Exam #3, ver A

March 9, 2018

Name _____

- You will be told when to begin the work and when to terminate work on the examination. You must stop when instructed. Points may be deducted in case of violations.

- Please show your work to support your answers that require calculations. Correct but unsupported answers may not be given full credit.

- The use of a cell phone or other electronic communication devices during the examination is not allowed. The exam will be canceled and a grade of "0" will be assigned to anyone who uses a cell phone during the examination or if one is found within hands reach.

- Calculators are not allowed on this exam.

- The exam consist of two parts. Part I contains four multiple choice questions worth 5 points each. Part II contains five open ended questions worth 10 points each if not stated otherwise.

Part I

Choose your answer from five available choices. No partial credit will be given for wrong answers.

1. Which of the following is a property of logarithms?

   (a) $\frac{\log A}{\log B} = \log\left(\frac{A}{B}\right)$

   (b) $\log\left(\frac{A}{B}\right) = \log A - \log B$

   (c) $\log(AB) = \log A \cdot \log B$

   (d) $B \log A = \log(AB)$

   (e) None of the above

2. The value of $\log_5(\log_7 7)$ is

   (a) -1

   (b) 1

   (c) 0

   (d) 5

   (e) None of the above

3. Choose the correct statement below regarding the following work:

$$\log(4) \cdot \log(25) = \log(100) = 2$$

   (a) The work is correct.

   (b) The work is incorrect since $\log(100)$ is not 2.

   (c) The work is incorrect since product of logarithms is not a logarithm of a product.

   (d) Cannot make a conclusion from the given steps.

4. The expression $3\log(x) - \frac{1}{2}\log(y) + 3\log(z)$ can be condensed to the following form.

   (a) $\log\left(\frac{3x}{\frac{1}{2}yz^3}\right)$

   (b) $\frac{\log x^3}{\log(\sqrt{y}z^3)}$

   (c) $\log\left(\frac{x^3 z^3}{\sqrt{y}}\right)$

   (d) $\log\left(\frac{x^2}{\sqrt{y}z^3}\right)$

   (e) None of the above

Part II

5. Let $f(x) = \log_2(-x + 3)$

(a) (5 pts) Find the domain of f. Show your work, and answer alone will get no credit.

(b) (10 pts) Graph the function using transformations. Start with the graph of a basic function – **plot accurately at least three points** and use them to perform the transformations. Do one transformation at a time. Name the transformation and write the equation of the resulting function. Draw asymptotes, if any.
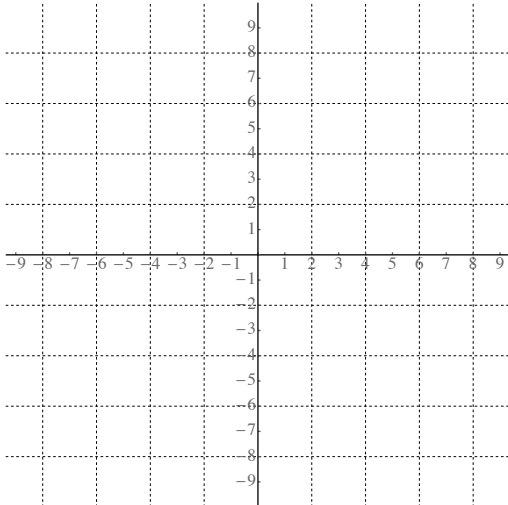
(i) Basic function:

y=

(ii) transformation:

y=
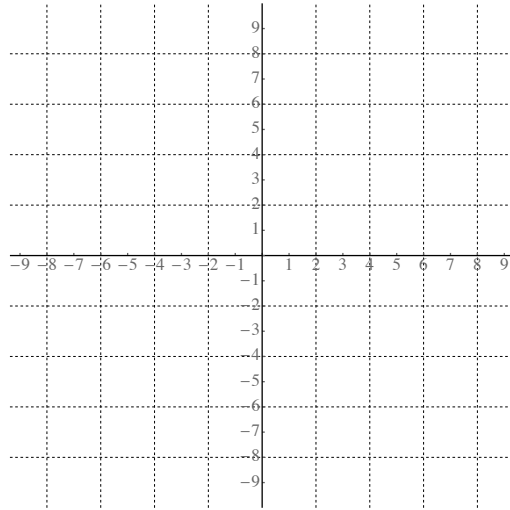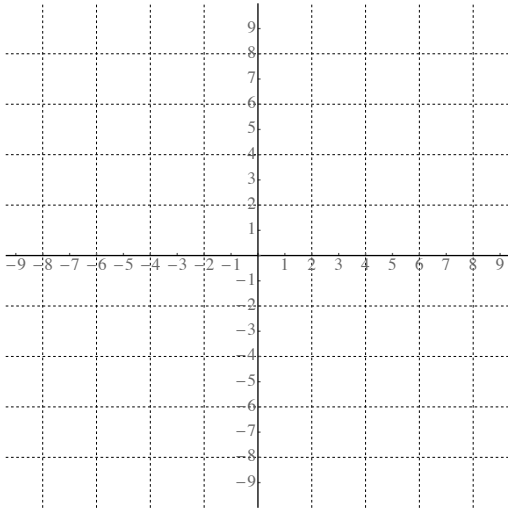
(iii) transformation:

