MHF 4U1- AM Name : Yusuf Ali Jaffer Date: Sept 27 2012

Chapter 1: Polynomials Test

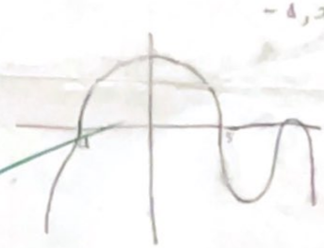
Total: 24.25 /30

1. The function $f(x) = -(x-5)^3(x-9)^2(x+4)$ is negative in what intervals.

(2)

$\hookrightarrow (-)$ Deg = 6

-4, 9, 5



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Intervals : $(-x, -4)$, $(5, 9)$, $(9, x)$

Let x be x to infinity.

2. Given the function, $f(x) = x^2(-3x+2)^2(-x-1)^3$.

a) Determine the first term: $-9x^7$ 0.75/1

b) Determine the end behavior of $f(x)$.

(2)

$x \to$ ∞, $f(x) \to$ $-\infty$

$x \to$ $-\infty$, $f(x) \to$ ∞ 0.5/1

+

3. Estimate the slope of the tangent to $f(x) = x^3 + 2x - 1$ when x = 2.

Approach the value of x=2 from both directions, left and right.

(3)

2

Points	Approximate Slope of tangent
From left (1.9999, 10.9986) f(1.9999) (2, 11) $\frac{11 - 10.9986}{2 - 1.9999} \to \frac{0.0014}{0.0001} \approx 14$	Slope
From right (2,11) (2.0001, 11.0014) AROC : $\frac{y_2 - y_1}{x_2 - x_1} \to \frac{11.0014 - 11}{2.0001 - 2} \to \frac{.001}{.0001} \approx 10$ Do not round!	Slope is 10 here 14

AVG Slope : $\left(\frac{14+10}{2}\right)$

The slope of the tangent is 12

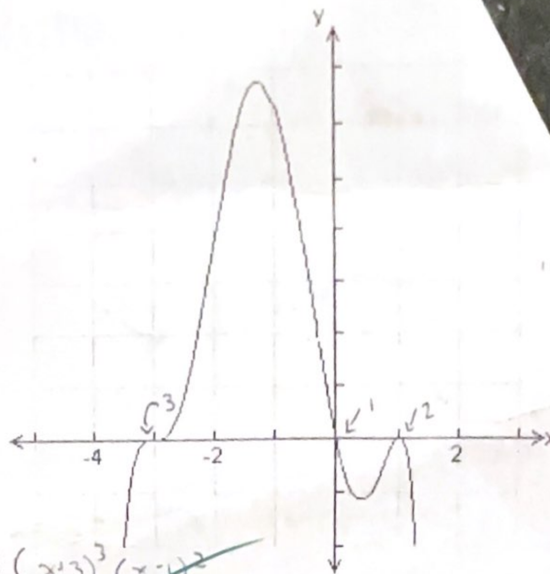
x 14.

AVG = 12

Assuming AVG AROC is the method being requested

5.25

. Determine the equation of this polynomial function in factored form, if $f(-4) = -75$



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Zero = -3, 0, 1

Deg = 6

LC = (-)

Thus... $f(x) = -x(x+3)^3(x-1)^2$

find a

$f(x) = -ax(x+3)^3(x-1)^2$

$-75 = -a(-4)(-4+3)^3(-4-1)^2$

$-75 = 4a(-1)(25)$

$-75 = 100a$

$-0.75 = a$

$f(x) = -0.75x(x+3)^3(x-1)^2$ is the equation of the graph

5. The table represents a polynomial function of degree 3.
Determine the equation of this function in the form, $f(x) = ax^3 + bx^2 + cx + d$.

x	f(x)
-2	26
-1	2
0	-2
1	-4
2	-22

-24, -4, -2, -18

20, 2, -16

-18, -18

(4)

2

Parent:

1,1

0,0

1,1

$\boxed{2,8}$

2,-22

Diff = LC·d!

