MAT 171: CLASS NOTES - Section 4.1: Exponential Functions

1) **Exponential Function**

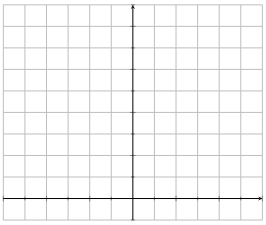
2) Evaluate the function at the indicated value of x. Round your result to three decimal places.

a) $f(x) = 2.3^x$ where $x = \frac{5}{2}$

b) $f(x) = 200(1.2)^{12x}$ where $x = 18$

3) Construct a table of values, then sketch the graph of the function.

a) $f(x) = 3^x$

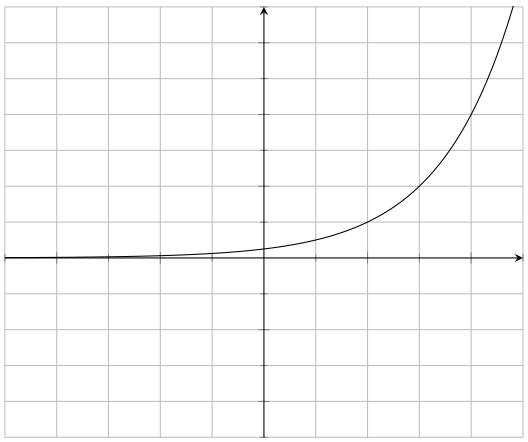


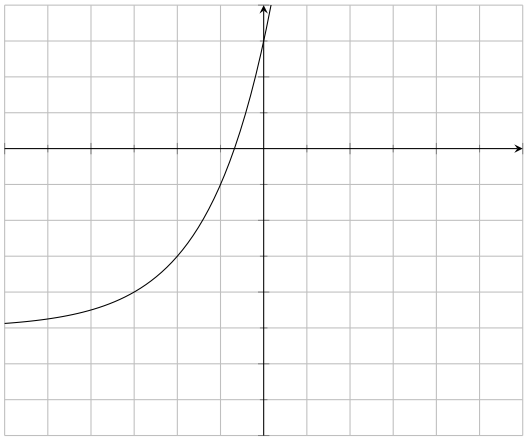
4) Use the graph of f to describe the transformation that yields the graph of g and draw a sketch

a) $f(x) = 2^x$ $\qquad$ $g(x) = 2^x - 3$

b) $f(x) = 5^x$ $\qquad$ $g(x) = -5^{x+2} + 4$

5) Write the equation that matches the graph given $f(x) = 2^x$





6) **Natural Exponential Function**

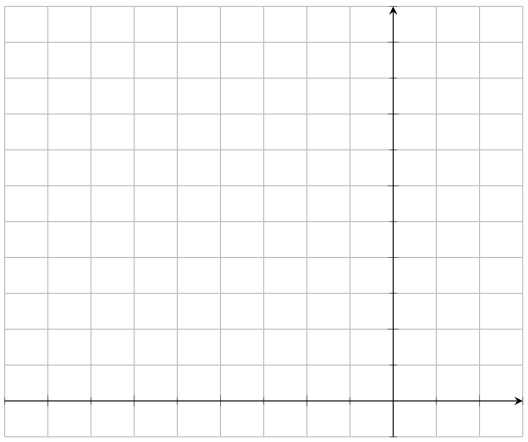
7) Evaluate the function at the indicated value of x. Round your result to three decimal places.

a) $f(x) = e^x$ where $x = 4.8$

b) $f(x) = 250e^{0.05x}$ where $x = 22$

8) Sketch $y = e^x$

9) Graph $y = e^{x+3}$



10) **Compound Interest Formula**

11) **Compound Interest, Compounded Continuously**

12) Find the accumulated value of an investment of \$7500 for 15 years at an interest rate of 5.25% if the money is

a) Compounded semiannually

b) Compounded quarterly

c) Compounded monthly

d) Compounded continuously

13) A deposit of \$5000 is made in a trust fund that pays 7.5% interest, compounded continuously. It is specified that the balance will be given to the college from which the donor graduated after the money has earned interest for 50 years. How much will the college receive?

14) Let Q represent a mass of carbon 14 (14C)(in grams), whose half-life is 5715 years. The quantity of carbon 14 present after t years is $Q = 10(\frac{1}{2})^{\frac{t}{5715}}$.

a) Determine the initial quantity (when $t = 0$)

b) Determine the quantity present after 2000 years.

15) The population P (in millions) of the United States from 1970 to 2000 can be approximated by the exponential function $P(t) = 203(1.0107)^t$, where t is the time, in years, with $t = 0$ corresponding to 1970. Use the model to estimate the population in the year

a) 2010

b) 2020

16) A meteorologist measures the atmospheric pressure P (in kilograms per square meter) at altitude h (in kilometers). A model for the data is given by $P = 10958e^{-0.15h}$.

a) What is the pressure at 0 kilometers?

b) What is the pressure at 8 kilometers?

c) What is the pressure at 125 kilometers?