

Math 16B, Section 3 - Winter 2018
Instructor: Christopher O'Neill
Practice Exam 1

Last Name: _____ **First Name:** _____

Directions:

- The use of a calculator, cell phone, laptop or computer is prohibited.
- TURN OFF cell phones and put them away. If a cell phone is seen during the exam, your exam will be collected and you will receive a zero.
- Answer all of the questions, and present your solutions in the space provided. *Show all your work* neatly and concisely and *clearly indicate your final answer*. You will be graded not merely on the final answer, but on the quality and correctness of the work leading up to it.

The UC Davis Code of Academic Conduct

I will conduct myself with honesty, fairness, and integrity.

Signature: _____

(1) Match each function below to its graph.

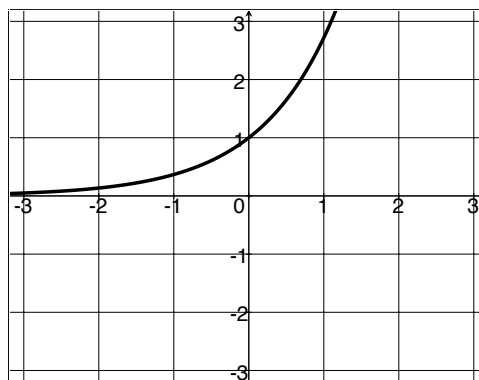
_____ $f(x) = 2^{-x}$

_____ $f(x) = \ln(x)$

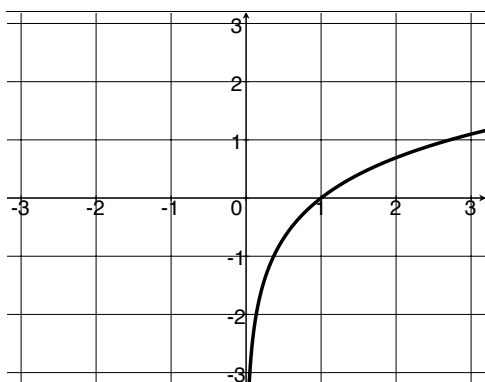
_____ $f(x) = \sin(x)$

_____ $f(x) = e^x$

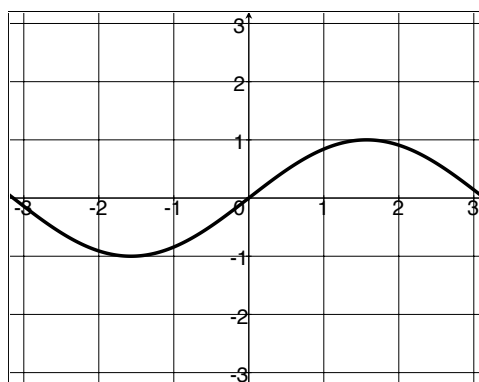
_____ $f(x) = \sqrt{x}$



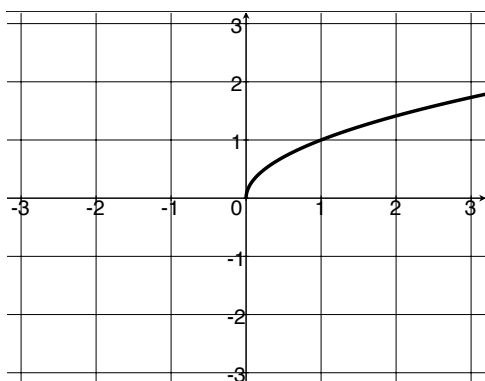
(a)



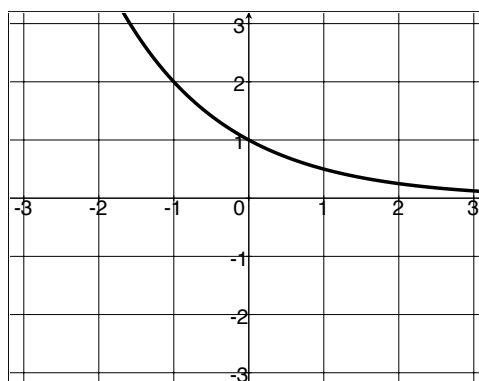
(b)



(c)



(d)



(e)

(2) Find the derivative of each of the following functions.

(a) $f(x) = \sqrt{x^6 + 2x^4 + 3x}$

(b) $f(x) = x \sin(x) + \cos(x)$

(c) $f(x) = x^2 e^{3x}$

(d) $f(x) = \ln(e^x(x-1)^2)$

(3) Chris decides to invest his life savings of \$4,000 in a savings account that yields 12% interest, compounded monthly.

(a) Find an equation for $B(t)$, the balance in Chris' account after t years.

(b) How long will Chris have to wait to have \$6,000 in his account?

(c) Chris has discovered a new bank that also offers 12% interest, but compounds continuously. Being a calculus teacher, he feels obligated to take advantage of this rare opportunity. If he invests his \$4,000 here instead, find an equation for $C(t)$, his balance after t years.

(4) Suppose 100g of a radioactive substance decays to 95g after 5 years.

(a) Find an equation for $R(t)$, the amount of substance remaining after t years.

(b) Find the half life of the substance.

(5) Write the following expression using only a single logarithm.

$$\ln(x) - \ln(2x + 3) + \ln(2) \log_2(x)$$

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(6) Find all possible solutions for x in the following equation.

$$\ln(x + 2) - \ln(2x + 3) = 0$$