$\frac{d}{0!}$ = LC

$\frac{-18}{3!}$ = LC

-3 = LC

needed = LC

$y = -3x^3 + bx^2 + cx + (-2)$

$y = -3x^3 + (-2)$

$f(x) = -3x^3 + (-2)$

The equation is $f(x) = -3x^3 - 2$

(7.)

Something is missing

5

ma noticed that the graph of the function, $f(x) = ax^b - cx$ is symmetrical with respect to the gin. Can it have turning points? If so, does it have an even or odd number of turning points? Explain using an example.

(2) This function Could have turning Points, however it would need to have an even number of turning Points for this to be the case.

This is point Symmetry with turning ~~Points~~

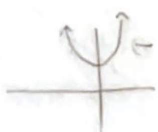
2

7. $f(x)$ is a polynomial function of degree n, where n is a positive even integer.
Is the following statement true or false? Give an example that illustrates your answer.

(2) Statement: $f(x)$ will have at least one zero.

$f(x) = ax^n$ ← even

2 This Statement is false, $f(x)$ may be translated down, Since exponent is even no zeros are a positive scenario



← x^4, not having any Zero Since it is modified by a +4 Vertical translation

Graphing time!!!

8. Given the function: $f(x) = -\frac{1}{2}\left(\frac{1}{2}x + 3\right)^4$,

$\left[\frac{1}{2}(x+6)\right]^4$ $3 \div \frac{1}{2}$ 6

a) State the transformations.

- Reflection in x-axis
- Horizontal Stretch by a Factor of 2
- Horizontal translation 6 left
- Vertical Stretch by Factor of ½

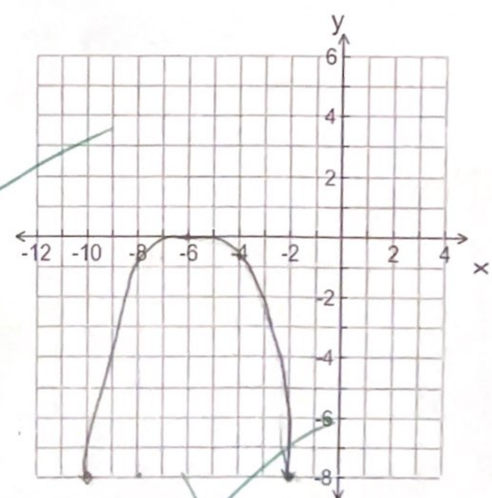
(4) 4

b) Sketch the graph using mapping rule. Graph 5 points.

$(x, y) \rightarrow$ $(2x-6, -\frac{y}{2})$

$(2,16) \rightarrow (-2,-8)$
$(1,1) \rightarrow (-4,-\frac{1}{2})$
$(0,0) \rightarrow (-6,0)$
$(-1,-1) \rightarrow (-8,\frac{1}{2})$
$(-2,-16) \rightarrow (-10,-8)$

x^4 parent
$(1,1)$
$(0,0)$
$(-1,1)$
$(-2,16)$
$(2,16)$



derived from other Side

Something is off here as well...

8

9. Graph the polynomial function, $f(x) = (x+4)^3(2x^2 - 3x - 14)(4x^2 - 4x + 1)$. Include 3 test points.

$F(x) = (x+4)^3 (x+2)^1 (2x-7)^1 (2x-1)^2$

$\to -4$ $\quad \to -2$ $\quad \to (3.5)$ $\quad \to (\frac{1}{2})$

Deg = 7

LC = (+)

$2x^2 - 3x - 14$

$2x^2 - 7x + 4x$

$x(2x-7) + 2(x-7)$

$(x+2)(2x-7)$

$4x^2 - 4x + 1$

$4x^2 - 2x - 2x + 1$

$2x(2x-1) - (2x-1)$

$(2x-1)^2$

(5)

