

Algebra 2 5.6 $f(z)$ $\underline{2}$
Use synthetic substitution to evaluate polynomials
Determine whether a binomial is a factor
Determine factors of polynomials

remainder theorem
synthetic substitution
depressed polynomial
factor theorem
whiteboards

Quiz Fri. 5.5-5.6

$$\begin{array}{r|rrrrr}
 -2 & 1 & 7 & 9 & -7 & -10 \\
 & \downarrow & -2 & -10 & 2 & 10 \\
 \hline
 & 1 & 5 & -1 & -5 & 0
 \end{array}$$

$$k^3 + 5k^2 - k - 5$$

$$k^2(k+5) - 1(k+5)$$

$$(k+5)(k^2-1)$$

$$(k+5)(k+1)(k-1)$$

25. ~~$6x^3 - 25x^2 + 2x + 8$~~ $2x+1$

$2x+1 \overline{) 6x^3 - 25x^2 + 2x + 8}$

23. $x^4 + 2x^3 + 2x^2 - 2x - 3 \quad (x-1)$

$\begin{array}{r} 1 \quad 2 \quad 2 \quad -2 \quad -3 \\ \downarrow \quad 1 \quad 3 \quad 5 \quad 3 \\ \hline 1 \quad 3 \quad 5 \quad 3 \quad 0 \end{array}$

$x^3 + 3x^2 + 5x + 3$

$\boxed{\pm 1 \quad \pm 3}$

$\begin{array}{r} -1 \quad 1 \quad 3 \quad 5 \quad 3 \\ \downarrow \quad -1 \quad -2 \quad -3 \\ \hline 1 \quad 2 \quad 3 \quad 0 \end{array}$

$x^2 + 2x + 3$

$(x+1)(x^2+2x+3)$

~~$\begin{array}{r} 3 \\ 2 \end{array}$~~

FML(4)

$$\boxed{u = h^{\frac{1}{5}}}$$

Solve $3(h^{\frac{2}{5}}) - 9h^{\frac{1}{5}} + 6 = 0$

$$(\quad)^2 + (\quad) + 6 = 0$$

$$(h^{\frac{1}{5}})^2$$

$$(x^3)^2 = x^6$$

$$\begin{array}{r} 2 \\ -2 \times -1 \\ -3 \end{array}$$

$$\frac{3u^2}{3} - \frac{9u}{3} + \frac{6}{3} = 0$$

$$u^2 - 3u + 2 = 0$$

$$(u-2)(u-1) = 0$$

$$\begin{array}{cc} \downarrow & \downarrow \\ (h^{\frac{1}{5}})^{u=2} & (h^{\frac{1}{5}})^{u=1} \\ = 2^5 & = 1^5 \end{array}$$

$$h = 32 \quad h = 1$$

Use synthetic substitution

1B. If $g(x) = 4x^5 + 2x^3 + x^2 - 1$, find $f(-1)$.

$$\begin{array}{r|rrrrrr} -1 & 4 & 0 & 2 & 1 & 0 & -1 \\ & \downarrow & -4 & 4 & -6 & 5 & -5 \\ \hline & 4 & -4 & 6 & -5 & 5 & -6 \end{array}$$

$$f(-1) = -6$$

$$x^5 + x^4 - 5x^3 - 5x^2 + 4x + 4 \quad (x+1)$$

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

$$x^4 - 5x^2 + 4 \quad u = x^2$$

$$u^2 - 5u + 4$$

$$\begin{array}{l} 4 \\ -4 \end{array} \begin{array}{l} \diagup \\ \diagdown \end{array} \begin{array}{l} -1 \\ -5 \end{array} \quad (u-4)(u-1)$$

$$(x^2-4)(x^2-1)$$

$$(x-2)(x+2)(x-1)(x+1)$$

Whiteboards

Guided Practice

2. **COLLEGE** The function $C(x) = 2.46x^3 - 22.37x^2 + 53.81x + 548.24$ can be used to approximate the number, in thousands, of international college students studying in the United States x years since 2000. How many international college students can be expected to study in the U.S. in 2015?

$f(15)$

4,624,640

$$\begin{array}{r} 15 \overline{) 2.46 - 22.37 \ 53.81 \ 548.24} \\ \underline{ 36.9 217.95 4076.4} \\ 2.46 14.53 271.76 4624.64 \end{array}$$

Guided Practice

If it is a factor, what must be true?

3. Show that $x - 2$ is a factor of $x^3 - 7x^2 + 4x + 12$. Then find the remaining factors of the polynomial.
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4. $x^3 - 6x^2 + 11x - 6; x - 1$

5. $x^3 + x^2 - 16x - 16; x + 1$

6. $3x^3 + 10x^2 - x - 12; x - 1$

WB s. 6 prac.
(odds)