The Method of Relaxation also works for Poission's equation (i.e., when there is charge!).

Given, $\nabla^2 V \approx \dfrac{V(x+a) - 2V(x) + V(x-a)}{a^2}$

Which equations describes the appropriate "averaging" that we must do:

A. $V(x) = \dfrac{1}{2}(V(x+a) - V(x-a))$

B. $V(x) = \dfrac{\rho}{\varepsilon_0} + \dfrac{1}{2}(V(x+a) - V(x-a))$

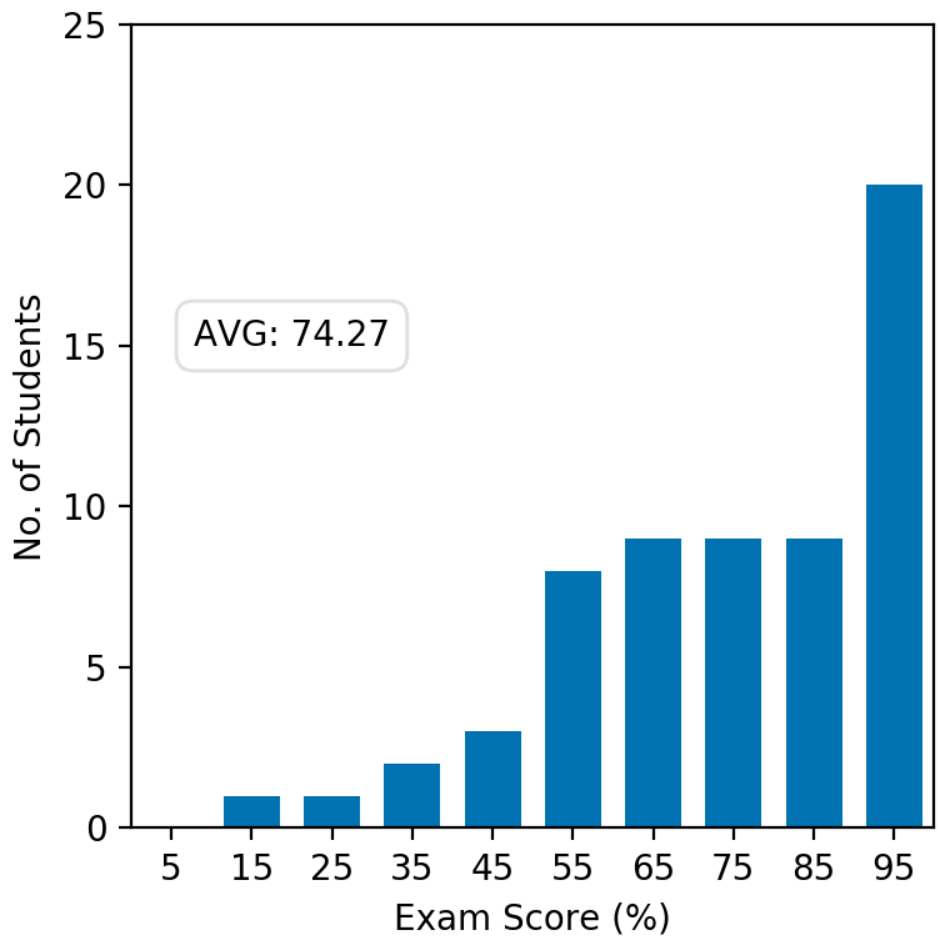
C. $V(x) = \dfrac{a^2\rho}{2\varepsilon_0} + \dfrac{1}{2}(V(x+a) - V(x-a))$