5

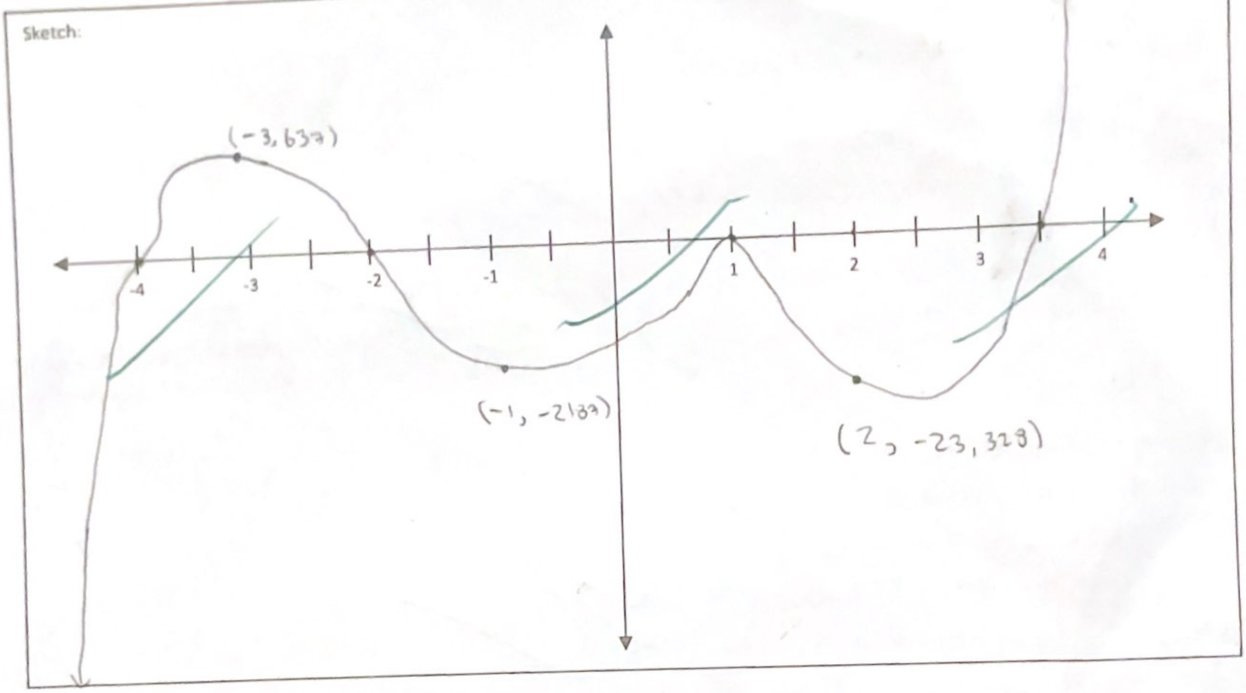
Test Points:

$-3 \to (-3+4)^3(-3+2)(-6-7)(-7)^2 \to 637$

$-1 \to (-1+4)^3(-1+2)(-2-7)(-3)^2 \to -2187$

$2 \to (2+4)^3(4)(4-7)(4-1)^2 \to -23{,}328$

Sketch:



10. The function $f(x) = x(x+1)(x-2)$ is

- reflected in the x-axis $\to (-)$
- horizontally stretched by a factor of 2 and $\frac{1}{2}$
- translated 3 units to the right

state the equation of the new function in full factored form, $f(x) = a(x-r)(x-s)(x-t)$ and determine its zeros.

(3)

1

3 right = -3

$x = -1, \to x = 2$

$x = 2, \to x = 5$

Not quite.

reflection $F(x) = -x(x+1)(x-2)$

3 right $F(x) = -x(x-2)(x-5)$

horizontal $F(x) = -(\frac{x}{2})(\frac{1}{2}(x-2))(\frac{1}{2}(x-5))$

$F(x) = (x-3)(x-2)(x-5)$

$F(x) = -(x-3)(x-2)(x-5)$

$F(x) = -$

OK

Zeros: $x = 1$, $x = \frac{5}{2}$