- Margaret and I will be available to help you with the problems. You should also ask your group members questions, and share your ideas with each other.
- Focus on **understanding** the solution each problem, and on being able to **explain** them to each other.

> A **Critical Number** for a function $f(x)$ is a value in the domain of $f(x)$ such that either $f'(x)$ is undefined, or $f'(x) = 0$.

1. Find the critical numbers for $f(x) = x\sqrt{1-x}$.
2. Find the critical numbers for $f(x) = \dfrac{x^2+1}{x+3}$.

   Note: there is a subtle detail in the definition of "critical number" above that is relevant in this problem: to count as a critical number, the value of x should be in the domain of $f(x)$. Although you may find that $f'(-3)$ is undefined for the function above, $x = -3$ does not count as a critical number, since the original function is not defined there either ($x = -3$ is not in the domain of $f(x)$).
3. Find the critical numbers for $f(x) = x^{\frac{3}{4}} - 2x^{\frac{1}{4}}$

> **Closed Interval Method:** Given a function f, continuous on a closed interval $[a, b]$, we can find the absolute maximum and minimum values of f on $[a, b]$ as follows:
> 1. Find the critical numbers for f in the interval.
> 2. Evaluate the function f at the critical numbers from Step 1, as well as at the endpoints a and b.
> 3. The largest and smallest of the values from Step 2 are the maximum and minimum values on the interval (respectively).

4. Find the maximum and minumum values of the function

$$F(x) = x^3 - 3x^2 \text{ on the interval } [-1, 1].$$

5. Find the maximum and minumum values of the function

$$G(x) = (x-1)^2(x-9)^2 \text{ on the interval } [0, 8].$$

6. Find the maximum and minumum values of the function

$$H(x) = \frac{10x}{x^2+1} \text{ on the interval } [0, 2].$$

7. Find the maximum and minimum values of the function

$$f(x) = x(x^2-5)^2 \text{ on the interval } [-2, 2].$$