D. Something else

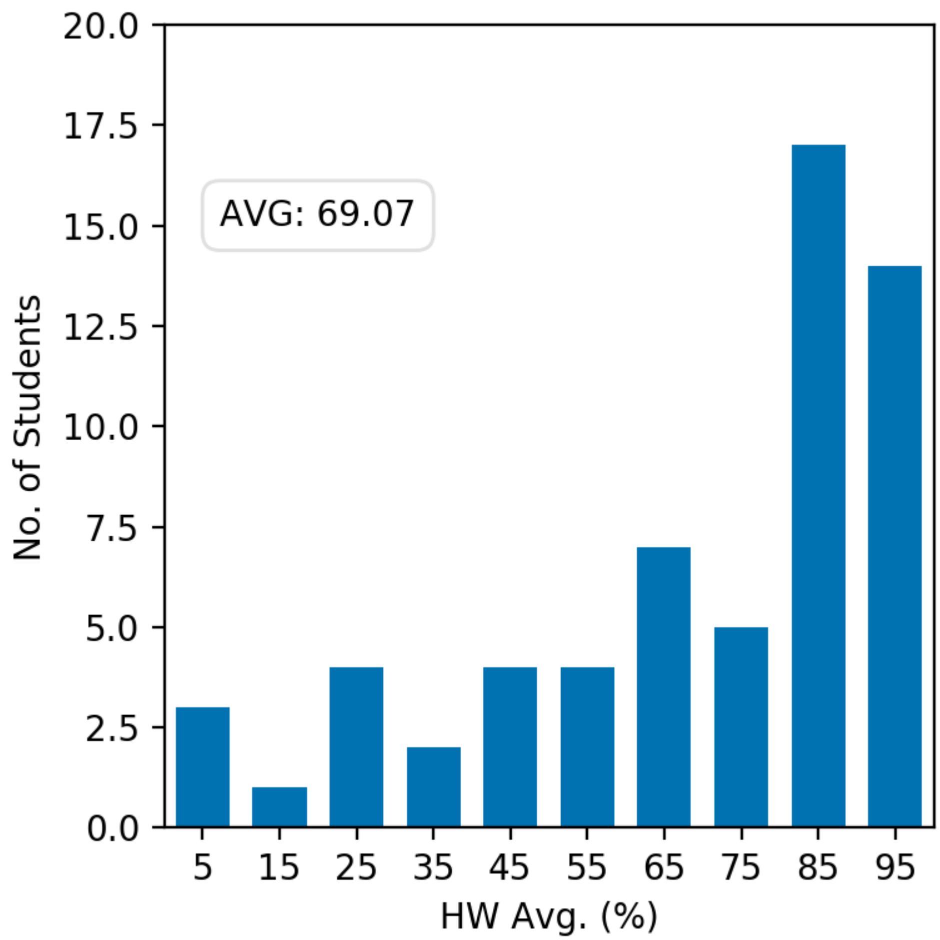
# ANNOUNCEMENTS

- Exam 1 is graded
  - Should have received email this morning with updated grades
- Danny out of town Friday
  - Norman Birge will substitute

