Student: Cole Lamers **Date:** 06/21/19	**Instructor:** Kelly Galarneau **Course:** CA&T Internet (70263) Galarneau	**Assignment:** 3.4, 3.5 Real & Complex Zeros of Poly Function

1.
Let $P(x) = a_n x^n + \ldots + a_0$ with integer coefficients. If $\frac{p}{q}$ is a rational zero of $P(x)$, then the possible values of

$$\frac{p}{q} = \frac{\text{possible factors of} \, \underline{\quad\quad}}{\text{possible factors of} \, \underline{\quad\quad}}.$$

Choose the correct answer for $\frac{p}{q}$ below.

- ○ **A.** $\dfrac{p}{q} = \dfrac{\text{possible factors of } x^n}{\text{possible factors of } a_0}$

- ✓ **B.** $\dfrac{p}{q} = \dfrac{\text{possible factors of } a_0}{\text{possible factors of } a_n}$

- ○ **C.** $\dfrac{p}{q} = \dfrac{\text{possible factors of } a_n}{\text{possible factors of } a_0}$

- ○ **D.** $\dfrac{p}{q} = \dfrac{\text{possible factors of } a_0}{\text{possible factors of } x^n}$

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2. List the potential rational zeros of the polynomial function. Do not attempt to find the zeros.

$$f(x) = 3x^4 - 6x^3 + x^2 - x + 1$$

Choose the answer below that lists the potential rational zeros.

- ○ **A.** $-1, 1, -\dfrac{1}{3}, \dfrac{1}{3}, -\dfrac{1}{6}, \dfrac{1}{6}$

- ○ **B.** $-1, 1, -3, 3$

- ○ **C.** $-1, 1, -3, 3, -6, 6, -\dfrac{1}{3}, \dfrac{1}{3}, -\dfrac{1}{6}, \dfrac{1}{6}$

- ✓ **D.** $-1, 1, -\dfrac{1}{3}, \dfrac{1}{3}$

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3. Find all rational zeros of the given polynomial function.

$$f(x) = x^3 + 3x^2 - 33x - 35$$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- ✓ **A.** The set of rational zeros of $f(x)$ is $\{\ \ -1, 5, -7\ \ \}$.
  (Type an integer or a simplified fraction. Use a comma to separate answers as needed.)

- ○ **B.** The given function has no rational zeros.

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4. Find all rational zeros of the given polynomial function.

$f(x) = x^3 + 5x^2 - 17x - 21$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

A. The set of rational zeros of f(x) is $\{$ $-1, -7, 3$ $\}$.
(Type an integer or a simplified fraction. Use a comma to separate answers as needed.)

B. The given function has no rational zeros.

5. Find all rational zeros of the given polynomial function.

$g(x) = 30x^3 + 151x^2 + 4x - 5$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

A.
The set of rational zeros of f(x) is $\left\{ -\dfrac{1}{5}, \dfrac{1}{6}, -5 \right\}$.

(Type an integer or a simplified fraction. Use a comma to separate answers as needed.)

B. The given function has no rational zeros.

6. Watch the video and then solve the problem given below.

Click here to watch the video.[1]

Find all zeros of the polynomial $P(x) = x^4 - x^3 - 8x^2 - 4x - 48$.

The solution set is $\{ -3, 4, 2i, -2i \}$. (Use a comma to separate answers as needed.)

   1: http://mediaplayer.pearsoncmg.com/assets/ogiSzoq62_rfApmfwXOpnXQVoCsjbR4m?clip=6

7. If P is a polynomial function with real coefficients and if $z = a + bi$ is a zero of P, then _____ is also a zero of P.

If P is a polynomial function with real coefficients and if $z = a + bi$ is a zero of P, then $a - bi$ is also a zero of P.

8. Find all solutions of the equation in the complex number system.

$x^2 + 81 = 0$

$x =$ $-9i, 9i$
(Simplify your answer. Type an exact answer, using radicals as needed. Express complex numbers in terms of i. Use a comma to separate answers.)

9. Solve.

$(t + 2)^2 + 49 = 0$

$t =$ $-2 - 7i, -2 + 7i$
(Type your answer in the form a + bi. Use a comma to separate answers as needed.)

10. Find all solutions of the following equation in the complex number system.

$(x - 1)(x - 6\,i)(x + 6\,i) = 0$

x = $\boxed{1, -6\,i\,, 6\,i}$

(Use a comma to separate answers as needed. Express complex numbers in terms of i.)

11. Information is given about a polynomial f(x) whose coefficients are real numbers. Find the remaining zeros of f.

Degree 3;   zeros: 1, $4 - i$

Enter the remaining zeros of f.

$\boxed{4 + i}$ (Use a comma to separate answers as needed.)

12. Solve the polynomial equation in the complex numbers.

$x^4 + 4x^3 + 4x^2 + 4x + 3 = 0$

The solution set is $\boxed{-1, -3, i, -i}$.

(Type an exact answer, using radicals as needed. Express complex numbers in terms of i. Use a comma to separate answers as needed.)