

## Long and Synthetic Division Review

Date 10/5/17 Period 1

© 2011 Kuta Software LLC. All rights reserved.

## Divide using Long Division.

Long Division

1)  $(x^3 + 3x^2 - 28x - 62) \div (x + 6)$

$$\begin{array}{r}
 x^2 - 3x - 10 \\
 x+6 \overline{) x^3 + 3x^2 - 28x - 62} \\
 \underline{+ x^3 + 6x^2} \phantom{- 62} \\
 -3x^2 - 28x \phantom{- 62} \\
 \underline{+ 3x^2 + 18x} \phantom{- 62} \\
 -10x - 62 \\
 \underline{+ 10x + 60} \\
 -2
 \end{array}$$

$$x^2 - 3x - 10 + \frac{-2}{x+6}$$

2)  $(a^3 - 4a^2 + 5a - 55) \div (a - 5)$

$$\begin{array}{r}
 a^2 + 1 + 10 \\
 a-5 \overline{) a^3 - 4a^2 + 5a - 55} \\
 \underline{+ a^3 - 5a^2} \phantom{+ 5a - 55} \\
 a^2 + 5a \phantom{- 55} \\
 \underline{+ a^2 - 5a} \phantom{- 55} \\
 10a - 55 \\
 \underline{+ 10a - 50} \\
 -5
 \end{array}$$

$$a^2 + 1a + 10 + \frac{-5}{a-5}$$

3)  $(k^3 + 16k^2 + 61k + 3) \div (k + 10)$

$$\begin{array}{r}
 k^2 + 6k + 1 \\
 k+10 \overline{) k^3 + 16k^2 + 61k + 3} \\
 \underline{+ k^3 + 10k^2} \phantom{+ 61k + 3} \\
 6k^2 + 61k \phantom{+ 3} \\
 \underline{+ 6k^2 + 60k} \phantom{+ 3} \\
 k + 3 \\
 \underline{+ k + 10} \\
 -7
 \end{array}$$

$$k^2 + 6k + 1 + \frac{-7}{k+10}$$

4)  $(p^3 + 15p^2 + 58p + 71) \div (p + 10)$

$$\begin{array}{r}
 p^2 + 5p + 8 \\
 p+10 \overline{) p^3 + 15p^2 + 58p + 71} \\
 \underline{+ p^3 + 10p^2} \phantom{+ 58p + 71} \\
 5p^2 + 58p \phantom{+ 71} \\
 \underline{+ 5p^2 + 50p} \phantom{+ 71} \\
 8p + 71 \\
 \underline{+ 8p + 80} \\
 -9
 \end{array}$$

$$p^2 + 5p + 8 + \frac{-9}{p+10}$$

Any Method you would like. Yes, something like this will be on quiz!

Find the missing dimensions:

5.

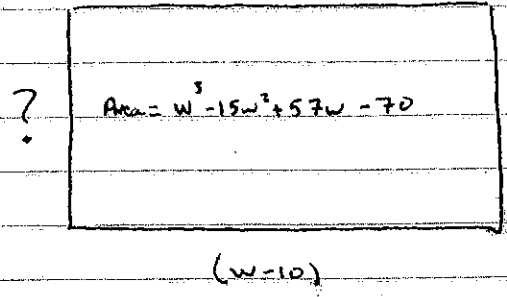
$$\begin{array}{|l}
 ? \\
 \hline
 \text{Area} = w^3 - 15w^2 + 57w - 70 \\
 \hline
 (w - 10)
 \end{array}$$

6.

$$\begin{array}{|l}
 ? \\
 \hline
 \text{Volume} = 3x^3 - x^2 - 27x + 9 \\
 \hline
 ?
 \end{array}$$

SEE NOTEBOOK PAPER (3x-1)

