Academic Algebra II
2.7-2.8 Review

Show All Work

Name Key
Date

Find all the zeros of the polynomial function.

1. $f(x) = x^4 + 4x^3 - 6x^2 - 36x - 27$

① $\frac{c}{LC} = \pm 1, \pm 3, \pm 9, \pm 27$

② Real zeros: $-3, -1, 3$

③④

-3	1	4	-6	-36	-27
	↓	-3	-3	$+27$	27
-1	1	1	-9	-9	0
	↓	-1	0	9	
3	1	0	-9	0	
	↓	3	9		
	1	3	0		

⑤ $x+3=0$

$x=-3$

⑥ All zeros: $x=-3$ (d.r.), $-1, 3$

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

① $\frac{c}{LC} = \pm 1, \pm 7$

② Real zeros: 1

③④

1	1	2	4	-7
	↓	1	3	7
	1	3	7	0

⑤ $x^2+3x+7=0$

Quad. Form $x = \frac{-3 \pm \sqrt{(3)^2-4(1)(7)}}{2(1)} = \frac{-3 \pm \sqrt{9-28}}{2}$

$a=1$
$b=3$
$c=7$

$= \frac{-3 \pm \sqrt{-19}}{2} = \frac{-3 \pm i\sqrt{19}}{2}$

⑥ All zeros: $x = 1, \frac{-3+i\sqrt{19}}{2}$

Write a polynomial function *f* of least degree that has rational coefficients, a leading coefficient of 1, and the given zeros.

imaginary zeros come in pairs

3. $-7, -4$

$(x+8)(x+4)$ FOIL!

$x^2+4x+8x+32$

$f(x) = x^2+12x+32$

4. $4, i, -i$

$(x-4)(x-i)(x+i)$

$(x-4)(x^2+ix-ix-i^2)$

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

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

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

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

5. $-5, 0, -2i, +2i$

$(x+5)(x)(x+2i)(x-2i)$

$(x+5)(x)(x^2-2ix+2ix-4i^2)$

$(x+5)(x)(x^2-4(-1))$

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

$x^4+4x^2+5x^3+20x$

$f(x) = x^4+5x^3+4x^2+20x$

Determine the possible numbers of positive real zeros, negative real zeros, and imaginary zeros for the function.

6. $h(x) = x^3 - 4x^2 + 5x + 9$

3 total zeros

1 2

$h(-x) = -x^3 - 4x^2 - 5x + 9$

1

Pos	Neg	Imag
2	1	0
or		or
0		2

7. $f(x) = x^5 - 6x^4 - 3x^3 + 7x^2 - 8x + 1$

5 total zeros

1 2 3 4

$f(-x) = -x^5 - 6x^4 + 3x^3 + 7x^2 + 8x + 1$

Pos	Neg	Imag
4	1	0
or		or
2		2
or		or
0		4

Use a graphing calculator to graph the function. Then use the *zero* (or *root* feature to approximate the real zeros of the function.

8. $g(x) = x^4 + 3x^2 - 2$

$x = -.75, .75$

9. $h(x) = x^5 + 12x^3 - 4x^2 + 16x + 25$

$x = -.86$

Use a graphing calculator to graph the function. Identify the *x*-intercepts and points where local maximums or local minimums occur.

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

x-int: $-.34, 1.43, 2.1$

local max: $(.7, 2.44)$

local min: $(1.83, -1.55)$

11. $g(x) = 3x^3 - 6x + x^4$

x-int: $0, 1.2$

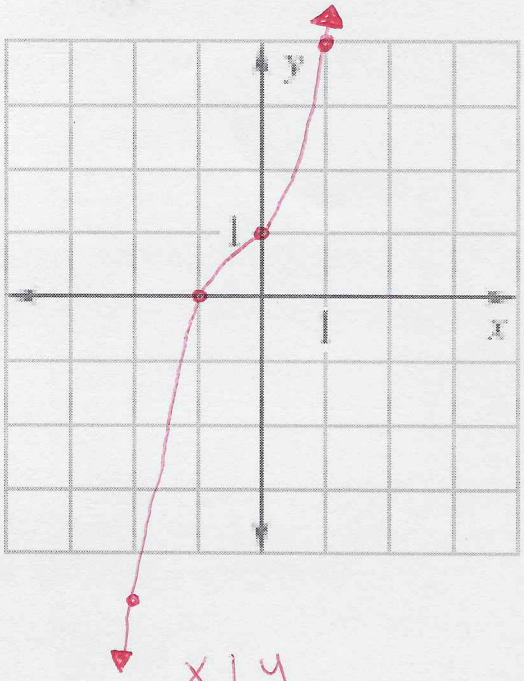
local max: $(-1.19, 4.09)$

local min: $(-1.77, 3.8)$

$(.71, -2.93)$

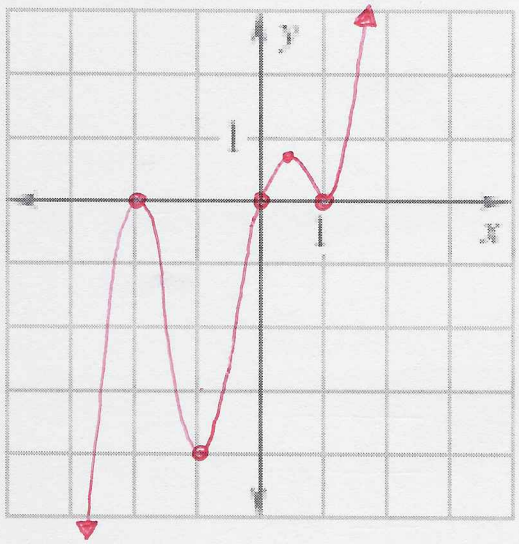
Graph the function.

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



x	y
-2	-5
-1	0
0	1
1	4

13. $g(x) = x(x + 2)^2(x - 1)^2$



x	y
-2	0
-1	-4
0	0
1	0

local Min. : (-1, -4)

local max : (.4, .8)