

Guided Practice pg 356

#16, 19, 20, 21, 23, 25, 27, 29, 33, 35, 41, 43, 45, 47, 49, 51, 53

$$\textcircled{16} \quad (3x^2 + 11x + 1) \div (x - 3)$$

$3x + 20 \quad R\ 61$

$$\begin{array}{r} x - 3) 3x^2 + 11x + 1 \\ \underline{+ (-3x^2 + 9x)} \\ \qquad \qquad 20x + 1 \\ \underline{+ (-80x + 60)} \\ \qquad \qquad \qquad 61 \end{array}$$

$$\textcircled{19} \quad (x^2 + 5x - 3) \div (x - 10)$$

$x + 15 \quad R\ 147$

$$\begin{array}{r} x - 10) x^2 + 5x - 3 \\ \underline{+ (-x^2 + 10x)} \\ \qquad \qquad \qquad 15x - 3 \\ \underline{+ (-15x + 150)} \\ \qquad \qquad \qquad 147 \end{array}$$

$3x + 20 \quad R\ 61$

$x + 15 \quad R\ 147$

$$\textcircled{20} \quad (x^3 - 3x^2 + x - 8) \div (x - 1)$$

$x^2 - 2x - 1 \quad R\ -9$

$$\begin{array}{r} x - 1) x^3 - 3x^2 + x - 8 \\ \underline{+ (-x^3 + x^2)} \\ \qquad \qquad \qquad - 2x^2 + x - 8 \\ \underline{+ (+ 2x^2 - 2x)} \\ \qquad \qquad \qquad - x - 8 \\ \underline{+ (+ x - 1)} \\ \qquad \qquad \qquad - 9 \end{array}$$

$$\textcircled{21} \quad (2x^4 + 7) \div (x^2 - 1)$$

$2x^2 + 2 \quad R\ 9$

$$\begin{array}{r} x^2 - 1) 2x^4 + 0x^3 + 0x^2 + 0x + 7 \\ \underline{+ (-2x^4 + 2x^2)} \\ \qquad \qquad \qquad 2x^2 + 0x + 7 \\ \underline{+ (-2x^2 + 2)} \\ \qquad \qquad \qquad 9 \end{array}$$

$2x^2 + 2 \quad R\ 9$

$x^2 - 2x - 1 \quad R\ -9$

$$\textcircled{23} \quad (6x^2 + x - 7) \div (2x + 3)$$

$$\begin{array}{r} 3x - 4 \quad R\ 5 \\ 2x + 3) 6x^2 + x - 7 \\ \underline{+ (-6x^2 - 9x)} \\ \qquad \qquad \qquad - 8x - 7 \\ \underline{+ (+ 8x + 12)} \end{array}$$

$3x - 4 \quad R\ 5$

5

$$\textcircled{25} \quad (5x^4 + 14x^3 + 9x) \div (x^2 + 3x)$$

$5x^2 - x + 3$

$$\begin{array}{r} x^2 + 3x) 5x^4 + 14x^3 + 0x^2 + 9x \\ \underline{+ (-5x^4 - 15x^3)} \\ \qquad \qquad \qquad - x^3 + 0x^2 + 9x \\ \underline{+ (+ x^3 + 3x^2)} \end{array}$$

$3x^2 + 9x$
 $+ (-3x^2 + 9x)$

(2)

$$\textcircled{27} \quad (x^3 - 7x - 6) \div (x - 2)$$

$$\begin{array}{r} 2 | 1 & 0 & -7 & -6 \\ \downarrow & 2 & 4 & -6 \\ \hline 1 & 2 & -3 & -12 \end{array}$$

$$x^2 + 2x - 3 \quad R - 12$$

$$\textcircled{29} \quad (4x^2 + 5x - 4) \div (x + 1)$$

$$\begin{array}{r} -1 | 4 & 5 & -4 \\ \downarrow & -4 & -1 \\ \hline 4 & 1 & -5 \end{array}$$

$$4x + 1 \quad R - 5$$

$$\textcircled{33} \quad (x^2 + 10) \div (x + 4)$$

$$\begin{array}{r} -4 | 1 & 0 & 10 \\ \downarrow & -4 & 16 \\ \hline 1 & -4 & 26 \end{array}$$

$$x - 4 \quad R 26$$

$$\textcircled{35} \quad (10x^4 + 5x^3 + 4x^2 - 9) \div (x + 1)$$

$$\begin{array}{r} -1 | 10 & 5 & 4 & 0 & -9 \\ \downarrow & -10 & 5 & -9 & 9 \\ \hline 10 & -5 & 9 & -9 & 0 \end{array}$$