#5



$$A = l \cdot w$$

$$\frac{w^3 - 15w^2 + 57w - 70}{(w-10)} = \frac{(w/10) \cdot l}{w/10}$$

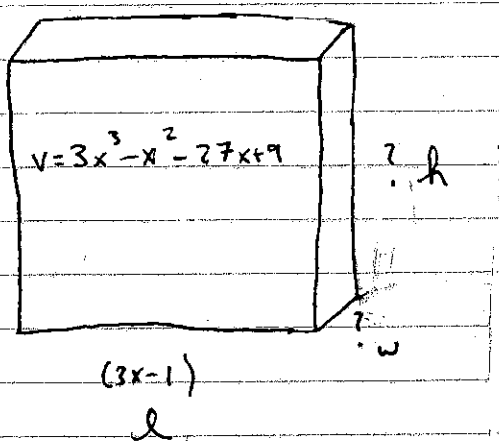
$$= l$$

$$\begin{array}{r|rrrr} 10 & 1 & -15 & 57 & -70 \\ & \downarrow & & & \\ & 10 & -50 & 70 & \\ \hline & 10 & -5 & 7 & 0 \end{array} = l$$

$$\text{length} = x^2 - 5x + 7$$

$$(x^2 - 5x + 7) = l$$

#6



$$V = l \cdot w \cdot h$$

$$\frac{3x^3 - x^2 - 27x + 9}{(3x-1)} = \frac{l \cdot w \cdot (\cancel{3x-1})}{(\cancel{3x-1})}$$

$$V = (3x-1)(x+3)(x-3)$$

↑ length    ↑ width    ↑ height

$$\begin{array}{r} x^2 - 9 \\ 3x-1 \overline{) 3x^3 - x^2 - 27x + 9} \end{array}$$

difference of squares

$$x^2 - 9 = l \cdot w$$

$$\wedge$$

$$(x+3)(x-3) = l \cdot w$$

$$l = (x+3) \quad (x-3) = w$$

$$5) (x^4 - 2x^3 - 52x^2 + 36x - 28) \div (x - 8)$$

$$\begin{array}{r} x-8 \overline{) x^4 - 2x^3 - 52x^2 + 36x - 28} \\ \underline{+ x^4 - 8x^3} \phantom{+ 36x - 28} \\ 6x^3 - 52x^2 \phantom{+ 36x - 28} \\ \underline{+ 6x^3 - 48x^2} \phantom{+ 36x - 28} \\ -4x^2 + 36x \phantom{- 28} \\ \underline{+ 4x^2 - 32x} \phantom{- 28} \\ 4x - 28 \\ \underline{+ 4x - 32} \\ 4 \end{array}$$

$$7) (r^4 + 12r^3 + 25r^2 + 48r - 18) \div (r + 10)$$

$$\begin{array}{r} r+10 \overline{) r^4 + 12r^3 + 25r^2 + 48r - 18} \\ \underline{+ r^4 + 10r^3} \phantom{+ 25r^2 + 48r - 18} \\ 2r^3 + 25r^2 \phantom{+ 48r - 18} \\ \underline{+ 2r^3 + 20r^2} \phantom{+ 48r - 18} \\ 5r^2 + 48r \phantom{- 18} \\ \underline{+ 5r^2 + 50r} \phantom{- 18} \\ -2r - 18 \\ \underline{+ 2r + 20} \\ 2 \end{array}$$

Divide using Synthetic Division.

$$9) (9x^3 - 73x^2 + 71x - 10) \div (x - 7)$$

$$\begin{array}{r} 7 \overline{) 9 \quad -73 \quad 71 \quad -10} \\ \downarrow \phantom{0} \phantom{0} \phantom{0} \phantom{0} \\ 63 \quad -70 \quad 7 \\ 9 \quad -10 \quad 1 \quad -3 \end{array}$$

$$9x^2 - 10x + 1 + \frac{-3}{x-7}$$

$$6) (-4n^2 - 24 + n^4 - 9n) \div (2 + n)$$

$$\begin{array}{r} n+2 \overline{) n^4 + 0x^3 - 4n^2 - 9n - 24} \\ \underline{+ n^4 + 2n^3} \phantom{- 24} \\ -2n^3 - 4n^2 \phantom{- 9n - 24} \\ \underline{+ 2n^3 + 4n^2} \phantom{- 9n - 24} \\ 0n^2 - 9n \phantom{- 24} \\ \underline{+ 0n^2 + 6n} \phantom{- 24} \\ -9n - 24 \\ \underline{+ 9n + 18} \\ -6 \end{array}$$

$$8) (m^4 - 8m^3 + 8m - 69) \div (m - 8)$$

$$\begin{array}{r} m-8 \overline{) m^4 - 8m^3 + 0m^2 + 8m - 69} \\ \underline{+ m^4 - 8m^3} \phantom{+ 0m^2 + 8m - 69} \\ 0m^3 + 0m^2 \phantom{+ 8m - 69} \\ \underline{+ 0m^3 + 0m^2} \phantom{+ 8m - 69} \\ 0m^2 + 8m \phantom{- 69} \\ \underline{+ 0m^2 + 0m} \phantom{- 69} \\ 8m - 69 \\ \underline{+ 8m - 64} \\ -5 \end{array}$$

