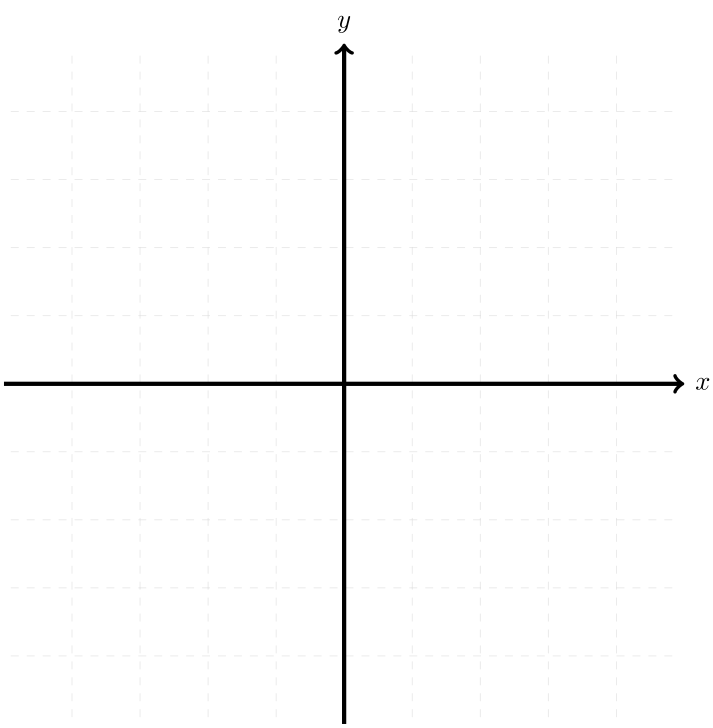
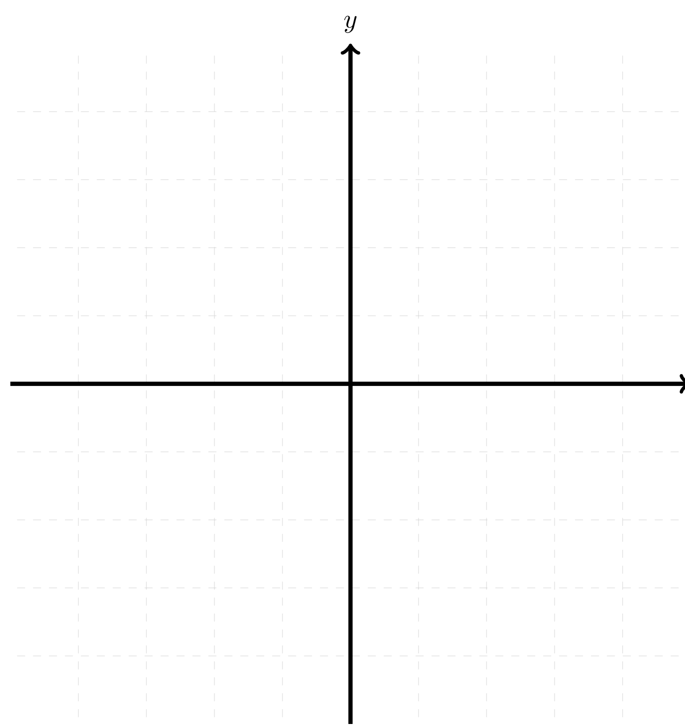
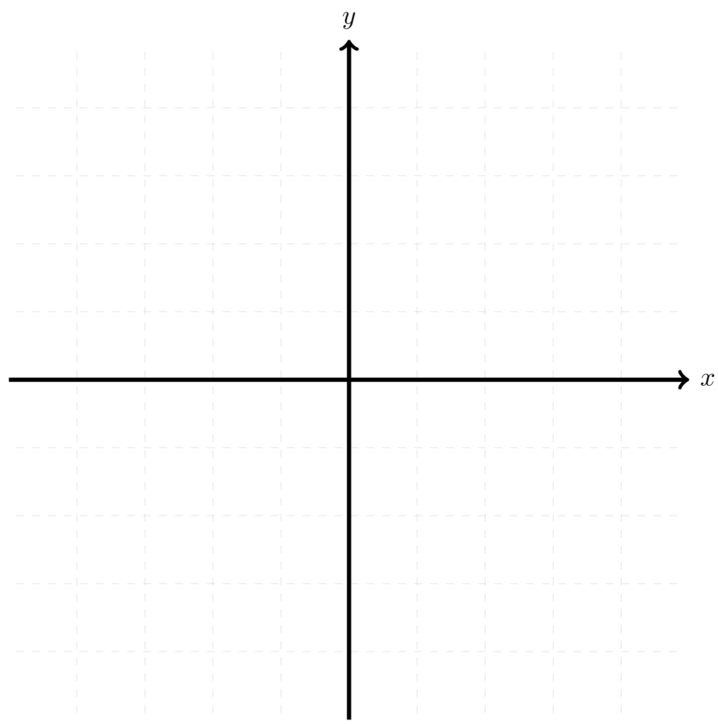
James McKeown's Math 162 exam I review worksheet 10/05/2017
This isn't worth anything and I don't care if you do it or not. It may or may not be similar to exam I.

Suppose $f(x) = \sqrt{x-2}$. Show f is one-to-one. Find $(f^{-1})'(2)$ using the inverse function theorem. Calculate f^{-1} and state its domain and range. Find $(f^{-1})'(x)$ and verify that evaluating at $x = 2$ gives the same thing you found before. Sketch a graphs of f and f^{-1}.





Sketch the curves $\frac{e^x}{2}, \frac{-e^{-x}}{2}$, and $\sinh(x)$. Label y-intercepts and functions.



For the purposes of this problem, make the (unrealistic) assumption that the *change* in the price of bitcoin at any given point in time is directly proportional to the price of bitcoin at that time.
A few years ago I invested \$100 in bitcoin. After $\ln(9)$ years (approximately 2.19722457734 years) my investment had grown to \$300. How much can I expect my bitcoin to be worth after $\ln(81)$ years (approximately 4.39444915467 years)? (hint: you shouldn't use a calculator and your answer should be a nice number.)

$\frac{d}{dx}\mathsf{log}_{10}(2+\mathsf{sin}x) =$

$\frac{d}{dx}\mathsf{sin}^{-1}(3+\mathsf{sin}x) =$

$\int \mathsf{e}^{2\theta}\mathsf{sin}(3\theta)d\theta =$

$\int \mathtt{tan}^5(\theta)\mathtt{sec}^7(\theta)d\theta =$

$\int \frac{2\pi}{\sqrt{3x^2-169}}dx =$

$\int \frac{x^4+1}{x(x^2+1)^2}dx =$

Use the Comparison Theorem to determine whether the integral is convergent or divergent.
$\int_1^\infty \frac{\cos^2(x)}{1+x^2}\,dx$

Find the values of p for which the integral converges and evaluate the integral for those values of p.
$\int_e^\infty \frac{1}{x(\ln x)^p}\,dx$