MATH 117: HW #2

Instructor: Joseph McGuire

Due: 09/25/2020 11:59pm

1

If the polynomial $P(x) = a_n x^n + a_{n-1}x^{n-1} + ... + a_1 x + a_0$ has integer coefficients, then the only numbers that could possible be rational zeros of P are all of the form $\frac{p}{q}$, where p is a factor of____and q is a factor of____. The possible rational zeros of $P(x) = 6x^3 + 5x^2 - 19x - 10$ are____________________________.

2

Find all rational zeros and write out in factored form: $4x^4 - 37x^2 + 9$.

3

Find all rational zeros and write out in factored form: $4x^3 - 7x + 3$.

4

Show that this polynomial has no rational zeros: $3x^3 - x^2 - 6x + 12$.

5 The Depressed Cubic

The most general cubic (third-degree) equation with rational coefficients can be written as $x^3 + ax^2 + bx + c = 0$

5.1

Prove that if we replace x by $X - \frac{a}{3}$ and simplify, we end up with an equation that doesn't have an X^2 term, that is, an equation of the form $X^3 + pX + q = 0$ (p, q are just any constants). This called a depressed cubic, because we have depressed the quadratic term.

5.2

Use the procedure described in part(a) to depress the equation $x^3+6x^2+9x+4 = 0$.