(82) 87%

MHF-4U **QUIZ#6** (Application) [redacted]

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1. Find the quotient (answer) and the remainder for $2x^4 - 13x^3 + 21x - 11 \div 2x^2 - 3x + 1$
Show work.

(4)

$2x^2-3x+1$ | $2x^4-13x^3+0x^2+21x-11$

x^2-5x-8

$2x^4-3x^3+x^2$

$-10x^3-x^2+21x$

$-10x^3+15x^2-5x$

$-16x^2+26x-11$

$-16x^2+24x-8$

$2x-3$

The quotient is x^2-5x-8

Remainder is $2x-3$

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1. # 3 continued

Sub in numbers to get 0 in

$x^3-x^2+21x+45$

$f(-3)=0$, $x+3$ is a factor

Divide $-x^3-x^2+21x+45 \div x+3$

$=-x^2+2x+15$

$-(x^2-2x-15)$ → factor this simple trinomial (take out the − sign)

2, # 3 continued

$-(x^2-2x-15) \rightarrow -(x-5)(x+3)(x+3)(x-2)$

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

2. Find only the remainder when $2x^3 + 3x^2 - 65x + 84$ is divided by

(5)

a) $x+2$

$f(-2)=2(-2)^3+3(-2)^2-65(-2)+84$

$=2(-8)+3(4)+130+84$

$R=210$

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b) $2x-3$

$2x=3$

$x=\frac{3}{2}$

$f(1.5)=2(1.5)^3+3(1.5)^2-65(1.5)+84$

$=6.75+6.75-97.5+84$

$R=0$

c) Which binomial is a factor of the polynomial a) or b). b) because remainder is 0

(If you have a − leading coefficient, you should have a − in front of bracket)

3. Sketch a graph of the function $f(x) = -x^4 + x^3 + 23x^2 + 3x - 90$. Find the zeros and label x and y-intercepts. **Sketch the graph on the next page.**

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$f(1)=1+1+23+3-90=-62$

$f(-1)=-(-1)^4+(-1)^3+23(-1)^2+3(-1)-90$

$=-1+(-1)+23-3-90$

$=-72$

grouping 2+2 only works when you get 2 brackets the same (See #4c)

The numbers you try have to divide into 90

$f(2)=-(2)^4+(2)^3+23(2)^2+3(2)-90=0$

$\therefore (x-2)$ is a factor

2	−1	1	23	3	−90
		−2	−2	42	90
	−1	−1	21	45	0

$(x-2)(-x^3-x^2+21x+45)$ ← new factor

after this step, start guessing again with this new factor

$=(x-2)(-x^2(x+1)+3(7x+15))$

$=(x-2)(-x^2+3)(x+1)(7x+15)$

$=-(x^2-3)(x-2)(x+1)(7x+15)$

you can try the same numbers again if there are 2 of the same brackets

Zeroes

$x^2-3=0$ $x-2=0$ $x+1=0$ $7x+15=0$

$x=\pm 1.73$ $x=2$ $x=-1$ $x=-\frac{15}{7}$

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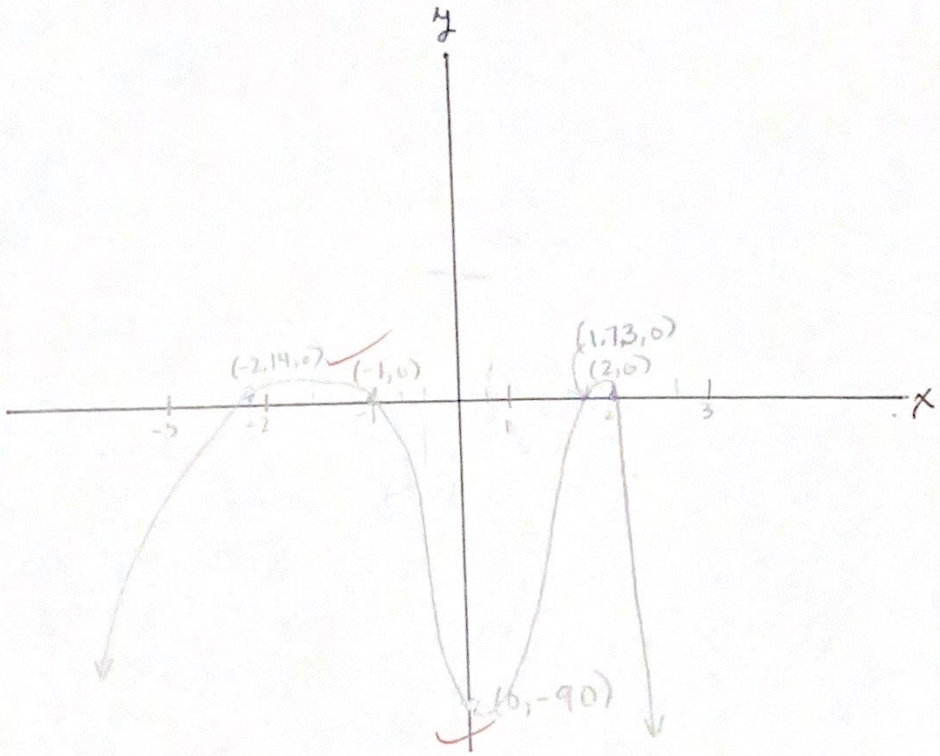
Y Int. → $f(0)=-90$

3.

(3)



2

4. Factor fully.

$a^3-b^3=(a-b)(a^2+ab+b^2)$

$a^3+b^3=(a+b)(a^2-ab+b^2)$

a) $8x^3 + 125y^3$

(2) $a=2x \quad b=5y$

$(2x+5y)(4x^2-(2x)(5y)+25y^2)$

$=(2x+5y)(4x^2-10xy+25y^2)$

b) $(x+2)^3 - 64$

(3) $a=x+2 \quad b=4$

$=((x+2)-4)((x+2)^2+(x+2)(4)+16)$

$=(x+2)(x^2+4x+4+4x+8+16)$

$=(x-2)(x^2+8x+28)$

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c) $x^5 - 5x^4 - 16x + 80$

(4) $=x^4(x-5)-16(x-5)$

$=(x^4-16)(x-5)$

$=(x^2-4)(x^2+4)(x-5)$

$=(x-2)(x+2)(x^2+4)(x-5)$

4

d) $x^6 - 729$

(3) $a=x^2 \quad b=9$

$a^3-b^3=(a-b)(a^2+ab+b^2)$

$=(x^2-9)(x^4+9x^2+81)$

$=(x-3)(x+3)(x^4+9x^2+81)$

3

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