

Multiple-Choice:

Record all answers to multiple-choice questions here. To clearly distinguish between A and D, it is recommended that you use capital letters. (2 points each)

#1-30: See multiple-choice packet.

Free-Response: (Total 40 points...exact points are listed in *italics* in each problem.) You must show a reasonable amount of work that leads to your answer. Where it is impossible to show work, explain the mental leaps that you made to draw your conclusion.

#31-33: Solve each exponential equation for x. GIVE EXACT ANSWERS.

31. $-2 \cdot 3^{x+5} + 27 = 13$ (4 points)

32. $e^{2x} + 4e^x = 21$ (4 points)

33. $\frac{100}{13 + 2e^{x+4}} = 3$ (5 points)

#34-37: Solve each logarithmic equation for x. GIVE EXACT ANSWERS. Mark any extraneous answers as such.

34. $\log_4(3x^2) = \log_4(2x + 5)$ (6 points)

35. $\ln x + \ln(x - 5) = \ln 14$ (7 points)

36. $\log_3(x - 4) - \log_3(x - 2) = 2$ (7 points)

37. $\log_2 x + \log_2(x + 14) = 5$ (7 points)

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Rewrite the expression as a sum or difference or multiple of logarithms.

1) $\log_6(xy)$ 1) _____

A) $\log_6 x + \log_6 y$

B) $\log_3 x + \log_3 y$

C) $\log_3 x - \log_3 y$

D) $\log_6 x - \log_6 y$

2) $\log_2 \left(\frac{5\sqrt{m}}{n} \right)$ 2) _____

A) $\log_2 n - \log_2 5 - \frac{1}{2} \log_2 m$

B) $\log_2 5 \cdot \frac{1}{2} \log_2 m \div \log_2 n$

C) $\log_2(5\sqrt{m}) - \log_2 n$

D) $\log_2 5 + \frac{1}{2} \log_2 m - \log_2 n$

3) $\ln x^2 y^2$ 3) _____

A) $\ln(2x) + \ln(2y)$

B) $\ln x^2 \cdot \ln y^2$

C) $\ln(2x) \cdot \ln(2y)$

D) $2\ln x + 2\ln y$

4) $\log \sqrt[3]{\frac{x}{y}}$ 4) _____

A) $\log \left(\frac{x}{3} \right) - \log \left(\frac{y}{3} \right)$

B) $\frac{\log \left(\sqrt[3]{x} \right)}{\log \left(\sqrt[3]{y} \right)}$

C) $\frac{1}{3} \log x - \frac{1}{3} \log y$

D) $\frac{\log x}{\log y}$

Use the product, quotient, and power rules of logarithms to rewrite the expression as a single logarithm. Assume that all variables represent positive real numbers.

5) $\log_4 8 - \log_4 x$ 5) _____

A) $\log_4(8 - x)$

B) $\log_8 8/x$

C) $\log_4 8/x$

D) $\log_4 x/8$

6) $\frac{1}{2} \log_a x + 4 \log_a y - 3 \log_a x$ 6) _____

A) $\log_a \sqrt{x} y^4$

B) $\log_a x^5 y^4$

C) $\log_a x^3 y^4$

D) $\log_a \left(\frac{y^4}{x^{5/2}} \right)$

7) $9 \log_m z - 4 \log_m p^2$ 7) _____

A) $\log_m \frac{z^9}{p^6}$

B) $\log_m \frac{9z}{4p^2}$

C) $\log_m \frac{z^9}{p^8}$

D) $\log_m \frac{z^9}{2p^4}$

Use the change of base rule to find the logarithm to four decimal places.

8) $\log_3 15.14$

A) 2.4734

B) 1.1801

C) 0.4043

D) 5.0467

8) _____

Write the expression using only the indicated logarithms.

