MHF4U
3.1 Exploring Polynomial Functions

1. Are the following functions polynomial? If yes, find the degree and the name of the polynomial function.

a) $f(x) = x + x^{-1} + x^{1/2}$

b) $f(x) = \dfrac{x^2 + x}{x}$

c) $f(x) = (x^2 + 1)(x - 1)$

d) $f(x) = (x^3 - x)^2$

e) $f(x) = \sqrt{x^2 - 1}$

f) $f(x) = 1 - \sqrt{x^2}$

2. Are the following functions polynomial? If yes, find the leading coefficient and the constant term.

a) $f(x) = (x^2 - 1)^3$

b) $f(x) = (x^2 - 1)^2 (x + 2)^3$

c) $f(x) = \sqrt{(x^2 + 1)^2}$

d) $f(x) = x(x - 1)(x + 2)(x - 3)$

3. If the y-intercept of the polynomial function $P(x)$ is 3 and the y-intercept of the polynomial function $Q(x)$ is -2, what is the y-intercept of the polynomial function $f(x) = [P(x) - Q^2(x)]^3$?

4. Are the following relations polynomial? If yes, find the degree and the leading coefficient.

a)

x	y
-5	325
-4	176
-3	81
-2	28
-1	5
0	0
1	1
2	-4
3	-27
4	-80
5	-175

b)

x	y
-5	24
-4	15
-3	8
-2	3
-1	0
0	1
1	0
2	3
3	8
4	15
5	24

c)

x	y
-5	-2055
-4	-864
-3	-285
-2	-60
-1	-3
0	0
1	-9
2	-60
3	-255
4	-768
5	-1845

5. Given that the following relation may be modelled by a cubic function $y = f(x)$, find $f(-2)$ and $f(3)$.

x	y
-1	-2
0	0
1	0
2	4

