CS 3010
Week # 1

class exercise 1.1

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- Write the two polynomials in horner's nested form.
  - $p(x) = -5 + 3x + 8x^2 - 2x^4$

    $= -5 + x(3 + x(8 + x^2(-2)))$

  - $p(x) = 6(x+2)^3 + 9(x+2)^7 + 3(x+2)^{15} - (x+2)^{31}$

    $\Downarrow \quad z = (x+2)$

    $p(x) = 6z^3 + 9z^7 + 3z^{15} - z^{31}$

    $= 0 + z^3(6 + z^4(9 + z^8(3 + z^{16}(-1))))$

- Calculate the following polynomials using horner's table.
  - $p(x) = x^4 - 4x^3 + 7x^2 - 5x - 2$ at $x = 2$

2	1	-4	7	-5	-2
		2	-4	6	2
	1	-2	3	1	0

$p(2) = 0$

  - $p(x) = 2x^4 + 9x^2 - 16x + 12$ at $x = -6$

-6	2	0	9	-16	12
		-12	72	-486	3012
	2	-12	81	-502	3024

$p(-6) = 3024$

- Calculate $P(2)$ and $P'(2)$ using horner's table.

$$P(x) = 2x^4 - 3x^3 - 5x^2 + 3x + 8$$

2)

2	-3	-5	3	8
	4	2	-6	-6
2	1	-3	-3	2

$P(2) = 2$

2)

2	1	-3	-3
	4	10	14
2	5	7	11

$P'(2) = 11$