Sample Problems

1. Use the remainder theorem to find the remainder in the division $\left(5x^4 - 8x^3 + 3x^2 - x - 1\right) \div (x - 2)$
2. Solve the equation $x^7 - 17x^5 + 36x^4 - 20x^3 = 0$ given that 2 is a solution of the equation.
3. Solve the equation $x^6 - 2x^5 - 50x^4 + 4x^3 + 97x^2 - 2x - 48 = 0$.

Practice Problems

1. Perform the indicated divisions with remainders:
   a) $132 \div 7$ b) $1145 \div 12$ c) $918 \div 8$ d) $201 \div 12$
2. Use the remainder theorem to find the remainder in each of the following divisions.
   a) $\left(8x^5 - 2x^3 + x + 11\right) \div (x - 1)$
   b) $\left(8x^5 - 2x^3 + x + 11\right) \div (x + 1)$
   c) $\left(x^5 + 3x^4 + 2x^3 - x^2 - 3x - 2\right) \div (x - 2)$
   d) $\left(x^5 + 3x^4 + 2x^3 - x^2 - 3x - 2\right) \div (x + 2)$
3. Solve the each of the given equations.
   a) $x^4 + 7x^3 - 4x^2 - 28x = 0$ given that -2 is a solution
   b) $x^6 + x^5 - 18x^4 - 52x^3 - 40x^2 = 0$ given that 2 is a solution
   c) $x^4 + 8x^3 + 12x^2 - 32x - 64 = 0$ given that -4 is a solution
4. Solve each of the following equations.
   a) $x^6 - 15x^5 + 53x^4 - 21x^3 - 90x^2 = 0$
   b) $x^6 + 7x^5 - 47x^4 - 307x^3 - 394x^2 + 236x + 504 = 0$