Date:
**AIM:** Zeros of a Function
**HMWK:** Wkst #114

**Do Now:** Solve for $x$, $x \in I$.

1. $x^2 = -36$  
2. $x^2 + 5 = 0$

**Note:** Zeros of a polynomial function:
1. Degree of a function = number of zeros
2. Can be real or complex, $a + bi$ (imaginary, $i$)
3. Real zeros are found on a graph, complex zeros (imaginary) are not
4. Can occur in multiples

**Together as a class . . .**

1. What are zeros?
2. What are other names or phrases for zeros?
3. What are the zeros of the graph?
4. How do we find the zeros of a polynomial function without a graph?
5. If we only know the zeros, how can we find the polynomial function?
Ex. Fill in the table.

\[
\begin{array}{|c|c|}
\hline
f(x) = (x+1)(x-1)(x^2 + 1) & g(x) = (x-1)(x-1)(x-1)(x+3)(x+3) \\
\hline
\text{Degree of the function?} & \\
\text{How many zeros in total?} & \\
\text{How many different zeros?} & \\
\text{List the real zeros.} & \\
\text{List the complex zeros.} & \\
\text{How many zeros would you see on a graph?} & \\
\hline
\end{array}
\]

Ex. Find a polynomial function with the given zeros and integral coefficients.

1. 1, -2
2. 2, \(\sqrt{3}, -\sqrt{3}\)
3. $2 + i, 2 - i$

Ex. Find the all the zeros.

1. $k(x) = x^4 - 81$
2. $f(x) = x^4 - x^2 - 12$
Together as a class . . .

Using your calculator, find the zeros of \( f(x) = x^2 - x - 4 \) to the nearest hundredth.

**HOW:**
1. Graph your function using "\( y= \)."
2. Go to **CALC** (2nd **TRACE**) and down to **ZERO**.
3. Using arrows, find the left bound of a zero (\( \text{ENTER} \)), right bound of the same zero (\( \text{ENTER} \)), "guess" is always (\( \text{ENTER} \)).

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