MAC1105 Week 10 Discussion

Module 10: Limits

October 24, 2019

(1) Complete the synthetic division, and then rewrite the expression to remove the fraction:

(a) $\dfrac{3x^3+7x^2-x}{x+1}$

Answer: $3x^3+7x^2-x=(3x^2+4x-5)(x+1)+5$

(b) $\dfrac{15x^3+7x^2+16x+10}{3x+2}$

Answer: $15x^3+7x^2+16x+10=(5x^2-x+6)(3x+2)-2$

(2) (a) Determine the possible rational roots of the following: $2x^2-10x+17$

Answer: ± 1, ± 17, $\pm\frac{1}{2}$, $\pm\frac{17}{2}$

What are the actual roots of this function?

Answer: $\dfrac{5\pm 3i}{2}$

(b) Determine the possible rational roots of the following: $6x^3-15x^2+7x+27$

Answer: ± 1, $\pm\frac{1}{2}$, $\pm\frac{1}{3}$, $\pm\frac{1}{6}$, ± 3, ± 9, $\pm\frac{9}{2}$, $\pm\frac{3}{2}$, ± 27, $\pm\frac{27}{2}$

(3) Factor the following. (*Hint*: first find the possible rational roots, then use synthetic division)

(a) $f(x)=x^3-6x^2+9x-4$

Answer: $(x-1)^2(x-4)$

(b) $f(x)=2x^4-5x^3-28x^2+87x-36$

Answer: $(x+4)(2x-1)(x-3)^2$