Warm Up

1) Find all the zeros of $x^3 - 3x^2 - 8x - 10 = 0$

P: 10 → 1, 2, 5, 10

Q: 1

$\pm 1, \pm 2, \pm 5, \pm 10$

$x = 5$

	1	−3	−8	−10
↓		5	10	10
	1	2	2	0

$x^2 + 2x + 2 = 0$

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

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

$$\frac{-2 \pm 2i}{2} \leftarrow -1 \pm i$$

2) Find a 3rd degree polynomial equation that has the given roots: 3 and $-4i$, $4i$

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

$$(x-3)(x^2+16) = x^3 - 3x^2 + 16x - 48$$

3) Find all the zeros by factoring: $x^4 - 7x^2 + 10 = 0$

$$(x^2 - 5)(x^2 - 2) = 0$$

$x = \pm\sqrt{5}$ $x = \pm\sqrt{2}$

(19) $1, 3i, -3i$

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

$(x-1)(x^2+9)$

(25) $12x^3-32x^2+25x-6$

$.667 = \frac{2}{3}$

$1.5 \quad \frac{3}{2}$

$\frac{3}{2}$	12	-32	25	-6
	↓	18	-21	6
	12	-14	4	0

$12x^2-14x+4=0$

$2(6x^2-7x+2)=0$

$6x^2-3x-4x+2$

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

$(2x-1)(3x-2)=0$

$\frac{3}{2} \quad \frac{1}{2} \quad \frac{2}{3},$

6.6 Fundamental Theorem of Algebra

1) Find all the roots of $x^4 + 2x^3 - x^2 - 8x - 12 = 0$

p: 12 → 1, 2, 3, 4, 6, 12 -2, 2

Q: 1

±1, ±2, ±3, ±4, ±6, ±12

-2	1	2	-1	-8	-12
	↓	-2	0	2	12
2	1	0	-1	-6	0
	↓	2	4	6	
	1	2	3	0	

Remember: (Always check to see if you can factor first!)

LIST p/q ⇒ GRAPH ⇒ TEST ⇒ KNOCK DOWN TO QUADRATIC ⇒ SOLVE

$$x^2 + 2x + 3 = 0$$

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$\frac{-2 \pm \sqrt{4 - 12}}{2}$$

$$\frac{-2 \pm \sqrt{-8}}{2} = \frac{-2 \pm 2i\sqrt{2}}{2}$$

2, -2, $-1 + i\sqrt{2}$ $-1 \pm i\sqrt{2}$

$-1 - i\sqrt{2}$

2) Find all the roots of $x^3 + 3x^2 + x + 3 = 0$

1 0 1 0

Remember: (Always check to see if you can factor first!)
LIST p/q ⇒ **GRAPH** ⇒
TEST ⇒ **KNOCK DOWN TO QUADRATIC** ⇒
SOLVE

$x^2 + 1 = 0$

$x^2 = -1$

$x = \pm i$

Homework

HW6.6 p. 343 #9 - 16 all,
#32 - 36