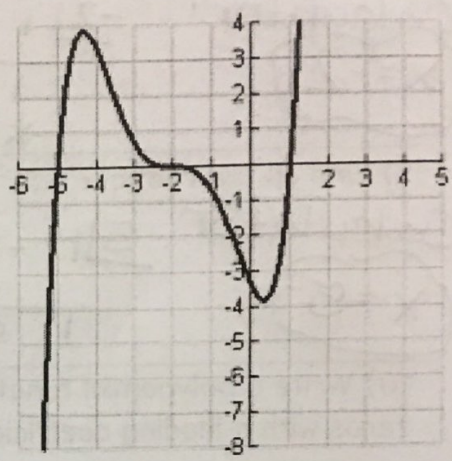
Unit . Review

1) List the roots (with multiplicities) of the polynomial graphed to the right.

$X=-5 \quad X=-2 \text{M} 3 \quad X=1$



Write the polynomial in factored form.

$f(x)=(x+5)(x+3)^3(x-1)$

State the degree:

5^{th}

State the end behavior:

$x \to -\infty \quad x \to +\infty$

$f(x) \to -\infty \quad f(x) \to +\infty$

Relative Max:

$(-4.2, 4)$

Relative Min:

$(\frac{1}{2}, -4)$

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2) Find the factors and then solve $x^3 - 64 = 0$

$x = -2 \pm 2i\sqrt{3}$ $= \frac{-4 \pm \sqrt{-48}}{2} = \frac{-4 \pm 4i\sqrt{3}}{2}$

$x = 4$

Factored form: $f(x) =$

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

Solve:

$x = \frac{-4 \pm \sqrt{16-4(1)(16)}}{2}$

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3) Simplify: $(3x^3+10+2x^2)-(6x^3-3x+23)$.

$3x^3 + 2x^2 + 10 - 6x^3 + 3x - 23 = -3x^3 + 2x^2 + 3x - 13$

Then name the polynomial by degree and the number of terms.

3^{rd} deg 4 terms

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4) Write the equation of a polynomial with zeros -4 and 3i in factored form and in standard form.

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

$f(x) = x^3 + 4x^2 + 9x + 36$

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5) Factor: $2x^2 - 19x + 24$

$(x-8)(2x-3)$

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6) Factor: $16x^2 - 25 = (4x+5)(4x-5)$

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7) Find all the zeros: $f(x) = x^3 + 4x^2 + 4x = x(x^2+4x+4)$

$x(x+2)(x+2)$

$x = 0 \quad x = -2 \text{M} 2$

8) Find all the solutions: $f(x)=x^3-3x^2-3x+14$

Calculator: $-2 \mid 1 \;\; -3 \;\; -3 \;\; 14$ / $\quad\;\; -2 \;\; 10 \;\; -14$ / $1 \;\; -5 \;\; 7 \;\; 0$

$x=-2$

$x^2-5x+7=0$

$x=\frac{5\pm\sqrt{25-4(1)(7)}}{2}$

$x=\frac{5\pm i\sqrt{3}}{2}$

9) Find all the roots: $x^3-5x^2+5x-25=0$

Calculator: $5 \mid 1 \;\; -5 \;\; 5 \;\; -25$ / $\quad\;\; 5 \;\; 0 \;\; 25$ / $1 \;\; 0 \;\; 5 \;\; 0$

$x=5$

$x^2+5=0$

$x=\pm i\sqrt{5}$

10) Write a polynomial function f(x) of least degree that has real coefficients and 3, 2 and -5 as zeros with a leading coefficient of -1.

$x=3 \quad x=2 \quad x=-5$

$f(x)=-1(x-3)(x-2)(x+5)$

11) Find a polynomial function in standard form that has zeros −2 and $1+2i$

$x=-2 \quad x=1+2i \quad x=1-2i$

$f(x)=(x+2)(x-1-2i)(x-1+2i)$

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

$=x^3-2x^2+5x+2x^2-4x+10$

$f(x)=x^3+x+10$

Name: _____ Review Math 3 Honors

Perform the indicated operations:

