4.1 day 2 notes

Monday, November 25, 2013 8:38 AM

WHO WANTS TO RACE MRS. GREEN?!?!

1. Divide $\frac{5y^4 - 6y^3 + 2y^2 - 5}{y - 2}$

| | 5 | −6 | 2 | 0 | −5 |
|---|---|---|---|---|---|
| 2 | ↓ | 10 | 8 | 20 | 40 |
| | 5 | 4 | 10 | 20 | 35 remainder |

$5y^3 + 4y^2 + 10y + 20 + \frac{35}{y-2}$

2. Divide: $\frac{5x^3 + 12x^2 - 29x + 12}{x - 1}$

| | 5 | 12 | −29 | 12 |
|---|---|---|---|---|
| 1 | | 5 | 17 | −12 |
| | 5 | 17 | −12 | 0 |

$5x^2 + 17x + -12$

3. Is 6 a zero of $x^4 - 2x^3 - 31x^2 + 32x + 60$?

3. Is 6 a zero of $x^4 - 2x^3 - 31x^2 + 32x + 60$?

| | | | | | |
|---|---|---|---|---|---|
| | 1 | −2 | −31 | 32 | 60 |
| 6 | | 6 | 24 | −42 | −60 |
| | 1 | 4 | −7 | −10 | 0 |

Yes!

4. Divide: $\dfrac{2x^3 - 3x^2 - 18x - 8}{2x+1}$

$= \dfrac{2x^3 - 3x^2 - 18x - 8}{2(x+1/2)}$

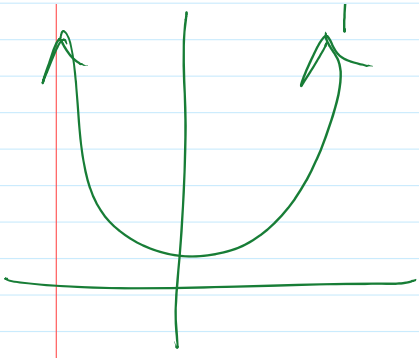
$= \dfrac{x^3 - \frac{3}{2}x^2 - 9x - 4}{x+1/2} = x^2 - 2x - 8$

5. Is $4i$ a zero of $x^2 - 2x + 1$?

| | | | |
|---|---|---|---|
| | 1 | −2 | 1 |
| $4i$ | | $4i$ | $-16 - 8i$ |
| | 1 | $-2+4i$ | $-15-8i$ |

$(-2+4i)\cdot 4i = -8i + 16i^2$

$= -16 - 8i$



1 | -2+4i | -15-8i

NO

6. Is $1+i$ a zero of $x^4-3x^3+2x^2-5x$?

| | 1 | -3 | 2 | -5 | 0 |
|---|---|---|---|---|---|
| $1+i$ | | $1+i$ | $-3-i$ | $-2i$ | $-3-7i$ |
| | 1 | $-2+i$ | $-1-i$ | $-5-2i$ | $-3-7i$ |

NO

- $(1+i)(-2+i) = -2+i-2i+i^2$
  $= -2-i-1$
  $= -3-i$
- $(1+i)(-1-i) = -1-i-i+1$
  $= -2i$
- $(1+i)(-5-2i) = -5-2i-5i+2$
  $= -3-7i$

Evaluate $f(5)$ if $f(x)=4x^3-2x^2+8x-1$.

$x+2$

| | 4 | -2 | 8 | -1 |
|---|---|---|---|---|
| $-2$ | | -8 | 20 | -56 |
| | 4 | -10 | 28 | -57 |

synthetic substitution

(5, 489)

(-2, -57)

(-1, -15)

| | 4 | -2 | 8 | -1 |
|---|---|---|---|---|
| $-1$ | | -4 | 6 | -14 |
| | 4 | -6 | 14 | -15 |

Use synthetic substitution to evaluate $f(-2)$ for $f(x) = -3x^3 + 4x - 7$.

$f(5) = -362$

$$\begin{array}{r|rrrr} & -3 & 0 & 4 & -7 \\ -2 & & 6 & -12 & 16 \\ \hline & -3 & 6 & -8 & 9 \end{array} \qquad \begin{array}{r|rrrr} & -3 & 0 & 4 & -7 \\ 5 & & -15 & -75 & -355 \\ \hline & -3 & -15 & -71 & -362 \end{array}$$

Without using synthetic substitution or synthetic division, how can you tell if $-1$ is a zero of $x^{41} + 1$?

$(-1)^{41} + 1 = -1 + 1 = 0$ yes!

Without using synthetic substitution or synthetic division, how can you tell if $x - 1$ is a factor of $x^{16} + 1$?

$1^{16} + 1 = 1 + 1 = 2$ NO