Practice quiz key

1a $P(x) = x^4 - 12x^3 + 52x^2 - 96x + 64$

Note: $P(-x) = x^4 + 12x^3 + 52x^2 + 96x + 64 \Rightarrow$ no neg. roots

~~1~~

	1	−12	52	−96	64
		1	−11	41	−55
	1	−11	41	−55	

2)

	1	−12	52	−96	64
		2	−20	64	−64
	1	−10	32	−32	0 = P(2)

2)

	1	−10	32	−32
		2	−16	32
	1	−8	16	0

$(x-2)^2(x^2-8x+16) = 0$

$(x-2)^2(x-4)^2 = 0$

double root, double root

Zeros: 2, 4

1b $P(x) = x^4 - x^2 + 2x + 2$

Descartes: 2 or 0 negs, 2 or 0 pos

$P(1) = 4$

$P(-1) = 0$

−1)

	1	0	−1	2	2
		−1	1	0	−2
	1	−1	0	2	0

−1)

	1	−1	0	2
		−1	2	−2
	1	−2	2	0

$$P(x) = (x+1)^2(x^2-2x+2) = 0$$

$x = -1$

$x = 1 \pm i$

$$x = \frac{2 \pm \sqrt{4-8}}{2} = \frac{2 \pm \sqrt{-4}}{2}$$

$$= \frac{2 \pm 2i}{2} = 1 \pm i$$

2

$x = 2+3i$

$x-2 = 3i$

$(x-2)^2 = (3i)^2$

$x^2-4x+4 = 9i^2 = -9$

$x^2-4x+13 = 0$

$x = -4$

$x+4 = 0$

$P(x) = (x+4)(x^2-4x+13)$

$= x^3 - 4x^2 + 13x + 4x^2 - 16x + 52$

$P(x) = x^3 - 3x + 52$