Quiz 3 – 4.3, 5.1-5.4, Tools 6

Solutions

October 30, 2006

Show all work for full credit. If you use a trial-and-error or guess-and-check method, or read a numerical solution from a graph on your calculator when an algebraic method is available, you will not receive full credit.

- 1. Given the function $m(x) = \frac{x^2}{2}$.
 - (a) Graph m(x+3) and clearly label it on the coordinate axes below.
 - (b) Graph -3m(x+3) and clearly label it on the coordinate axes below.
 - (c) Graph -3m(x+3) + 7 and clearly label it on the coordinate axes below.

Solution.



- 2. Sketch of $f(x) = \log x$ and $g(x) = e^x$ on the coordinate axes below, clearly indicating which line is which function. Then answer the following questions.
 - (a) Compare the concavity of f(x) and g(x).
 - (b) State whether f(x) and/or g(x) is increasing or decreasing.

Solution.



f(x) is increasing and concave down. g(x) is increasing and concave up.

3. Let $f(x) = \sqrt{x}$ and $g(x) = \sqrt{-2(x+7)} - 4$. List the transformations required to obtain the graph of g(x) from the graph of f(x) in the correct order.

Solution. g(x) can be rewritten as $\sqrt{-2x-14} - 4$. Therefore, we see that the -2 has to be taken care of first. This gives $\sqrt{-2x}$. Then shifting left 7 units gives $\sqrt{-2(x+7)}$. Finally, take care of the -4.

- (a) horizontal shrink by $\frac{1}{2}$, then reflect horizontally (over the *y*-axis)
- (b) horizontal shift left 7 units
- (c) vertically shift down 4 units

The following questions are related to the Test 1 material. Your scores along with those on past and future quizzes will be used to determine if you have mastered the Test 1 material.

1. Find an equation for the line showing in the following figure. Your equation will involve the constants given on the graph. Be sure to simplify your answer.



Solution.
$$y = \frac{4N}{3M}x - \frac{N}{3}$$
.

2. (a) Find the domain of
$$s(x) = \frac{\sqrt{x-3}}{(x-3)^2}$$
.
Solution. $x \le 1$ and $x \ne 3$.

(b) Find the range of $r(x) = \frac{x+3}{6-x}$. Solution. $r \neq -1$.