 = 2$

## Exercise 2.4 Page: 43

**1. Determine which of the following polynomials has (x + 1) a factor:**

**(i) $x^3+x^2+x+1$**

Solution:

Let $p(x) = x^3+x^2+x+1$

The zero of x+1 is -1. [x+1 = 0 means x = -1]

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

$= -1+1-1+1$

$= 0$

∴ By factor theorem, x+1 is a factor of $x^3+x^2+x+1$

**(ii) $x^4+x^3+x^2+x+1$**

Solution:

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

The zero of x+1 is -1. [x+1= 0 means x = -1]

$p(-1) = (-1)^4+(-1)^3+(-1)^2+(-1)+1$

$= 1-1+1-1+1$

$= 1 \neq 0$



∴ By factor theorem, x+1 is not a factor of $x^4 + x^3 + x^2 + x + 1$

**(iii) $x^4+3x^3+3x^2+x+1$**

Solution:

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

The zero of x+1 is -1.

$p(-1)=(-1)^4+3(-1)^3+3(-1)^2+(-1)+1$

$=1-3+3-1+1$

$=1 \neq 0$

∴ By factor theorem, x+1 is not a factor of $x^4+3x^3+3x^2+x+1$

**(iv) $x^3 - x^2 - (2+\sqrt{2})x + \sqrt{2}$**

Solution:

Let $p(x) = x^3-x^2-(2+\sqrt{2})x + \sqrt{2}$

The zero of x+1 is -1.

$p(-1) = (-1)^3-(-1)^2-(2+\sqrt{2})(-1) + \sqrt{2} = -1-1+2+\sqrt{2}+\sqrt{2}$

**3. Factorise the following using appropriate identities:**

**(i) $9x^2+6xy+y^2$**

Solution:

$9x^2+6xy+y^2 = (3x)^2+(2\times3x\times y)+y^2$

Using identity, $x^2+2xy+y^2 = (x+y)^2$

Here, $x = 3x$

$y = y$

$9x^2+6xy+y^2 = (3x)^2+(2\times3x\times y)+y^2$

$= (3x+y)^2$

$= (3x+y)(3x+y)$

**(ii) $4y^2-4y+1$**

Solution:

$4y^2-4y+1 = (2y)^2-(2\times2y\times1)+1$

Using identity, $x^2 - 2xy + y^2 = (x - y)^2$

Here, $x = 2y$

$y = 1$

$4y^2-4y+1 = (2y)^2-(2\times2y\times1)+1^2$

$= (2y-1)^2$

$= (2y-1)(2y-1)$

**(iii) $x^2-y^2/100$**

Solution:

$x^2-y^2/100 = x^2-(y/10)^2$

Using identity, $x^2-y^2 = (x-y)(x+y)$

Here, $x = x$

$y = y/10$

$x^2-y^2/100 = x^2-(y/10)^2$

$= (x-y/10)(x+y/10)$

**4. Expand each of the following using suitable identities:**

**(i) $(x+2y+4z)^2$**

**(ii) $(2x-y+z)^2$**

**(iii) $(-2x+3y+2z)^2$**

**(iv) $(3a-7b-c)^2$**

$$\left(x-\frac{2}{3}y\right)^3=(x)^3-\left(\frac{2}{3}y\right)^3-\left(3\times x\times\frac{2}{3}y\right)\left(x-\frac{2}{3}y\right)$$
$$=(x)^3-\frac{8}{27}y^3-2xy\left(x-\frac{2}{3}y\right)$$
$$=(x)^3-\frac{8}{27}y^3-2x^2y+\frac{4}{3}xy^2$$

**7. Evaluate the following using suitable identities:**

**(i) $(99)^3$**

**(ii) $(102)^3$**

**(iii) $(998)^3$**

Solutions:

**(i) $(99)^3$**

Solution:

We can write 99 as 100–1

Using identity, $(x-y)^3 = x^3-y^3-3xy(x-y)$

$(99)^3 = (100-1)^3$

$= (100)^3-1^3-(3\times100\times1)(100-1)$

$= 1000000-1-300(100-1)$

$= 1000000-1-30000+300$

$= 970299$



**(ii) $(102)^3$**

Solution:

We can write 102 as 100+2

Using identity, $(x+y)^3 = x^3+y^3+3xy(x+y)$

$(100+2)^3 =(100)^3+2^3+(3\times100\times2)(100+2)$

$= 1000000 + 8 + 600(100 + 2)$

$= 1000000 + 8 + 60000 + 1200$

$= 1061208$

**(iii) $(998)^3$**

Solution:

We can write 99 as 1000–2

Using identity, $(x-y)^3 = x^3-y^3-3xy(x-y)$

$(998)^3 =(1000-2)^3$