

## §3.2 (PART 1): DERIVATIVES OF POLYNOMIALS AND EXPONENTIALS

1.] Differentiate the following functions:

a.)  $f(x) = \pi$

b.)  $g(x) = x^7$

c.)  $h(x) = x$

d.)  $k(x) = \sqrt{x}$

2.] Differentiate the following functions, using the correct notation:

a.)  $f(x) = 6x^5 - x$

b.)  $y = 6\sqrt{x} - 4x^3 + 9$

c.)  $f(x) = 4\sqrt{x} - \frac{1}{4}x^4 + x + 1$

d.)  $y = \sqrt{x}(\sqrt{x} - 1)$

e.)  $f(x) = (x^2 + 1)^2$

f.)  $y = (2x + 1)(3x^2 + 2)$

3.] Determine the following limits:

a.)  $\lim_{x \rightarrow 0} \frac{e^x - 1}{x}$

b.)  $\lim_{x \rightarrow 0} \frac{2^x - 1}{x}$

4.] Find the first, second, and tenth derivatives of the following functions:

a.)  $f(x) = 4x^2 - x + 1$

b.)  $g(x) = 3e^x + x^{100} - 3x$

c.)  $h(x) = 4^x + 4^2$

d.)  $k(x) = 3^{2x}$

5.] Find the equation of the tangent line to the curve  $y = -3x^3 + 2x^2 + 10$  at the point  $(2, f(2))$ .