1) Calculate each of the following using synthetic division. Express your answer using the statement that could be used to check the division.

a) $x^3 - 7x - 6$ divided by $x - 3$

b) $2x^3 - 7x^2 - 7x + 19$ divided by $x - 1$

c) $6x^4 + 13x^3 - 34x^2 - 47x + 28$ divided by $x + 3$

d) $2x^3 + x^2 - 22x + 20$ divided by $2x - 3$

e) $12x^4 - 56x^3 + 59x^2 + 9x - 18$ divided by $2x + 1$

f) $6x^3 - 15x^2 - 2x + 5$ divided by $2x - 5$

g) $x^3 - 2x + 1$ divided by $x - 4$

h) $x^3 + 2x^2 - 6x + 1$ divided by $x + 2$

2) Divide $x^4 - 16x^3 + 4x^2 + 10x - 11$ by each of the following binomials...

a) $x - 2$

b) $x + 4$

3) Are either of the binomials in question #2 factors of $x^4 - 16x^3 + 4x^2 + 10x - 11$? Explain.

1)a) $x^3 - 7x - 6 = (x - 3)(x^2 + 3x + 2)$ **b)** $2x^3 - 7x^2 - 7x + 19 = (x - 1)(2x^2 - 5x - 12) + 7$

c) $6x^4 + 13x^3 - 34x^2 - 47x + 28 = (x + 3)(6x^3 - 5x^2 - 19x + 10) - 2$

d) $2x^3 + x^2 - 22x + 20 = (2x - 3)(x^2 + 2x - 8) - 4$

e) $12x^4 - 56x^3 + 59x^2 + 9x - 18 = (2x + 1)(6x^3 - 31x^2 + 45x - 18)$ **f)** $6x^3 - 15x^2 - 2x + 5 = (2x - 5)(3x^2 - 1)$

g) $x^3 - 2x + 1 = (x - 4)(x^2 + 4x + 14) + 57$ **h)** $x^3 + 2x^2 - 6x + 1 = (x + 2)(x^2 - 6) + 13$

2)a) $x^4 - 16x^3 + 4x^2 + 10x - 11 = (x - 2)(x^3 - 14x^2 - 24x - 38) - 87$
b) $x^4 - 16x^3 + 4x^2 + 10x - 11 = (x + 4)(x^3 - 20x^2 + 84x - 326) + 1293$

3) No, because for each division problem, there is a remainder.