EXERCISE 2.2

Which of the following expressions are polynomials? Justify your answer:

(i) 8 (ii) $\sqrt{3}x^2 - 2x$ (iii) $1 - \sqrt{5x}$

(iv) $\frac{1}{5x^{-2}} + 5x + 7$ (v) $\frac{(x-2)(x-4)}{x}$ (vi) $\frac{1}{x+1}$

(vii) $\frac{1}{7}a^3 - \frac{2}{\sqrt{3}}a^2 + 4a - 7$ (viii) $\frac{1}{2x}$

Solution:

(i) 8

8 can be written as $8x^0$.

i.e., $8 = 8x^0$,

Here, the power of x = 0, which is a whole number.

Hence, 8 is a polynomial.

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

$\sqrt{3}x^2$ - 2x

Here, the power of x are 2 and 1 respectively

2 and 1 both are whole numbers.

Hence, $\sqrt{3}x^2$ - 2x is a polynomial.

(iii) 1 - √(5x)

$1 - \sqrt{5}\sqrt{x} = 1 - \sqrt{5}\, x^{½}$

Here, the power of x = ½, which is not a whole number.

Hence, 1 - √5x is not a polynomial

(iv)

$$\frac{1}{5x^{-2}} + 5x + 7$$

$1/5x^{-2} + 5x + 7 = 5x^2 + 5x + 7$

Here, the power of x are 2 and 1 respectively

2 and 1 both are whole numbers.

Hence, $1/5x^{-2} + 5x + 7$ is a polynomial.

(v)

$$\frac{(x-2)(x-4)}{x}$$

$((x-2)(x-4))/x = (x^2 - 4x - 2x + 8)/x$

$= (x^2 - 6x + 8)/x$

$= x - 6 + (8/x)$

$= x - 6 + 8x^{-1}$

Here, the power of x = – 1, which is not a whole number, but a negative number.
Hence, ((x – 2)(x – 4))/x is not a polynomial

(vi)

$$\frac{1}{x+1}$$

$1/(x+1) = (x+1)^{-1}$
Here, the power of x is not a whole number.
Hence, 1/(x+1) is not a polynomial

(vii)

$$\frac{1}{7}a^3 - \frac{2}{\sqrt{3}}a^2 + 4a - 7$$

$(1/7)a^3 – (2/\sqrt{3})a^2 + 4a – 7$
Here, the power of a are 3, 2 and 1 respectively
3, 2 and 1 are all whole numbers.
Hence, $(1/7)a^3 – (2/\sqrt{3})a^2 + 4a – 7$ is a polynomial.

(viii)

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

$1/2x = (x^{-1}/2)$
Here, the power of x = – 1, which is not a whole number, but a negative number.
Hence, 1/2x is not a polynomial