y=

(c) (5 pts) Find the inverse of $f(x) = \log_2(-x + 3)$

6. (10 pts each) Solve the equation.

(a) $3 + e^{2x-1} = 5$

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

(c) $\ln(x + 9) - \ln(2x) = \ln(x + 2)$

(d) $\log_4(x^2 - 4) = 2$

7. Write as the sum and/or difference of logarithms. Express powers as factors.

$$\ln\left(\frac{(x-2)^5(x+1)^3}{x^3}\right)$$

8. If $f(x) = \log_6 x$ and $g(x) = \log_6(x+1)$, then what are the solutions of $(f+g)(x) = 1$?
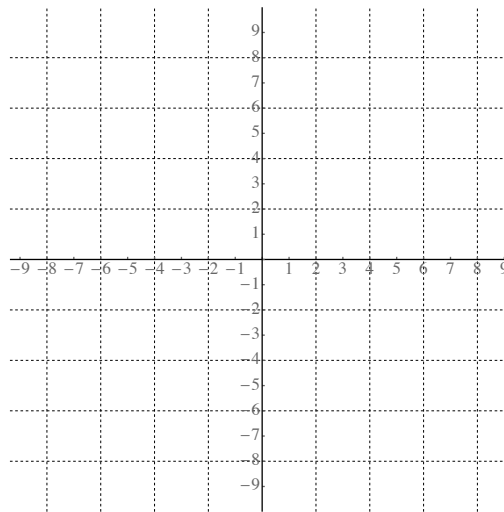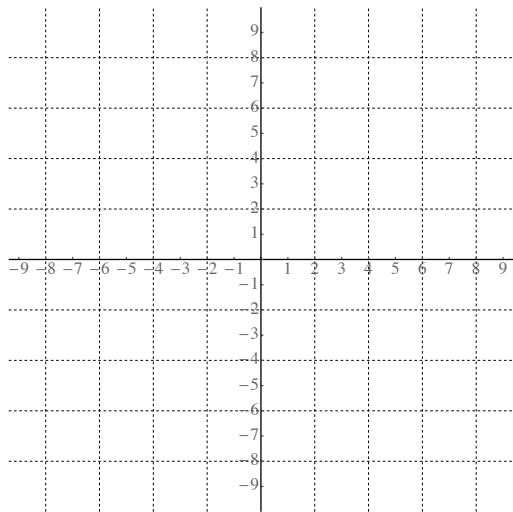
9. Graph $y = e^{x+5} - 3$ using transformations. Start with the graph of a basic function – **plot accurately at least three points** and use them to perform the transformations. Do one transformation at a time. Name the transformation and write the equation of the resulting function. Draw asymptotes, if any.
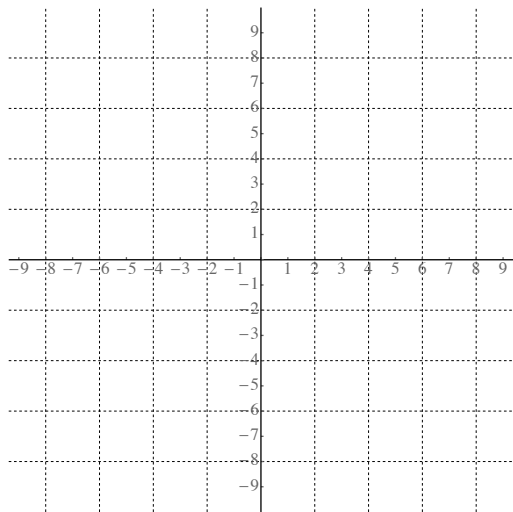
(i) Basic function:

y=

(ii) transformation:

y=

(iii) transformation:

y=

This page is intentionally left blank.