

Here's what's happening the rest of this week...

Today: Finish 2.3
 Tomorrow: Review for Quiz
 Friday: Quiz (2.1-2.3)



Jan 16-9:08 AM

Questions from homework (2.3a)?

⑪

$$x^2 + 1 \overline{) x^3 + 0x^2 + 0x - 9}$$

$$\underline{-x^3 + x}$$

$$-x - 9$$

$$x - \frac{x+9}{x^2+1}$$

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TRUE or FALSE: 6 is a factor of 12.

Why or why not?

A polynomial $f(x)$ has a **factor $(x-k)$ if and only if k is a zero of $f(x)$ [$f(k)=0$].

$$x^2 + 2x - 8 = (x+4)(x-2)$$

$$(-4)^2 + 2(-4) - 8 = 16 - 8 - 8 = 0$$

If we want to show that $(x-2)$ is a factor of $f(x)$, we can show that 2 is a zero.

If we want to show that $x=-5$ is a zero of $f(x)$, we can show that $x+5$ is a factor.

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Example | p. 128 #40

$$(-4)^2 - 28(-4) - 48 = 0$$

a) Show $x=-4$ is a solution to $x^2 - 28x - 48 = 0$.

b) Use the result to factor the polynomial completely.

c) List all the real zeros of the function.

$$-4 \overline{) 1 \ 0 \ -28 \ -48}$$

$$\underline{-4 \ 16 \ 48}$$

$$1 \ -4 \ -12 \ 0$$

$$x^2 - 4x - 12 = (x-6)(x+2)$$

$$x = -4, 6, -2$$

p. 128, #39 (HW)

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Example | p. 128 #44

a) Verify $(x+3)$ is a factor of $f(x) = 3x^3 + 2x^2 - 19x + 6$
 $x = -3$ $3(-3)^3 + 2(-3)^2 - 19(-3) + 6 = 0$

b) Write the complete factorization of $f(x)$.

c) List all real zeros of $f(x)$.

$3x^2 - 7x + 2$
 $(3x-1)(x-2)$
 $x = \frac{1}{3}, x = 2$

$-3 \overline{) 3 \ 2 \ -19 \ 6}$
 $\underline{3 \ -7 \ 2 \ 0}$
 $3 \ -7 \ 2 \ 0$

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

p. 128, #43 (HW)

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Rational Zero Test

If a polynomial has integer coefficients, every rational zero has the form $\frac{p}{q}$ where p is a factor of the Constant term and q is a factor of the Leading Coefficient

Example $f(x) = 4x^5 - 8x^4 - 5x^3 + 10x^2 + x - 2$

p's: $\pm 1, \pm 2$
 q's: $\pm 1, \pm 2, \pm 4$

Possible rational zeros: $\pm 1, \pm 2, \pm \frac{1}{2}, \pm \frac{1}{4}$

p. 128, #49 (HW)

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Try #53 (HW). You can narrow down your real zeros by using the Rational Zero Test...

$f(z) = z^4 - z^3 - 2z - 4$

① Find Possibilities
 $\frac{p}{q} = \frac{\pm 1, \pm 2, \pm 4}{\pm 1}$
 $\pm 1, \pm 2, \pm 4$

② Graph
 $x = -1$
 $x = 2$
 $x = \pm i\sqrt{2}$

③ Verify
 $f(-1) = (-1)^4 - (-1)^3 - 2(-1) - 4 = 0$
 $f(2) = (2)^4 - (2)^3 - 2(2) - 4 = 0$

$2 \overline{) 1 \ -1 \ 0 \ -2 \ -4}$
 $\underline{2 \ 2 \ 4 \ 4}$
 $1 \ 1 \ 2 \ 2 \ 0$
 $(x^3 + x^2) + (2x + 2)$
 $x^2(x+1) + 2(x+1)$
 $(x+1)(x^2 + 2)$
 $x = -1 \quad x^2 + 2 = 0$
 $x^2 = -2$
 $x = \pm i\sqrt{2}$

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HOMEWORK

...we <3 algebra.

2.3 (p. 127)
 {Part a (Tuesday's): 3, 9, 11, 15, 17, 19, 23}
 Part b (today's): 39, 41, 43, 45, 49, 53, 57, 61

Jan 16-9:03 AM