

# Answer Key to More Polynomial Practice

## Homework 11-20

$$\textcircled{1} \begin{array}{r|rrrr} -2 & 1 & -3 & 0 & 1 \\ & & -2 & 10 & -20 \end{array}$$

$1 \quad -5 \quad 10 \quad (-19)$  remainder is not 0 so  $x+2$  is not a factor of  $x^3-3x^2+1$

$$\textcircled{2} V = 3x^3 - 2x^2 - 11x + 10 \quad h = x - 1$$

$$\begin{array}{r|rrrr} 1 & 3 & -2 & -11 & 10 \\ & & 3 & 1 & 10 \\ \hline & 3 & 1 & -10 & 0 \end{array}$$

$$V = lwh$$

$$V = Ah$$

$$A = \frac{V}{h}$$

$3x^2 + x - 10$  represents the area.

$$\textcircled{3} 2-3i, 2+3i$$

$$\text{sum} = 2-3i + 2+3i = 4$$

$$\text{product} = 4-9i^2 = 4+9 = 13$$

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

Roots:  $2 \pm 3i, 3$

$$\begin{array}{r} x-3 \\ x^2-4x+13 \overline{) x^3-7x^2+25x-39} \\ \underline{x^3-4x^2+13x} \phantom{-39} \\ -3x^2+12x-39 \\ \underline{-3x^2+12x-39} \\ 0 \end{array}$$

3rd degree

$$\begin{array}{r|rrrr} 2-3i & 1 & -7 & 25 & -39 \\ & 2-3i & -19+9i & 39 & \end{array}$$

2nd degree

$$\begin{array}{r|rr} 2+3i & 1 & -5-3i & 6+9i \\ & 2+3i & -6-9i & \end{array} \quad \begin{array}{l} x-3=0 \\ x=3 \end{array}$$

1st

$$\begin{array}{r|rr} 1 & -5-3i & 6+9i & 0 \end{array}$$

degree

$$\begin{array}{r|rr} 1 & -3 & 0 \end{array}$$

plug in 1 for x  
 plug in 2 for x  
 1, 2 are roots

$$1 - 4 + c + d = 0, \quad c + d = 3$$

$$8 - 16 + 2c + d = 0, \quad 2c + d = 8$$

④  $(x-1)(x-2) = x^2 - 3x + 2$  OR

$$-(c+d=3) = -c - d = -3$$

$$\underline{2c + d = 8}$$

$$c = 5$$

$$x^2 - 3x + 2 \overline{) x^3 - 4x^2 + cx + d}$$

$$\underline{-x^3 + 3x^2 - 2x}$$

$$-x^2 + (c-2)x + d$$

$$\underline{+x^2 - 3x + 2}$$

$$c + d = 3$$

$$5 + d = 3$$

$$d = -2$$

$c - 2 - 3 = 0$   
 $c - 5 = 0$   
 $\boxed{c = 5}$

$0 \leftarrow$  has to be zero  
 $d + 2 = 0 \Rightarrow \boxed{d = -2}$

OR

1)  $\begin{array}{cccc} 1 & -4 & c & d \\ \hline 1 & -3 & c-3 & \\ \hline 1 & -3 & c-3 & \textcircled{0} \end{array}$

$$d + c - 3 = 0$$

$$\begin{array}{r} d + c - 3 = 0 \\ -d + 2c + 8 = 0 \\ \hline -c + 5 = 0 \\ -c = -5 \\ \hline \boxed{c = 5} \end{array}$$

$$-c + 5 = 0$$

$$-c = -5$$

$$\boxed{c = 5}$$

2)  $\begin{array}{cccc} 1 & -4 & c & d \\ 2 & -4 & 2c-8 & \\ \hline 1 & -2 & c-4 & \textcircled{0} \end{array}$   $d + 2c - 8 = 0$

$$d + c - 3 = 0$$

$$d + 5 - 3 = 0$$

$$\boxed{d = -2}$$

or

$$\textcircled{5} \quad x^2 + ax + 12 = 0$$

one root is 3 times the other

$$-a = y + 3y = 4y$$

$$\begin{array}{ll} 2, & 6 \quad s = 8 \\ -2, & -6 \quad s = -8 \end{array}$$

$$12 = y(3y)$$

$$a = \pm 8$$

$$12 = 3y^2$$

$$4 = y^2$$

$$y = \pm 2$$

$$\textcircled{6} \quad (-n)^2 + 5(-n) - 2 = -8$$

$$n^2 - 5n + 6 = 0$$

$$(n-3)(n-2) = 0$$

$$n = 3 \quad | \quad n = 2$$

$$\textcircled{7} \quad 2i, -2i, 3 \text{ double zero}$$

$$x^2 = -4$$

$$(x^2 + 4)(x - 3)^2$$

$$(x^2 + 4)(x^2 - 6x + 9) = x^4 - 6x^3 + 9x^2 + 4x^2 - 24x + 36$$

$$x^4 - 6x^3 + 13x^2 - 24x + 36$$