Math 151 - Quiz 7

October 14, 2015

Name key

Score _____

Show all work to receive full credit. Supply explanations when necessary.

1. (3 points) Use long division to rewrite in terms of the quotient and remainder.

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

$$
\begin{array}{r}
2x^3 \qquad -2x - 3 \\
x^2 + 0x + 1 \overline{\big) 2x^5 + 0x^4 + 0x^3 - 3x^2 + 0x + 1} \\
-(2x^5 + 0x^4 + 2x^3) \\
\hline
-2x^3 - 3x^2 + 0x + 1 \\
-(-2x^3 + 0x^2 - 2x) \\
\hline
-3x^2 + 2x + 1 \\
-(-3x^2 + 0x - 3) \\
\hline
2x + 4
\end{array}
$$

$$2x^3 - 2x - 3 + \frac{2x+4}{x^2+1}$$

2. (2 points) Use synthetic division to determine $f(4)$ when $f(x) = 2x^4 - 3x^3 - 6x + 5$.

4	2	-3	0	-6	5
		8	20	80	296
	2	5	20	74	301

$f(4) = 301$

3. (2 points) Construct a 3rd degree polynomial that has zeros 3, -1, and 2, and whose graph has y-intercept $(0, 12)$.

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

Y-INTERCEPT NOW IS

$(-3)(1)(-2) = 6$

SO MULTIPLY BY 2

$$\boxed{f(x) = 2(x-3)(x+1)(x-2)}$$

4. (3 points) List all possible rational zeros of $p(x) = \overset{1,2}{2}x^4 + 7x^3 + x^2 - 7x - \overset{1,3}{3}$. Then find all zeros of p.

POSSIBLE RATIONAL ZEROS ARE $\pm\left\{\frac{1}{1}, \frac{1}{2}, \frac{3}{1}, \frac{3}{2}\right\}$

FROM CALCULATOR, IT LOOKS LIKE $x=1$, $x=-3$, $x=-1$, $x=-\frac{1}{2}$ ARE ZEROS.

LET'S CHECK...

1	2	7	1	-7	-3
		2	9	10	3
	2	9	10	3	0

$(x-1)(2x^3+9x^2+10x+3)$

-3	2	9	10	3
		-6	-9	-3
	2	3	1	0

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

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

SO,

$p(x) = (x-1)(x+3)(2x+1)(x+1)$

ZEROS ARE

$x=1$, $x=-3$, $x=-1$, $x=-\frac{1}{2}$