pg. 333 # 13-29 odd +20

13. Square roots come in ± pairs!
$-\sqrt{5}$ & $\sqrt{13}$ are other roots

19. 1 and $\pm 3i$. $-3i$ is other root
roots: 1 $3i$ $-3i$
factors: $(x-1)$ $(x-3i)$ $(x+3i)$

D2□
$x^2 - 9i^2 = x^2 - 9(-1) =$

x^2+9

	x^3	$9x$
x		
-1	$-x^2$	-9

$\boxed{x^3 - x^2 + 9x - 9}$

25. $\frac{6}{12}$ ± 1 ± 2 ± 3 ± 6 / ± 1 ± 2 ± 3 ± 4 ± 6 ± 12

look in table / STO▸

possible roots	y
1	-7
-1	-75
2	12
-2	-280
3	105
-3	-693
6	1584
-6	-3900
$\frac{1}{2}$	0
$-\frac{1}{2}$	-28
$\frac{3}{2}$	0
$-\frac{3}{2}$	-156
$\frac{1}{3}$	$-\frac{7}{9}$
$-\frac{1}{3}$	$-\frac{55}{3}$
$\frac{2}{3}$	0
$-\frac{2}{3}$	$-\frac{364}{9}$

possible roots	y
$\frac{1}{4}$	-1.5625
$-\frac{1}{4}$	-14.44
$\frac{3}{4}$	-.1875
$-\frac{3}{4}$	-47.81
$\frac{1}{6}$	$-\frac{8}{3}$
$-\frac{1}{6}$	$-\frac{100}{9}$
$-\frac{1}{12}$	$-\frac{133}{16}$
$\frac{1}{12}$	$-\frac{595}{144}$

actual roots
$\frac{1}{2}, \frac{3}{2}, \frac{2}{3}$

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

$12x^3 \ldots -6$

29. $3+i$ & $3-i$, $-2i$ & $2i$ ← roots

$(x-(3+i))\ (x-(3-i))\ (x+2i)(x-2i)$ ← factors

D2D

	x	$-3-i$
x	x^2	$-3x-ix$
$-3+i$	$-3x+ix$	$9+1$

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

$x^2-6x+10$

	x^4	$-6x^3$	$10x^2$
x^2			
4	$4x^2$	$-24x$	40

$x^4-6x^3+14x^2-24x+40$

Answers for Lesson 6-5, pp. 333–334 Exercises

1. $\pm 1, \pm 2; 1$
2. $\pm 1, \pm 2, \pm 3, \pm 6; 1, -2, -3$
3. $\pm 1, \pm 2, \pm 4; -1$
4. $\pm \frac{1}{2}, \pm 1, \pm 2, \pm 4, \pm 8$; no rational roots
5. $\pm 1, \pm 2, \pm 4, \pm 8, \pm 16; -2$
6. $\pm 1, \pm 3, \pm 5, \pm 15$; no rational roots
7. $2, \pm i\sqrt{5}$
8. $5, \pm i\sqrt{7}$
9. $-3, 1, \frac{7}{2}$
10. $-5, \frac{1 \pm \sqrt{3}}{2}$
11. $\pm \frac{1}{2}, \pm 3$
12. $1, -2, \frac{1 \pm \sqrt{7}}{3}$
13. $-\sqrt{5}, \sqrt{13}$
14. $4 + \sqrt{6}, -\sqrt{3}$
15. $1 + \sqrt{10}, 2 - \sqrt{2}$
16. $1 - i, 5i$
17. $2 - 3i, -6i$
18. $4 + i, 3 - 7i$
19. $x^3 - x^2 + 9x - 9 = 0$
20. $x^3 + 3x^2 - 8x + 10 = 0$
21. $x^3 - 2x^2 + 16x - 32 = 0$
22. $x^3 - 3x^2 - 8x + 30 = 0$
23. $x^3 - 6x^2 + 4x - 24 = 0$
24. $x^3 - x^2 + 2 = 0$
25. $\pm \frac{1}{12}, \pm \frac{1}{6}, \pm \frac{1}{4}, \pm \frac{1}{2}, \pm \frac{1}{3}, \pm \frac{2}{3}, \pm \frac{3}{4}, \pm 1, \pm \frac{3}{2}, \pm 2, \pm 3, \pm 6; \frac{1}{2}, \frac{3}{2}, \frac{2}{3}$
26. $\pm \frac{1}{10}, \pm \frac{1}{5}, \pm \frac{2}{5}, \pm \frac{1}{2}, \pm \frac{4}{5}, \pm 1, \pm 2, \pm \frac{5}{2}, \pm 4, \pm 5, \pm 10, \pm 20; 2, \frac{2}{5}, \frac{5}{2}$
27. $\pm \frac{7}{3}, \pm \frac{1}{6}, \pm \frac{1}{2}, \pm \frac{1}{3}, \pm \frac{7}{6}, \pm 1, \pm \frac{3}{2}, \pm 3, \pm \frac{7}{2}, \pm 7, \pm \frac{21}{2}, \pm 21; \frac{1}{3}, -\frac{7}{2}, 1, 3$
28. $\pm \frac{1}{4}, \pm \frac{5}{4}, \pm \frac{1}{2}, \pm \frac{3}{4}, \pm \frac{1}{8}, \pm \frac{5}{8}, \pm \frac{3}{8}, \pm \frac{15}{4}, \pm \frac{5}{2}, \pm 1, \pm \frac{3}{2}, \pm \frac{15}{8}, \pm \frac{15}{2}, \pm 15, \pm 3, \pm 5; -\frac{1}{2}, \frac{3}{2}, \frac{5}{2}$
29. $x^4 - 6x^3 + 14x^2 - 24x + 40 = 0$
30. $x^4 - 2x^3 - x^2 + 6x - 6 = 0$
31. $x^4 - 6x^3 + 2x^2 + 30x - 35 = 0$