$$10x^3 - 5x^2 + 9x - 9$$

$$\textcircled{41} \quad f(x) = x^3 - 12x^2 + 12x + 80; k=10$$

$$\begin{array}{r} 10 | 1 & -12 & 12 & 80 \\ \downarrow & 10 & -20 & -80 \\ \hline 1 & -2 & -8 & 0 \\ x^2 - 2x - 8 = 0 \end{array}$$

$$(x - 4)(x + 2)(x - 10)$$

$$\textcircled{43} \quad f(x) = x^3 - x^2 - 21x + 45; k=-5$$

$$\begin{array}{r} -5 | 1 & -1 & -21 & 45 \\ \downarrow & -5 & 30 & -45 \\ \hline 1 & -6 & 9 & 0 \\ x^2 - 6x + 9 = 0 \end{array}$$

$$(x - 3)(x - 3)(x + 5)$$

$$\textcircled{45} \quad f(x) = 4x^3 - 4x^2 - 9x + 9; k=1$$

$$\begin{array}{r} 11 | 4 & -4 & -9 & 9 \\ \downarrow & 4 & 0 & -9 \\ \hline 4 & 0 & -9 & 0 \\ 4x^2 - 9 = 0 \\ (2x - 3)(2x + 3)(x - 1) \end{array}$$

$$(47) f(x) = 9x^3 + 10x^2 - 17x - 2 ; -2$$

$$\begin{array}{r} -2 | 9 & 10 & -17 & -2 \\ \downarrow & -18 & 16 & 2 \\ \hline 9 & -8 & -1 & 0 \end{array}$$

$$9x^2 - 8x - 1 = 0 \quad \frac{9}{-9+1}$$

$$9x^2 - 9x + 1x - 1 = 0$$

$$9x(x-1) + 1(x-1) = 0$$

$$(9x+1)(x-1) = 0$$

$$9x+1=0 \quad x-1=0$$

$x = -1/9$	$x = 1$	$x = -2$
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$$(47) f(x) = 2x^3 + 3x^2 - 39x - 20 ; 4$$

$$\begin{array}{r} 4 | 2 & 3 & -39 & -20 \\ \downarrow & 8 & 44 & 20 \\ \hline 2 & 11 & 5 & 0 \end{array}$$

$$2x^2 + 11x + 5 = 0$$

$$2x^2 + 10x + 1x + 5 = 0 \quad \frac{10}{1 \cdot 10}$$

$$2x(x+5) + 1(x+5) = 0$$

$$(2x+1)(x+5) = 0$$

$$2x+1=0 \quad x+5=0$$

$x = -1/2$	$x = -5$	$x = 4$
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(4)

$$\textcircled{51} \quad f(x) = x^3 - 14x^2 + 47x - 18; 9$$

$$\begin{array}{r} 9 \mid 1 & -14 & 47 & -18 \\ & \downarrow & 9 & -45 & 18 \\ & 1 & -5 & 2 & 0 \end{array}$$

$$x^2 - 5x + 2 = 0 \quad \text{can't factor use quadratic formula}$$

$$a=1$$

$$b=-5$$

$$c=2 \quad x = \frac{5 \pm \sqrt{(-5)^2 - 4(1)(2)}}{2(1)}$$

$$x = \frac{5 \pm \sqrt{17}}{2}$$

$$x = \frac{5 \pm \sqrt{17}}{2} \quad x = 9$$

$$\textcircled{53} \quad f(x) = x^3 + x^2 + 2x + 24; -3$$

$$\begin{array}{r} -3 \mid 1 & 1 & 2 & 24 \\ & \downarrow & -3 & 6 & -24 \\ & 1 & -2 & 8 & 0 \end{array}$$

$$x^2 - 2x + 8 = 0$$

$$a=1$$

$$b=-2$$

$$c=8$$

$$\begin{aligned} x &= \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \\ &= \frac{2 \pm \sqrt{(-2)^2 - 4(1)(8)}}{2} \\ &= \frac{2 \pm \sqrt{-28}}{2} \\ &= \frac{2 \pm \sqrt{-4 \cdot 7}}{2} \\ &= \frac{2 \pm 2i\sqrt{7}}{2} \\ &= 1 \pm i\sqrt{7} \end{aligned}$$

$$x = 1 \pm i\sqrt{7} \quad x = -3$$