

IM3H Module 1 Quiz 2 Review

1. Sketch a graph of the polynomial: $f(x) = 2x^4 - 3x^3 - 9x^2 - x + 3$, given that $(x^2 - 2x - 3)$ is a factor.

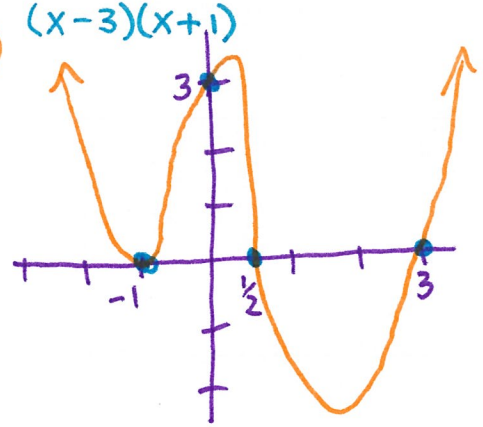
$$\begin{array}{r} 2x^2 + x - 1 \\ x^2 - 2x - 3 \overline{) 2x^4 - 3x^3 - 9x^2 - x + 3} \\ \underline{-(2x^4 - 4x^3 - 6x^2)} \\ 1x^3 - 3x^2 - x \\ \underline{-(x^3 - 2x^2 - 3x)} \\ -1x^2 + 2x + 3 \\ \underline{-(-1x^2 + 2x + 3)} \\ 0 \end{array}$$

$$(2x^2 + x - 1)(x - 3)(x + 1)$$

$$(2x - 1)(x + 1)(x - 3)$$

$$x = \frac{1}{2} \quad x = -1 \quad x = 3$$

$$m = 1 \quad m = 2 \quad m = 1$$



2. Sketch a graph of the polynomial: $g(x) = 2x^5 - 5x^4 - 33x^3 + 158x^2 - 236x + 120$, given that $x = 2$, is a root with multiplicity of 3 $\rightarrow (x - 2)^3 = x^3 - 6x^2 + 12x - 8$

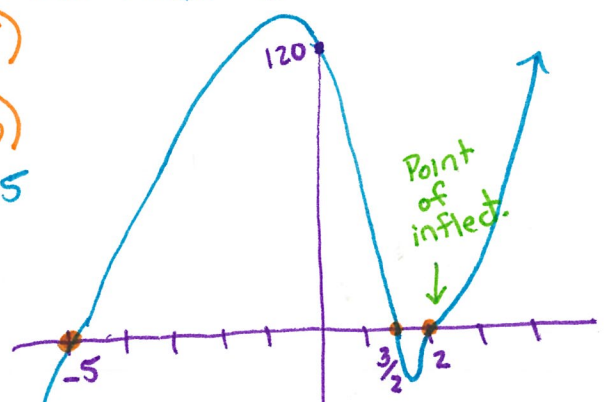
x^3	$2x^5$	$7x^4$	$-15x^3$
$-6x^2$	$-12x^4$	$-42x^3$	$90x^2$
$12x$	$24x^3$	$84x^2$	$180x$
-8	$-16x^2$	$-56x$	120

$$(x - 2)^3(2x^2 + 7x - 15)$$

$$(x - 2)^3(2x - 3)(x + 5)$$

$$x = 2 \quad x = \frac{3}{2} \quad x = -5$$

$$m = 3$$



3. Expand: $(2x - 3)^5$

$$\begin{array}{r} 1 \\ 11 \\ 121 \\ 1331 \\ 14641 \\ 15101051 \end{array}$$

$$= 1(2x)^5 + 5(2x)^4(-3) + 10(2x)^3(-3)^2 + 10(2x)^2(-3)^3 + 5(2x)(-3)^4 + 1(-3)^5$$

$$= 32x^5 - 240x^4 + 720x^3 - 1,080x^2 + 810x - 243$$

4. Find the fifth term: $(3x + 5)^7$

$$nC_r \cdot a^{n-r} \cdot b^r$$

term # - 1

$${}^7C_4 \cdot (3x)^{7-4} \cdot (5)^4$$

$$= 35 \cdot 27x^3 \cdot 625 = \boxed{590,625x^3}$$

5. Factor the following

a. $48 - 3x^4 = 3(16 - x^4) = 3(4 - x^2)(4 + x^2) = \boxed{3(2 - x)(2 + x)(4 + x^2)}$

b. $8x^6 - 343y^{15} = \boxed{(2x^2 - 7y^5)(4x^4 + 14x^2y^5 + 49y^{10})}$

c. $9x^4 - 15x^3 - 12x^2 + 20x = x(9x^3 - 15x^2 - 12x + 20) = x(3x^2(3x - 5) - 4(3x - 5)) = \boxed{x(3x - 5)(3x^2 - 4)}$

d. $6x^4 - 7x^2 - 24 \rightarrow \boxed{(3x^2 - 8)(2x^2 + 3)}$