Rational Root Theorem Day 2 HW Name _____

For each problem:

a) List the possible rational roots (p's/q's)
b) Factor completely (hint: Use synthetic to get you started!)
c) List all real zeros
d) Graph making note of the x-intercept(s) and y-intercept

1. $s(x) = x^3 + 4x^2 + 5x + 2$

2. $b(x) = 5x^3 + 29x^2 + 19x - 5$

3. $c(x) = x^4 - 12x^3 + 42x^2 - 52x + 21$

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Name Solns

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1. $s(x) = x^3 + 4x^2 + 5x + 2$

(a) $\pm 1 \quad \pm 2$

$\pm 1 \mid \pm 1 \quad \pm 2$

(b) $-1 \mid 1 \quad 4 \quad 5 \quad 2$

$\quad\quad -1 \quad -3 \quad -2$

$\quad 1 \quad 3 \quad 2 \quad 0$ ✓

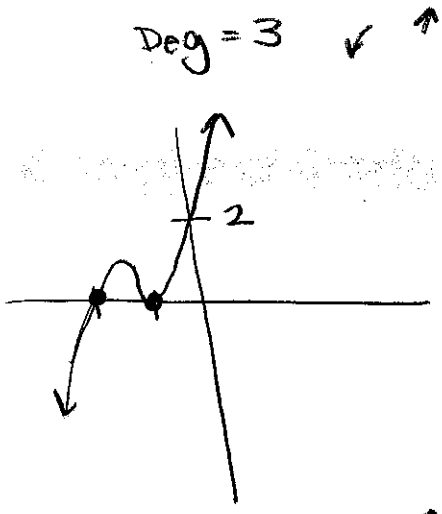
$(x+1)(x^2+3x+2)$

$(x+1)(x+2)(x+1)$

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

(c) $x = -2, -1^*$

(d)



2. $b(x) = 5x^3 + 29x^2 + 19x - 5$

(a) $\pm 1 \quad \pm 5$

$\pm 1 \mid \pm 1 \quad \pm 5$

$\pm 5 \mid \pm 1/5 \quad \pm 5/5 = 1$

(b) $-1 \mid 5 \quad 29 \quad 19 \quad -5$

$\quad\quad -5 \quad -24 \quad 5$

$\quad 5 \quad 24 \quad -5 \quad 0$ ✓

$(x+1)(5x^2+24x-5)$

$(x+1)(x+5)(5x-1)$

MFDC

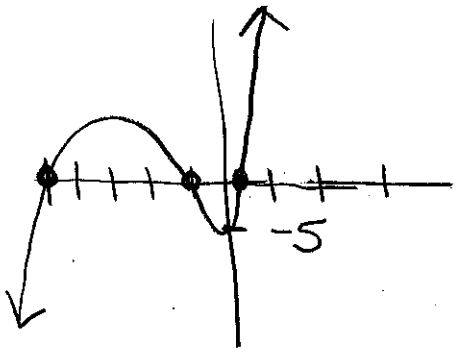
$x^2+24x-25$

$(x+\frac{25}{5})(x-\frac{1}{5})$

$(x+5)(5x-1)$

(c) $x = -1, -5, 1/5$

(d) deg = 3



3. $c(x) = x^4 - 12x^3 + 42x^2 - 52x + 21$

(a) $\pm 1 \quad \pm 3 \quad \pm 7 \quad \pm 21$

$\pm 1 \mid \pm 1 \quad \pm 3 \quad \pm 7 \quad \pm 21$

(b) $1 \mid 1 \quad -12 \quad 42 \quad -52 \quad 21$

$\quad\quad 1 \quad -11 \quad 31 \quad -21$

$\quad 1 \quad -11 \quad 31 \quad -21 \quad 0$ ✓

$(x-1)(x^3-11x^2+31x-21)$

$1 \mid 1 \quad -11 \quad 31 \quad -21$

$\quad\quad 1 \quad -10 \quad 21$

$\quad 1 \quad -10 \quad 21 \quad 0$ ✓

$(x-1)(x-1)(x^2-10x+21)$

$(x-1)^2(x-3)(x-7)$

(c) x-int = $1^*, 3, 7$

(d) deg = 4