

Tutorial 4 - Sheet 2

1. State which of the following are polynomial expressions.

(a) $x^2 - 2x + 1000$

(b) $3x^2 + 2x + 7\sqrt{x} + 1$

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

(d) $x^2 - 2x + \frac{1}{x}$

(e) $(2x - 3)^{\frac{1}{2}} = 10$

2. State the degree of the following polynomial expressions.

(a) $7x^2 - 3x^3 + x^4$

(b) $3x + 2$

(c) 95

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

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

3. Calculate the poles and zeros of the following rational functions.

(a) $\frac{3x + 2}{2x + 3}$

(b) $\frac{(x - 1)(x + 1)}{2x - 6}$

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

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

(e) $\frac{(2x - 1)(x + 1)(x + 6)}{x(x + 2)(3x + 7)}$

4. The function, $f(x)$, is defined by

$$f(x) = \begin{cases} |x|, & -2 \leq x < 1; \\ 1, & 1 \leq x \leq 1.5; \\ 2x - 2, & 1.5 < x < 2. \end{cases}$$

and $f(x)$ is periodic with period $T=4$.

- (a) Sketch $f(x)$ on $[-2, 2)$.

- (b) Evaluate $f(-1)$ and $f(1.7)$.
(c) Evaluate $f(-3)$ and $f(26.2)$.