EMT111 Practice Problems

Factorisation, Synthetic Division, Remainder Theorem

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1. Factor completely.
   (a) $2xy + 4x$ (b) $4y^2 - 9x^2$ (c) $3x^2 + x - 2$ (d) $8x^3 - 27y^3$
   (e) $6x^2y + 3xy + 9xy^2$ (f) $3x^2 + 5xy + 7x + 3xy + 5y^2 + 7y$
   (g) $a^6 - 7a^3 - 8$ (h) $x^4 - x^3y + x - y$ (i) $10x^8y^6 + 25x^2y^4 + 20x^3y^{10}$

2. Use Synthetic Division to find the quotient and remainder when

   (a) $x^2 + 4x + 7$ is divided by $(x + 1)$

   (b) $3x^3 + x^2 - 5$ is divided by $(x - 2)$

   (c) $2x^5 - x^4 + 3x^2 + x - 1$ is divided by $(x - 3)$

3. Find the remainder if

   (a) $x^5 + 4x^2 - 5x + 1$ is divided by $(x - 1)$

   (b) $2x^3 - x^2 + 12x - 7$ is divided by $(x + 2)$

4. Is $(x - 1)$ a factor of $4x^5 - 3x^3 + 2x^2 - 3$?