Practice Test 4 (Final) - 1314 - Spr 18

MULTIPLE CHOICE. (5pts each) Choose the one alternative that best completes the statement or answers the question. Write your choice in the space provided. No work will be graded. No partial credit.

Use properties of logarithms to condense the logarithmic expression. Write the expression as a single logarithm whose coefficient is 1. Where possible, evaluate logarithmic expressions.

1) $9\ln a - 7\ln b$ 1) _____

A) $\ln \frac{a^9}{b^7}$ B) $\ln \left(\frac{a}{b}\right)^{16}$ C) $\frac{\ln a^9}{\ln b^7}$ D) $\ln \frac{9a}{7b}$

Solve.

2) Let $\log_b A = 1.186$ and $\log_b B = 0.332$. Find $\log_b AB$. 2) _____

A) 0.854 B) 0.394 C) 3.572 D) 1.518

Solve the exponential equation. Express the solution set in terms of natural logarithms.

3) $4^{x+8} = 7$ 3) _____

A) $\{\ln 7 - \ln 4 - \ln 8\}$ B) $\left\{\frac{\ln 4}{\ln 7} + 8\right\}$

C) $\left\{\frac{\ln 7}{\ln 4} - 8\right\}$ D) $\left\{\frac{\ln 4}{\ln 7} + \ln 8\right\}$

Solve the problem.

4) Find out how long it takes a \$2800 investment to double if it is invested at 9% compounded quarterly. Round to the nearest tenth of a year. Use the formula $A = P\left(1 + \frac{r}{n}\right)^{nt}$. 4) _____

A) 8 years B) 7.6 years C) 7.8 years D) 8.2 years

Find the domain of the logarithmic function.

5) $f(x) = \log_8 (x + 6)$ 5) _____

A) $(8, \infty)$ B) $(-6, \infty)$ C) $(-\infty, 0)$ or $(0, \infty)$ D) $(6, \infty)$

Find the domain of the rational function.

6) $f(x) = \frac{x + 8}{x^2 - 4x}$ 6) _____

A) $\{x \mid x \neq -2, x \neq 2, x \neq -8\}$ B) $\{x \mid x \neq -2, x \neq 2\}$

C) $\{x \mid x \neq 0, x \neq 4\}$ D) all real numbers

For the given functions f and g , find the indicated composition.

7) $f(x) = \frac{2}{x + 5}$, $g(x) = \frac{7}{2x}$ 7) _____

$(f \circ g)(x)$

A) $\frac{2x}{7 + 10x}$ B) $\frac{4x}{7 + 10x}$ C) $\frac{4x}{7 - 10x}$ D) $\frac{7x + 35}{4x}$

Write an equation for a function that has a graph with the given characteristics.

8) The shape of $y = \sqrt{x}$ is shifted 2 units to the left. Then the graph is shifted 6 units upward. 8) _____

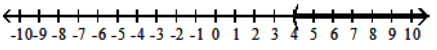
A) $f(x) = 6\sqrt{x + 2}$ B) $f(x) = \sqrt{x + 2} + 6$

C) $f(x) = \sqrt{x + 6} + 2$ D) $f(x) = \sqrt{x - 2} + 6$

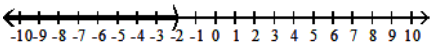
Solve the polynomial inequality and graph the solution set on a number line. Express the solution set in interval notation.

9) $(x + 5)(x + 2)(x - 4) > 0$ 9) _____

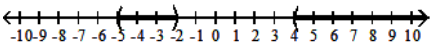
A) $(4, \infty)$



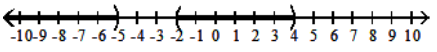
B) $(-\infty, -2)$



C) $(-5, -2) \cup (4, \infty)$



D) $(-\infty, -5) \cup (-2, 4)$



Find the average rate of change of the function from x_1 to x_2.

10) $f(x) = -3x^2 - x$ from $x_1 = 5$ to $x_2 = 6$ 10) _____

A) -2 B) $-\frac{1}{6}$ C) $\frac{1}{2}$ D) -34

SHORT ANSWER. (5pts each) Write the answer in the space provided. No work will be graded. No partial credit.

Write the equation in its equivalent exponential form.

11) $\log_b 64 = 3$ 11) _____

Use properties of logarithms to expand the logarithmic expression as much as possible. Where possible, evaluate logarithmic expressions.

12) $\log_5 \left(\frac{125}{\sqrt{x - 1}} \right)$ 12) _____

Solve the logarithmic equation. Be sure to reject any value that is not in the domain of the original logarithmic expressions. Give the exact answer.

13) $\log_6 (x + 2) = -1$ 13) _____

Solve the exponential equation by expressing each side as a power of the same base and then equating exponents. Note that the expression in the left hand side is 2 being raised to the power (3x + 7).

14) $2^{(3x + 7)} = \frac{1}{4}$ 14) _____

ESSAY. (6pts each) Show all work to justify your answer. Answer with no work or insufficient work will receive no credit. Partial credit may be given for correct work.

Solve the logarithmic equation. Be sure to reject any value that is not in the domain of the original logarithmic expressions. Give the exact answer.

15) $\ln (x - 2) - \ln (x + 2) = \ln (x - 9) - \ln (x + 4)$

Solve the exponential equation. Express the solution set in terms of natural logarithms.

16) $e^{x + 5} = 2$

Find the domain of the function.

17) $f(x) = \log_{10}\left(\frac{x + 6}{x - 4}\right)$

For the given functions f and g , find the indicated composition.

18) $f(x) = 4x^2 + 2x + 8, \quad g(x) = 2x - 4$

$(g \circ f)(x)$

Solve the polynomial equation by factoring and then using the zero product principle.

19) $3x^3 + 4x^2 = 27x + 36$