9) $\log_7 x$ using natural logarithms

A) $\frac{\ln x}{\ln 7}$

B) $\ln x + \ln 7$

C) $\ln x \cdot \ln 7$

D) $\frac{\ln 7}{\ln x}$

9) _____

10) $\log_{1/9} (a - b)$ using natural logarithms

A) $\frac{1}{\ln 9}$

B) $\frac{\ln (a - b)}{\ln 9}$

C) $-\frac{\ln (a - b)}{\ln 9}$

D) $\frac{\ln 9}{\ln (a - b)}$

10) _____

Evaluate the logarithm.

11) $\log_2 \left(\frac{1}{2}\right)$

A) 2

B) 0

C) -1

D) 1

11) _____

12) $\log_8(32)$

A) $\frac{5}{3}$

B) $\frac{3}{2}$

C) $\frac{4}{3}$

D) $\frac{5}{4}$

12) _____

13) $\ln e^6$

A) 1

B) $6 \ln e$

C) 6

D) e^6

13) _____

14) $\log 10,000,000$

A) -7

B) 1

C) 7

D) 10

14) _____

15) $\log_3 \sqrt[4]{\frac{1}{9}}$

A) $-\frac{1}{2}$

B) $\frac{1}{2}$

C) -2

D) 2

15) _____

Simplify the expression.

16) $e \ln 3$

A) $\ln 3$

B) 3

C) e^3

D) $\frac{1}{3}$

16) _____

17) $2^{\log_2 3}$

A) 3

B) 6

C) 8

D) 2

17) _____

Find the following using a calculator. Round to four decimal places.

18) $\ln 0$

A) -0.2354

B) -0.1997

C) -0.2108

D) Does not exist

18) _____

Solve the equation.

19) $2^{(8 - 2x)} = 16$

A) 4

B) 8

C) 2

D) -2

19) _____

20) $4^{-x} = \frac{1}{256}$

A) $\frac{1}{4}$

B) 4

C) -4

D) $\frac{1}{64}$

20) _____

Find the exact solution to the equation.

21) $9 - \log_{10}(x + 2) = 8$

A) $x = 12$

B) $x = 16$

C) $x = 8$

D) $x = -8$

21) _____

22) $4 \ln(x - 3) = 1$

A) $x = 4e + 3$

B) $x = e^{1/4} + 3$

C) $x = e^4 + 3$

D) $x = e^{1/4} - 3$

22) _____

23) $4 \cdot 4^{x/2} = 256$

A) $x = \frac{3}{2}$

B) $x = 3$

C) $x = 6$

D) $x = 5$

23) _____

Find the domain of the function.

24) $f(x) = \log(x - 9)$

A) $(9, \infty)$

B) $(0, \infty)$

C) $(-9, \infty)$

D) $(1, \infty)$

24) _____

25) $f(x) = \ln(9x - x^2)$

A) $(-9, 9)$

B) $(-\infty, 9]$

C) $(0, 9)$

D) $[-9, 0)$

25) _____

26) $f(x) = \log_{10} \frac{x+8}{x-3}$

A) $(-8, 3)$

B) $(3, \infty)$

C) $(-\infty, -8)$

D) $(-\infty, -8) \cup (3, \infty)$

26) _____

Solve the equation.

27) $\log(x + 3) = 1 - \log x$

A) -5, 2

B) -2

C) 2

D) -2, 5

27) _____

28) $\log 2x = \log 4 + \log(x - 5)$

A) 10

B) -1

C) $-\frac{10}{3}$

D) -10

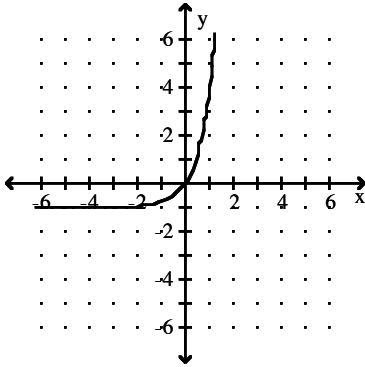
28) _____

Match the function f with its graph.

