Rational Zeros of Polynomial Functions

1. Use the Rational Zero Test to find all possible rational zeros of *f*. $f(x) = 2x^3 + 3x^2 + 4x + 6$

a. $\pm 1, \ \pm 2, \ \pm 3, \ \pm 6, \ \pm\frac{1}{2}, \ \pm\frac{3}{2}$

b. $0, \ \pm 1, \ \pm 2, \ \pm 3, \ \pm\frac{1}{2}, \ \pm\frac{3}{2}$

c. $\pm 2, \ \pm 3, \ \pm 6, \ \pm\frac{1}{2}, \ \pm\frac{3}{2}, \ \pm\frac{7}{2}$

d. $\pm 2, \ \pm 3, \ \pm 6, \ \pm 12, \ \pm\frac{1}{2}, \ \pm\frac{3}{2}$

2. Use long division to divide: $\left(-x^2 - 3x^3 - 5 + 11x\right) \div \left(3x - 2\right)$

a. $-x^2 - x + 4 + \frac{3}{3x-2}$

b. $-x^2 + x - 3 + \frac{1}{3x-2}$

c. $-x^2 + x - 4 + \frac{3}{3x-2}$

d. $-x^2 - x + 3 + \frac{1}{3x-2}$

3. Use long division to divide: $6x^4 - 3x^3 + 5x^2 + 2x - 6$ by $3x^2 - 2$

4. Use synthetic division to divide: $3x^4 - 5x^2 + 6x - 5$ by $x - 3$.

5. Use the Remainder Theorem to find the remainder of $x^{279} - 7x^{14} + 8 \div x - 1$.

6. Use the Factor Theorem to determine if $x - 3$ is a factor of $2x^4 - 4x^3 - 12x - 14$.

7. A 48 cubic inch box has dimensions of x + 2, x – 3 and x – 4. Find the surface area of the box.

8. Find a polynomial f(x) with real coefficients that has: zeros: -1 (multiplicity 3) and 3.

9. Find all real solutions of the polynomial equation: $f(x) = 3x^3 + 4x^2 – 5x – 2$.

10. Find all real solutions of the polynomial equation: $f(x) = 2x^4 – 7x^3 – 8x^2 + 14x + 8$

11. Find all real solutions of the polynomial equation: $f(x) = x^3 + 3x^2 – 16x – 6$.

12. Write the polynomial as a product of exact factors that are irreducible over the:
$f(x) = x^5 - 3x^4 - 2x^3 + 6x^2 - 3x + 9$

a) rational numbers

b) real numbers

c) complex numbers