Fifteenth Set of Homework for Math 05

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Please note: You should fully justify your answers.

1 Solving higher degree equations

1. Solve the following equations:
   (a) $5(3x - 7) = 0$
   (b) $3x(x - 1) = 0$
   (c) $(x - 1)(x + 3)(2x + 5) = 0$
   (d) $2x(3x - 1)(x^2 + 1) = 0$
   (e) $(x + 7)^2(x - 2)(x + 1) = 0$

2. Solve the following equations:
   (a) $x^2 - 7x = 0$
   (b) $x^2 - 64 = 0$
   (c) $3x^3 - 75x = 0$
   (d) $x^2 - x - 6 = 0$
   (e) $x^2 - 12x + 35 = 0$
   (f) $x^2 + 16x + 55 = 0$
   (g) $6x^2 - 5x + 1 = 0$
   (h) $x^2 - 2x - 80 = 0$
   (i) $10x^3 - 29x^2 + 10x = 0$
   (j) $3x^2 + 12 = 0$
   (k) $2x^2 + x - 15 = 0$
   (l) $18x^2 + 29x + 3 = 0$
   (m) $3x^3 + 3x^2 - 6x = 0$
   (n) $x^4 - 81 = 0$
   (o) $x^4 - 5x^2 + 4 = 0$
   (p) $x^4 + 10x^2 + 9 = 0$
   (q) $x^3 - 27 = 0$
   (r) $x^5 - 2x^3 + x^4 - 8x^2 - 8x + 16 = 0$

3. Solve the following equations:
   (a) $x^2 + 4x + 2 = 7$
   (b) $x^3 = 4x$
   (c) $x^2 + 8x + 6 = 3x$
   (d) $2x(x + 11) = 13x + 5$

4. Find a polynomial equation that satisfies the given conditions. Both sides of the equation should be in Simplified Expanded Form.
   (a) has solutions $x = 1$, $x = 0$ and $x = -5$.
   (b) its only real solutions are $x = 3$, $x = \dfrac{3}{2}$ and has degree 3.
   (c) it has solutions $x = \dfrac{1}{2}$, $x = 2$, $x = -\dfrac{2}{3}$ and integer coefficients.