

Sec 3.4.2
Solving Polynomials
-new today-
beyond cubic...need to use synthetic
division more than once



Determine all solutions- $C \rightarrow \pm 24, 1, 12, 2, 8, 3, 6, 4$
 $x^4 - 6x^2 - 8x + 24 = 0$

$$2 \left| \begin{array}{cccc|c} 1 & 0 & -6 & -8 & 24 \\ & 2 & 4 & -4 & -24 \\ \hline 1 & 2 & -2 & -12 & 0 \end{array} \right.$$

$$(x-2)(x^3 + 2x^2 - 2x - 12) = 0$$

$$C \rightarrow \pm 12, 1, 6, 2, 3, 4$$

$$2 \left| \begin{array}{cccc|c} 1 & 2 & -2 & -12 \\ & 2 & 8 & 12 \\ \hline 1 & 4 & 6 & 0 \end{array} \right.$$

$$(x-2)^2 (x^2 + 4x + 6) = 0$$


$$x = \frac{-4 \pm \sqrt{16 - 4(6)}}{2}$$

$$= \frac{-4 \pm \sqrt{8}}{2} \quad \dots -1 \cdot 4 \cdot 2$$

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

$$= -1 \pm i\sqrt{2}$$

$$x = \{2, -1 \pm i\sqrt{2}\}$$

A black and white photograph of a snowy forest path. The path is covered in snow and leads into a dense forest of bare trees. On the right side of the path, there is a rustic wooden fence made of vertical posts and horizontal rails, also covered in snow. The overall scene is serene and wintry.

Suggested Practice
Sec 3.4
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17,19,20,23,24

17. a) 1, 2, 3, 4, 6, 12
solns

$$\{-3, 1, 4\}$$

19. a) 1, 2, 3, 4, 6, 12

$$\{-2, 1 \pm \sqrt{7}\}$$

20. a) $\pm 1, \pm 13$

b/c) $\{1, 2 \pm 3i\}$

23. a) 1, 2, 4

b/c)

$$\{\pm 2, 1 \pm \sqrt{2}\}$$

24. a) $\pm 1, \pm 3, \pm 5, \pm 15$

b) -1 or 3

c) $\{-1, 3, 1 \pm 2i\}$