1.) $2(3a^2 + a - 6) + (-a - a^2 + 1)$

2.) $(5a^3 - 4a^2 - a) - 3(a + 6 - 2a^2)$

3.) $\frac{5}{9i}$

4.) $3i\,(2 + i)(3 - 4i)$

4a) $\frac{4+3i}{2i}$

4b) $2i^{84} - 2i^{107}$

Solve for real and complex roots – state multiplicity

5.) $x^3 - 9x^2 + 20x = 0$

6.) $(x^2 + 9)^4(x^2 - 5) = 0$

Fri

7.) $3x^2(x + 12)^2(x - 5) = 0$

8.) $x^4 + 9x^2 + 20 = 0$

already done part 1

9.) $8x^3 - 125 = 0$

10.) $-3x^2 + 10 = 91$

11) $(2x + 3)^2 = -12$

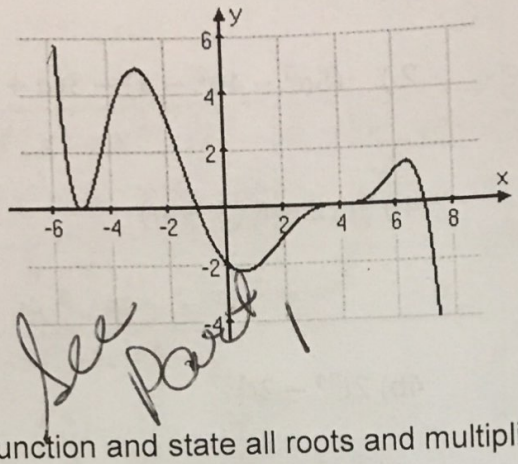
12) $2x^2 - x = 3$

13) $4x^2 = 25$

14) $3x^2 - 8x = -2$

Given:

15.)



Roots & multiplicity if any:

Domain (interval notation)

Maximun:

End behavior:

write in terms of its linear factors:

Range (interval notation)

Increasing:

minimun:

see part 1

sketch the graph the function and state all roots and multiplicity

16) $y = (x-3)^2(x+5)^3(x-1)$

I drew part 1

17) $y = -(x-7)(x+2)^2(x-1)^3(x+5)$

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

Given the roots of a polynomials function write the function is standard form.MUST SHOW WORK!

19.) x = -1 with multiplicity of 3

$f(x) = (x+1)^3$

$f(x) = (x+1)(x+1)(x+1)$

$f(x) = (x+1)(x^2+2x+1)$

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

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

20.) a.) x = 7 and x = -2*i*

$a) f(x) = (x-7)(x+2i)(x-2i)$

$= (x-7)(x^2+4)$

$f(x) = x^3 + 4x - 7x^2 - 28$

b.) x = -8 and x = 1 + 9i

$f(x) = (x+8)(x-1-9i)(x-1+9i)$

$= (x+8)(x^2-2x+82)$

$f(x) = x^3 - 2x^2 + 82x + 8x^2 - 16x + 656$

$f(x) = x^3 + 6x^2 - 16x + 738$

21.) Given: $f(x) = x^4 + 2x^3 + 5x^2 + 8x + 4$ with a root of x = -1 with a multiplicity of two, find the remaining solutions: !

-1	1	2	5	8	4
		-1	-1	-4	-4
-1	1	1	4	4	0
		-1	0	-4	
	1	0	4	0	

$x^2 + 4 = 0$

$x = \pm 2i$

22.) **Is f(1) a factor of :** SHOW YOUR WORK

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

$f(1) = 6(x$ $x=1$ | 6 0 -2 2 -9
6 6 4 6
6 6 4 6 -3 no remainder not zero

23.) One factor of $x^3 + 3x^2 + x + 3$ *is* $(x + 3)$, factor completely:

$x=-3$ | 1 3 1 3
-3 0 -3
1 0 1 0

$f(x) = (x+i)(x-i)(x+3)$

$x^2+1=0$

$x=\pm i$

24.) Divide using long division: $(3x^4 + 2x^3 - 8x - 48) by (x^2 - 4)$

$3x^2 + 2x + 12$
$x^2-4 \overline{)3x^4 + 2x^3 + 0x^2 - 8x - 48}$
$-3x^4 \quad -12x^2$
$2x^3 + 12x^2 - 8x - 48$
$-2x^3 \quad +8x$
$12x^2 - 48$
$12x^2 - 48$
0

25) If x = 2i is a root to the polynomial f(x) = $2x^3 - 3x^2 + 8x - 12$, find the remaining roots

$x=-2i$

$(x+2i)(x-2i)$

x^2+4

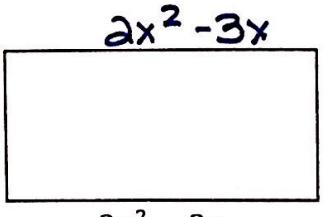
$2x - 3$
$x^2+4 \overline{)2x^3 - 3x^2 + 8x - 12}$
$-2x^3 \quad +8x$
$-3x^2 - 12$
$-3x^2 - 12$
0

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

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

$x=\pm 2i \quad x=3/2$

26) Perimeter is $26x^2 - 12x + 4$, find the length of the missing side?



$26x^2 - 12x + 4 - (4x^2 - 6x)$

$26x^2 - 12x + 4 - 4x^2 + 6x$

$22x^2 - 6x - 4$

each side

$11x^2 - 3x - 2$

$4x^2 - 6x$