Do Now: From the Geometric Approach to Absolute Value packet on 11-01

Name: ______________________________ Date: ____________

PCH: Geometric Approach to Absolute Value Ms. Loughran

Do Now:

1. A closed tin can with height *h* and radius *r* has volume 5 cubic centimeters. Express the surface area of the tin can as a function of *r*.

$SA = 2\pi r h + 2\pi r^2$

* need h in terms of r

$SA(r) = 2\cancel{\pi r} \cdot \frac{5}{\cancel{\pi} r^{\cancel{2}}} + 2\pi r^2$

$SA(r) = \frac{10}{r} + 2\pi r^2$, $r > 0$

$V = 5 cm^3$

$\pi r^2 h = 5$

$h = \frac{5}{\pi r^2}$

L. Lewis

Homework 11-16

1. Using integral factors, find the complete factorization of
$9x^5 - 21x^4 - 2x^3 + 20x^2 - 8x$ if a multiple root is $\frac{2}{3}$.

① $x(9x^4 - 21x^3 - 2x^2 + 20x - 8)$

$$\begin{array}{r|rrrrr} \frac{2}{3} & 9 & -21 & -2 & 20 & -8 \\ & & 6 & -10 & -8 & 8 \\ \hline & 9 & -15 & -12 & 12 & 0 \end{array}$$

$$\frac{9 \quad -15 \quad -12 \quad 12}{3}$$

$$\begin{array}{r|rrrr} \frac{2}{3} & 3 & -5 & -4 & 4 \\ & & 2 & -2 & -4 \\ \hline & 3 & -3 & -6 & 0 \end{array}$$

$$\frac{3 \quad -3 \quad -6}{3}$$

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

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

$x(x^3+2x^2-5x-10)$ $\{0, \pm\sqrt{5}\}$

2. Find the remaining zeros of $x^4 + 2x^3 - 5x^2 - 10x$ if one zero is -2.

$$\begin{array}{r|rrrr} -2 & 1 & 2 & -5 & -10 \\ & & -2 & 0 & 10 \\ \hline & 1 & 0 & -5 & 0 \end{array}$$

$x(x+2)(x^2-5)=0$

$x=0$ | $x=-2$ | $x=\pm\sqrt{5}$

3. Find a formula for $f(x)$ in factored form if the zeros of $f(x)$ are $\{0, \pm 2i, \pm\sqrt{3}, \frac{1}{2}\}$. Express your answer with integral coefficients.

$f(x) = x(x^2+4)(x^2-3)(2x-1)$

4. Find the value of k if $4x^4 - 3x^2 + kx - 1$ divided by $x + 3$ gives a remainder of -4.

$f(x)$

means $f(-3)=-4$

$-4 = 4(-3)^4 - 3(-3)^2 + k(-3) - 1$

$-4 = 324 - 27 - 3k - 1$

$-4 = 296 - 3k$

$-300 = -3k$

$100 = k$

or

$$\begin{array}{r|rrrrr} -3 & 4 & 0 & -3 & k & -1 \\ & & -12 & 36 & -99 & -3k+297 \\ \hline & 4 & -12 & 33 & k-99 & -4 \end{array}$$

$-1 - 3k + 297 = -4$

$-3k + 296 = -4$

$-3k = -300$

$k = 100$

5. Use synthetic division to express $\dfrac{2x^3 - x^2 + 4x - 5}{2x - 1}$ as a mixed fraction. Check your result.

another way of saying quotient $+ \dfrac{\text{remainder}}{\text{divisor}}$ format

$$\begin{array}{c|cccc} \frac{1}{2} & 2 & -1 & 4 & -5 \\ & & 1 & 0 & 2 \\ \hline & 2 & 0 & 4 & -3 \end{array}$$

$\underbrace{2 \quad 0 \quad 4}_{\div 2}$

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