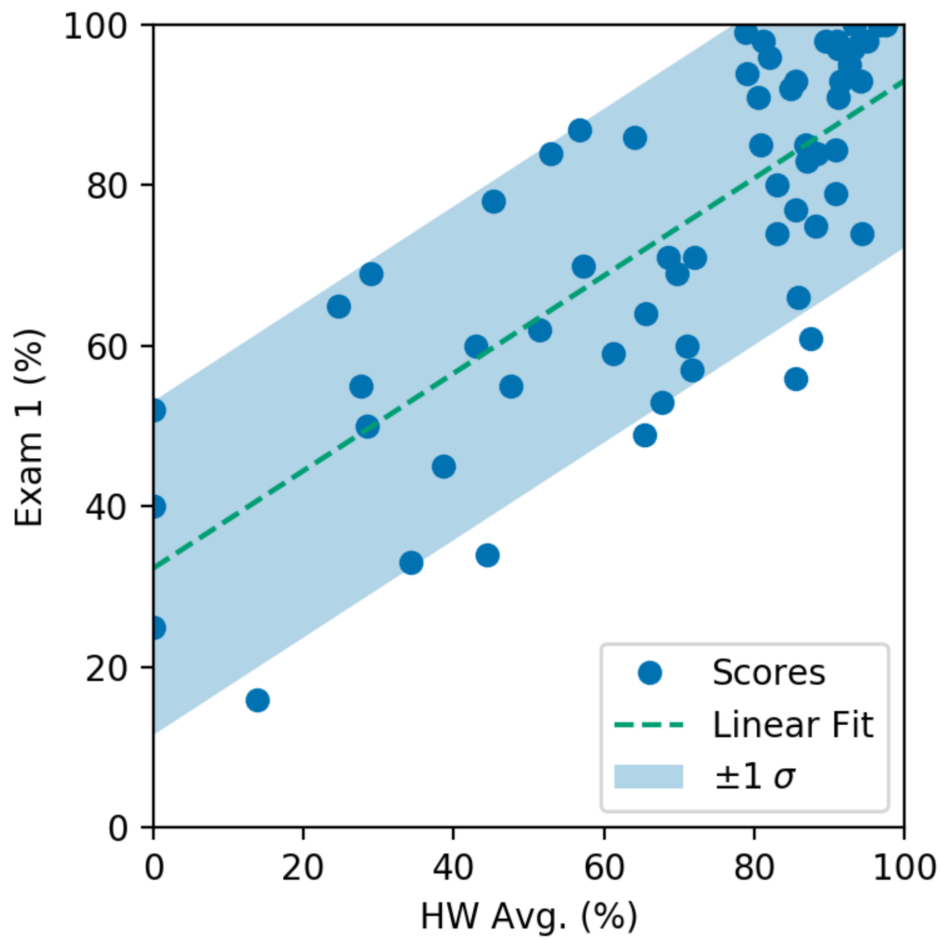
# EXAM 1 GRADES



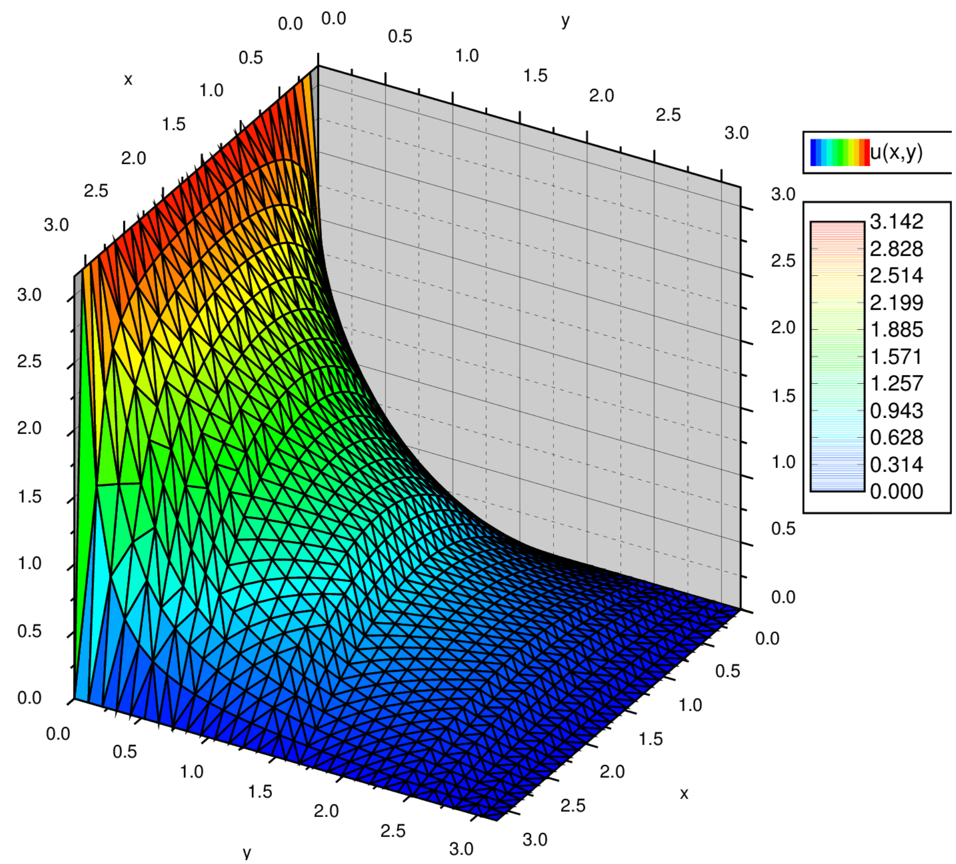
# HOMEWORK AVERAGES



# PLEASE DO YOUR HOMEWORK



# SEPARATION OF VARIABLES (CARTESIAN)



Say you have three functions $f(x)$, $g(y)$, and $h(z)$. $f(x)$ depends on $x$ but not on $y$ or $z$. $g(y)$ depends on $y$ but not on $x$ or $z$. $h(z)$ depends on $z$ but not on $x$ or $y$.

If $f(x) + g(y) + h(z) = 0$ for all $x, y, z$, then:

A. All three functions are constants (i.e. they do not depend on $x, y, z$ at all.)
B. At least one of these functions has to be zero everywhere.
C. All of these functions have to be zero everywhere.
D. All three functions have to be linear functions in $x$, $y$, or $z$ respectively (such as $f(x) = ax + b$)

If our general solution contains the function,

$$X(x) = Ae^{\sqrt{c}x} + Be^{-\sqrt{c}x}$$

What does our solution look like if $c < 0$; what about if $c > 0$?

A. Exponential; Sinusoidal
B. Sinusoidal; Exponential
C. Both Exponential
D. Both Sinusoidal
E. ???

Our example problem has the following boundary conditions:

- $V(0, y > 0) = 0; V(a, y > 0) = 0$
- $V(x_{0 \to a}, y = 0) = V_0; V(x, y \to \infty) = 0$

If $X'' = c_1 X$ and $Y'' = c_2 Y$ with $c_1 + c_2 = 0$, which is constant is positive?

A. $c_1$
B. $c_2$
C. It doesn't matter either can be