HALG2 Review for 6.7-6.8 Quiz

Name: Key

List all possible rational zeros for each polynomial function.

1) $f(x) = x^4 - 3x^3 - 7x^2 - 27x - 18$

$\pm 1, \pm 2, \pm 3, \pm 6, \pm 9, \pm 18$

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

$\pm \frac{5}{2}, \pm 5, \pm \frac{1}{2}, \pm 1$

p: $\pm 5 \pm 1$
q: $\pm 2 \pm 1$

Make a Descartes chart detailing the possible number and type(s) of zeros that may exist for this function:

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

TOT =	POS +	NEG +	i
8	3	3	2
8	1	3	4
8	3	1	4
8	1	1	6

4) Find all the zeros for this function:

$f(x) = x^3 - 7x^2 + 16x - 10$

p: $\pm 1, \pm 2, \pm 5, \pm 10$
q: ± 1

p/q	1	-7	16	-10
1	1	-6	10	0

$x^2 - 6x + 10 = 0$

$\frac{6 \pm \sqrt{36 - 4(1)(10)}}{2}$

$\frac{6 \pm \sqrt{-4}}{2}$

$\frac{6 \pm 2i}{2}$

$1, 3+i, 3-i$

5) Given $x + 5$ is a factor of the following function, find the remaining factors:

$f(x)\ 3x^3 + 20x^2 + 23x - 10$ $\quad (x+2)(3x-1)$

-5	3	20	23	-10
		-15	-25	10
	3	5	-2	0

$3x^2 + 5x - 2$

6) Apply the Remainder Theorem/Synthetic substitution to find f(-2) if $f(x) = x^3 + 4x^2 - 3x + 2$

-2	1	4	-3	2
		-2	-4	14
	1	2	-7	16

16

7) Is $(y + 2)$ a factor of $6y^3 + 13y^2 - 10y - 24$? Support your position algebraically & explain your Position with a complete sentence.

-2	6	13	-10	-24
		-12	-2	24
	6	1	-12	0

yes; $y+2$ is a factor because when the polynomial is divided by $y+2$ the remainder is zero.

Solve each & describe the appearance of each graph:

8) $x^2 - 10x + 25 = 0$

$(x-5)^2 = 0$

$x = 5$ (mult. 2)

upward opening parabola touching but not crossing x-axis at $x = 5$!

9) $x^3 + 16x = 0$

$x(x^2 + 16) = 0$

$x = 0 \quad x^2 = -16$

$x = \pm 4i$

sort of up: cuts thru x-axis @ origin; left and ↓

10) The zeros of a cubic polynomial P(x) are -3, 2, & 4. Also, P(0) = 72. Write P(x) in standard form.

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

$72 = a(0+3)(0-2)(0-4)$

$72 = 24a$

$3 = a$

$P(x) = 3(x+3)(x-2)(x-4)$

$3x^3 - 9x^2 - 30x + 72$

11) Use graphing, synthetic division, factoring, or whatever technique necessary to find all the roots of the function:

$Q(x) = x^3 + 2x^2 + 4x + 8$

$-2, 2i, -2i$

$-2 \mid 1 \;\; 2 \;\; 4 \;\; 8$

$\quad\quad -2 \;\; 0 \;\; -8$

$1 \;\; 0 \;\; 4$

$x^2 + 4 = 0$

$x^2 = -4$

$x = \pm 2i$

12) Write in standard form the least degree polynomial function with integral coefficients having zeros that include -3, 1, & -3i. $P(x) = x^4 + 2x^3 + 6x^2 + 18x - 27$

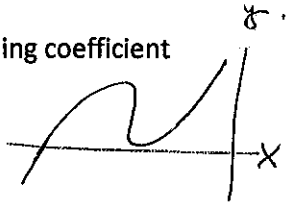
$(x+3)(x-1)(x+3i)(x-3i)$

$(x^2 + 2x - 3)(x^2 + 9)$

13) Describe the graph of a polynomial function with the given characteristics:

a) 1 real zero w/odd multiplicity, 2 imaginary zeros & a positive leading coefficient

left ↓ right ↑
cuts thru x-axis @ real zero



b) 1 positive real zero w/multiplicity of two & a negative leading coefficient

downward opening parabola that only touches x-axis @ pos real zero

c) 4 real zeros w/odd multiplicity & positive leading coefficient

"W" shaped graph cutting thru x-axis @ each of 4 real zeros.