Unit 3 Mod 7.2 Part 2 Name Key

Write the polynomial function with least degree and a leading coefficient of 1 that has the given zeros.

1. 0 *and* 2 *and* 3
   a. Write the polynomial in factored form
   $f(x) = x(x-2)(x-3)$
   b. Now distribute the polynomial to write standard form
   $(x^2-2x)(x-3)$
   $x^3-3x^2-2x^2+6x$
   $f(x) = x^3-5x^2+6x$

2. -2 *and* $4i$
   a. Write the polynomial in factored form
   $f(x) = (x+2)(x-4i)(x+4i)$
   b. Now distribute the polynomial to write standard form
   $(x+2)(x-4i)(x+4i)$
   $x^2-4xi+4xi-16i^2$
   $x^2-(16(-1))$
   $(x+2)(x^2+16)$
   $(x+2)(x^2+16)$
   $x^3+2x^2+16x+32$
   $f(x) = x^3+2x^2+16x+32$

3. Find the zeros of the polynomial function.
   $f(x) = x^3 - 2x^2 - 15x - 14$
   Possible zeros $\pm 1 \pm 7 \pm 2 \pm 14$

-2	1	-2	-15	-14
		-2	8	14
	1	-4	-7	0

$f(x) = (x+2)(x^2-4x-7)$
↖ Doesn't factor, use Quad Form.

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

$x = \frac{4 \pm \sqrt{16+28}}{2} = \frac{4}{2} \pm \frac{\sqrt{44}}{2}$ 4.11

$2 \pm \frac{2\sqrt{11}}{2}$

Zeros
$x = 2+\sqrt{11}$ $x = -2$
$x = 2-\sqrt{11}$

4. Find the zeros of the polynomial function.
   $f(x) = x^3 + 4x^2 - 23x + 22$
   Possible zeros $\pm 1, \pm 2, \pm 11, \pm 22$

2	1	4	-23	22
		2	12	-22
	1	6	-11	0

$f(x) = (x-2)(x^2+6x-11)$
↖ not factorable use Quad Form

$x = \frac{-6 \pm \sqrt{36-4(1)(-11)}}{2(1)} = \frac{-6 \pm \sqrt{80}}{2} = \frac{-6 \pm \sqrt{16 \cdot 5}}{2} = -3 \pm \frac{4}{2}\sqrt{5}$

Zeros: $x = 2$, $x = -3+2\sqrt{5}$ $x = -3-2\sqrt{5}$