Synthetic Division

$$10) (6n^3 + 47n^2 + 2n + 72) \div (n + 8)$$

$$\begin{array}{r} -8 \overline{) 6 \quad 47 \quad 2 \quad 72} \\ \downarrow \phantom{0} \phantom{0} \phantom{0} \phantom{0} \\ -48 \quad 8 \quad -80 \\ 6 \quad -1 \quad 10 \quad -8 \end{array}$$

$$6n^2 - 1n + 10 + \frac{-8}{n+8}$$

11)  $(b^3 + 4b^2 - 6b + 2) \div (b - 1)$

$$\begin{array}{r} \overline{11} \phantom{00} \\ 1 \phantom{00} 4 \phantom{00} -6 \phantom{00} 2 \\ \downarrow \phantom{00} + \phantom{00} + \phantom{00} + \\ 1 \phantom{00} 5 \phantom{00} -1 \phantom{00} 1 \end{array}$$

$$b^2 + 5b - 1 + \frac{1}{b-1}$$

12)  $(v^3 - 12v^2 + 30v + 6) \div (v - 8)$

$$\begin{array}{r} \overline{8} \phantom{00} \\ 1 \phantom{00} -12 \phantom{00} 30 \phantom{00} 6 \\ \downarrow \phantom{00} + \phantom{00} + \phantom{00} + \\ 1 \phantom{00} -4 \phantom{00} -2 \phantom{00} -10 \end{array}$$

$$v^2 - 4v - 2 + \frac{-10}{v-8}$$

13)  $(2x^3 - 15x^2 - 42x - 88) \div (x - 10)$

$$\begin{array}{r} \overline{10} \phantom{00} \\ 2 \phantom{00} -15 \phantom{00} -42 \phantom{00} -88 \\ \downarrow \phantom{00} + \phantom{00} + \phantom{00} + \\ 2 \phantom{00} 5 \phantom{00} 8 \phantom{00} -8 \end{array}$$

$$2x^2 + 5x + 8 + \frac{-8}{x-10}$$

14)  $(n^4 + 5n^3 + 3n + 12) \div (n + 5)$

$$\begin{array}{r} \overline{-5} \phantom{00} \\ 1 \phantom{00} 5 \phantom{00} 0 \phantom{00} 3 \phantom{00} 12 \\ \downarrow \phantom{00} + \phantom{00} + \phantom{00} + \phantom{00} + \\ 1 \phantom{00} 0 \phantom{00} 0 \phantom{00} 3 \phantom{00} -3 \end{array}$$

$$n^3 + 3 + n + 5$$

15)  $(-3a^3 + a^4 - 47a^2 - 21 + 37a) \div (a + 6)$

$$\begin{array}{r} \overline{-6} \phantom{00} \\ 1 \phantom{00} -3 \phantom{00} -47 \phantom{00} 37 \phantom{00} -21 \\ \downarrow \phantom{00} + \phantom{00} + \phantom{00} + \phantom{00} + \\ 1 \phantom{00} -9 \phantom{00} 7 \phantom{00} -5 \phantom{00} 9 \end{array}$$

$$a^3 - 9a^2 + 7a - 5 + \frac{9}{a+6}$$

16)  $(4k^4 + 32k^3 - 45k^2 - 87k - 64) \div (k + 9)$

$$\begin{array}{r} \overline{-9} \phantom{00} \\ 4 \phantom{00} 32 \phantom{00} -45 \phantom{00} -87 \phantom{00} -64 \\ \downarrow \phantom{00} + \phantom{00} + \phantom{00} + \phantom{00} + \\ 4 \phantom{00} -4 \phantom{00} -9 \phantom{00} -6 \phantom{00} -10 \end{array}$$

$$4k^3 - 4k^2 - 9k - 6 + \frac{-10}{k+9}$$