

Alg2 Quiz Review on 3.7 - 3.8

Name Ky

1. Use the remainder theorem to find the remainders if $3x^3 + 14x^2 - x + 20$ is divided by the following:

a) $x-2$ $2 \overline{) 3 \ 14 \ -1 \ 20}$
 $6 \ 40 \ 78$
 $\hline 3 \ 20 \ 39 \ 98$

b) $x+2$ $-2 \overline{) 3 \ 14 \ -1 \ 20}$
 $-6 \ -16 \ 34$
 $\hline 3 \ 8 \ -17 \ 54$

c) $x-5$ $5 \overline{) 3 \ 14 \ -1 \ 20}$
 $15 \ 145 \ 720$
 $\hline 3 \ 29 \ 144 \ 740$

d) $x+5$ $-5 \overline{) 3 \ 14 \ -1 \ 20}$
 $-15 \ 5 \ -20$
 $\hline 3 \ -1 \ 4 \ 0$

Which is any of the binomials above are Factors of $3x^3 + 14x^2 - x + 20$?
 $(x+5)$

2. Which is a third degree polynomial with -3 and 2 as its only zeros?

$-3 \overline{) 1 \ 1 \ -3 \ 2}$
 $-3 \ 6 \ -9$
 $\hline 1 \ -2 \ 3$

$-3 \overline{) 1 \ -1 \ -8 \ 12}$
 $-3 \ 12 \ -12$
 $\hline 1 \ -4 \ 4 \ 0$

- a) $x^2 - 3x + 2$ b) $x^3 + x^2 - 3x + 2$
 c) $x^3 - x^2 - 8x + 12$ d) $x^3 + x^2 + 2x - 3$

$2 \overline{) 1 \ -1 \ -8 \ 12}$
 $2 \ 2 \ -12$
 $\hline 1 \ -1 \ -6 \ 0$

3. Use binomial expansion to solve $(x-2)^4$.

$\frac{1}{1} \frac{x^4}{1} \frac{-2^0}{1} + \frac{4}{1} \frac{x^3}{4} \frac{-2^1}{-2} + \frac{6}{6} \frac{x^2}{4} \frac{-2^2}{4} + \frac{4}{4} \frac{x^1}{-8} \frac{-2^3}{-8} + \frac{1}{1} \frac{x^0}{1} \frac{-2^4}{16}$
 $x^4 + -8x^3 + 24x^2 + -32x + 16$

4. Use binomial expansion to solve $(3a+2)^3$.

$\frac{3^3 a^3}{1 \cdot 27 a^3 \cdot 1} + \frac{3 \cdot 3^2 a^2 \cdot 2^1}{3 \cdot 9 a^2 \cdot 2} + \frac{3 \cdot 3 a^1 \cdot 2^2}{3 \cdot 3 a \cdot 4} + \frac{1 \cdot 3^0 a^0 \cdot 2^3}{1 \cdot 1 \cdot 8}$
 $27a^3 + 54a^2 + 24a + 8$

5. Use long division for $x^3 + 2x^2 - 5x - 6$ with a divisor of $x+3$.

$x+3 \overline{) x^3 + 2x^2 - 5x - 6}$
 $-x^3 + 3x^2$
 $\hline -x^2 - 5x - 6$
 $+x^2 + 3x$
 $\hline -2x - 6$
 $-2x + 6$
 $\hline 0$

$x \cdot x^2 = x^3$
 $x \cdot -x = -x^2$
 $x \cdot -2 = -2x$
 $x^2 - x - 2$ is a factor

$$x \cdot x^2 = x^3$$

$$x \cdot 5x = 5x^2$$

$$x \cdot 9 = 9x$$

6. Use long division for $x^3 + 3x^2 - x + 5$ with a divisor of $x - 2$.

$$x-2 \overline{) x^3 + 3x^2 - x + 5}$$

$$\begin{array}{r} x^2(x-2) \leftarrow -x^3 + 2x^2 \\ \hline 5x^2 - x + 5 \\ 5x(x-2) \leftarrow -5x^2 + 10x \\ \hline 9x + 5 \\ 9(x-2) \leftarrow -9x + 18 \\ \hline 23 \end{array}$$

$x-2$ is NOT a factor *

7. Use synthetic division for $x^3 + 2x^2 - 5x - 6$ with a divisor of $x + 5$.

$$\begin{array}{r|rrrr} -5 & 1 & 2 & -5 & -6 \\ & & -5 & 15 & -50 \\ \hline & 1 & -3 & 10 & -56 \end{array}$$

$$x^2 - 3x + 10 + \frac{-56}{x+5}$$

NOT a factor *

8. Use synthetic division for $x^3 + 4x^2 - 5x + 1$ with a divisor of $x - 3$.

$$\begin{array}{r|rrrr} 3 & 1 & 4 & -5 & 1 \\ & & 3 & 21 & 48 \\ \hline & 1 & 7 & 16 & 49 \end{array}$$

$$x^2 + 7x + 16 + \frac{49}{x-3}$$

NOT a factor *