## NO CALCULATORS ALLOWED SHOW PROPER WORK & SIMPLIFY ALL ANSWERS PUT A BOX AROUND EACH FINAL ANSWER

If  $f(x) = 2x^4 + 9x^3 - 16x^2 + 17x + 23$ , find f(-6) using synthetic division.

SCORE: \_\_\_\_ / 3 PTS

$$\begin{array}{rrrrr} -6|&2&9&-16&17&23\\ \\ -12&18&-12&-30\\ \hline 2&-3&2&5&[-7]\\ \\ f(-6)=-7\end{array}$$

Consider the polynomial 
$$f(x) = x^3 - 39x + 70$$
.

[a] List all the possible integer zeros of f.

$$\pm 1, \pm 2, \pm 5, \pm 7, \pm 10, \pm 14, \pm 35, \pm 70$$

[b] Factor f(x) completely.

$$2 | 1 0 -39 70$$

$$\frac{2 4 -70}{1 2 -35 0}$$

$$f(x) = (x - 2)(x^{2} + 2x - 35)$$

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

SCORE: \_\_\_\_\_ / 5 PTS

Write 3 statements which are equivalent to the following statement, as shown in lecture.

"-2 is a zero/root of 
$$f(x) = 3x^3 - 4x + 16$$
"  
[a]  $f(-2) = 0$   
[b]  $x + 2$  IS A FACTOR OF  $f(x)$   
[c]  $(-2, 0)$  IS AN X-INTERCEPT OF  $y = f(x)$   
Fill in the blank USING THE REMAINDER THEOREM: SCORE: \_\_\_\_/1 PT  
If the remainder when  $f(x) = 3x^3 - 20x^4 - 2350$  is divided by  $x - 7$  is 51, then  $f(7) = 51$   
Find the value of  $i^{865}$ . You must show how you got your answer to earn any credit. SCORE: \_\_\_\_/1 PT  
 $4\int 55 r^3 i^3 = -i$   
Divide  $\frac{5-4i}{-3+2i}$  and write your final answer in standard form. SCORE: \_\_\_\_/3 PTS  
 $\frac{5-4i}{-3+2i} \cdot \frac{-3-2i}{-3-2i} = \frac{-15-10i+12i+8i^2}{9-4i^2}$   
 $= \frac{-15+2i-8}{9+4}$   
 $= \frac{-23+2i}{13} = -\frac{23}{13} + \frac{2}{13}i$   
Use long division to divide  $\frac{-4x^4+x^2-20x}{2x^2+3x-1}$ . SCORE: \_\_\_\_/4 PTS  
 $2x^2+3x-1 = -\frac{-2x^2+3x-5}{-4x^4}$ 

$$2x^{2}+3x-1) -4x^{4}+0x^{3}+x^{2}-20x+0$$

$$\frac{-2x^{2}+3x-5}{4x^{4}\pm 6x^{3}\mp 2x^{2}}$$

$$-2x^{2}+3x-5$$

$$-6x^{3}\mp 9x^{2}\pm 3x$$

$$+\frac{-2x-5}{2x^{2}+3x-1}$$

$$\frac{-10x^{2}-17x+0}{\pm 10x^{2}\pm 15x\mp 5}$$

$$-2x-5$$