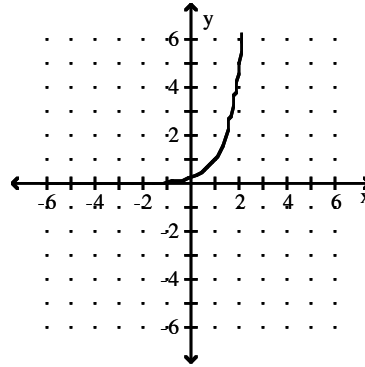
29) $f(x) = \log_5(x - 1)$

29) _____

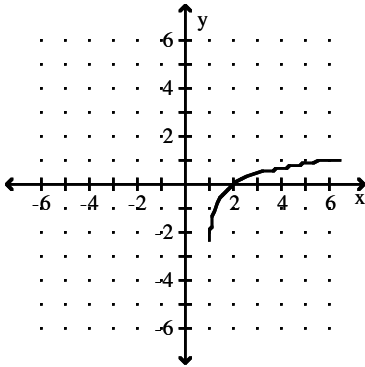
A)



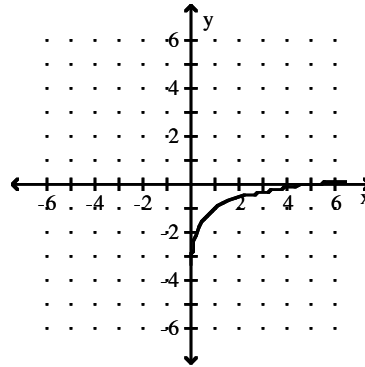
B)



C)



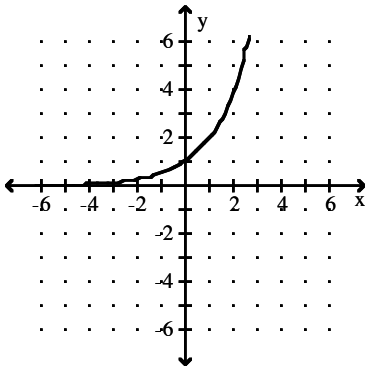
D)



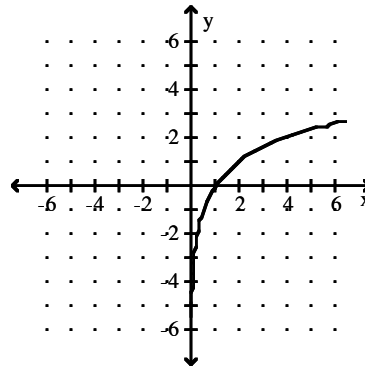
30) $f(x) = \log_2 x$

30) _____

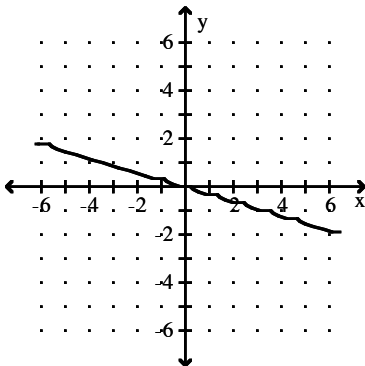
A)



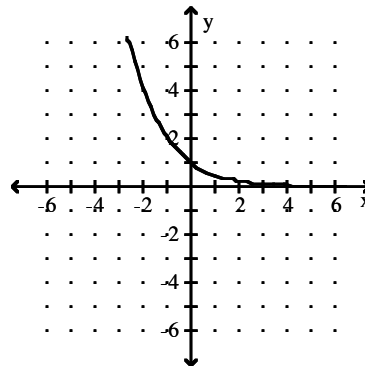
B)



C)



D)



Answer Key

Testname: HA2PC_CH6(A2)REVIEW

- 1) A
- 2) D
- 3) D
- 4) C
- 5) C
- 6) D
- 7) C
- 8) A
- 9) A
- 10) C
- 11) C
- 12) A
- 13) C
- 14) C
- 15) A
- 16) B
- 17) A
- 18) D
- 19) C
- 20) B
- 21) C
- 22) B
- 23) C
- 24) A
- 25) C
- 26) D
- 27) C
- 28) A
- 29) C
- 30) B