

Math 125, Intermediate Algebra

Practice Problems for Exam#5

Show all your work on this handout. If you use additional sheets of paper, you must staple them together ("folding corners" will NOT be accepted). No work, no staple, NO POINT!

Your Name: _____ Due Date: _____

(Q1.) Let $f(x) = \frac{1}{6}x$ and $g(x) = x^2 - 4x + 3$. Evaluate $(f \circ g)(-2)$

(A) $\frac{40}{9}$

(B) $\frac{5}{3}$

(C) $\frac{5}{2}$

(D) $\frac{3}{4}$

(Q2.) Let $f(x) = \frac{1}{6}x$ and $g(x) = x^2 - 4x + 3$. Evaluate $(g \circ f)(-2)$

(A) $\frac{40}{9}$

(B) $\frac{5}{3}$

(C) $\frac{5}{2}$

(D) $\frac{3}{4}$

(Q3.) If $f(x) = \frac{2}{3}x - 12$, then $f^{-1}(x) = ?$

(A) $\frac{3}{2}x + 18$

(B) $\frac{3}{2}x + 12$

(C) $\frac{3}{2x - 12}$

(D) $\frac{3}{2x + 18}$

(Q4.) If $f(x) = 8x^3 + 1$, then $f^{-1}(x) = ?$

(A) $\frac{1}{8x^3}$

(B) $\frac{1}{\sqrt[3]{2x+1}}$

(C) $\frac{\sqrt[3]{x-1}}{2}$

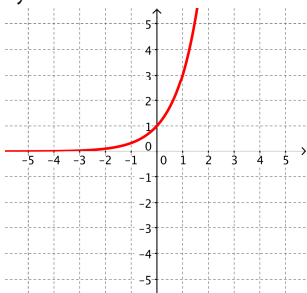
(D) $\frac{1}{8x^3 + 1}$

(Q5.) Let $f(x) = 9^x$. Evaluate $f(\frac{-1}{2})$

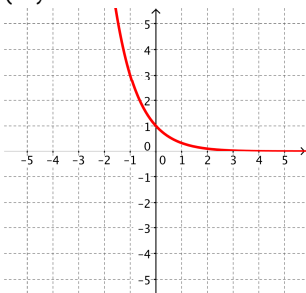
- (A) $\frac{1}{3}$
- (B) $3i$
- (C) -3
- (D) 3

(Q6.) Which of the following is the graph for $y = -3^x$?

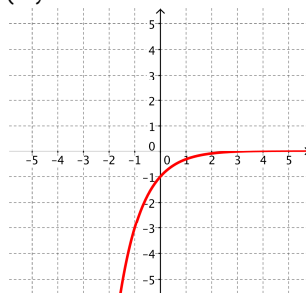
(A)



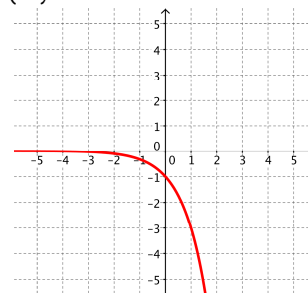
(B)



(C)



(D)



(Q7.) Which of the following best describes the function f ?

- (A) Exponential growth
- (B) Linear growth
- (C) Exponential decay
- (D) None of these

x	0	1	2	3	4
f(x)	7	13	19	25	31

(Q8.) Find an exponential function that models the data in the table

- (A) $f(x) = 5(4)^x$
- (B) $f(x) = 15x + 5$
- (C) $f(x) = 4(5)^x$
- (D) $f(x) = \frac{1}{15}x + 5$

x	0	1	2	3	4
y	5	20	80	320	1280

(Q9.) Mr. Jackson's art collection has been increasing in value by 6% per year. This year it was valued at \$20,000. Write an exponential equation for the value, V , of the collection t years from now.

- (A) $V = 20000(0.06)^t$
- (B) $V = 20000(1.06)^t$
- (C) $V = 20000 + 0.06t$
- (D) $V = 20000(0.94)^t$

(Q10.) Plutonium-238 decays at a rate of 0.8% per year. How much of a 50-gram sample will be left after 25 years?

- (A) 40.904 grams
- (B) 38.992 grams
- (C) 43.135 grams
- (D) 29.112 grams

(Q11.) The function $f(x) = 33.4 + 1.4 \log(x + 1)$ gives the salinity of ocean water at depth x meters. Find the salinity at a depth of 607 meters.

- (A) -29.50
- (B) 91.58
- (C) 94.38
- (D) 37.30

(Q12.) Evaluate $\log_{16}(2)$

- (A) 4
- (B) $\frac{1}{4}$
- (C) $\frac{1}{2}$
- (D) 8

(Q13.) Which of the following x value **cannot** be plugged into $\log(3 - x)$?

- (A) $x = 0$
- (B) $x = 2$
- (C) $x = 8$
- (D) $x = -1$
- (E) $x = -7$

(Q14.) Convert $8^2 = 64$ into logarithmic form

- (A) $\log_2 8 = 64$
- (B) $\log_2 8 = 256$
- (C) $\log_8 64 = 2$
- (D) $\log_8 2 = 64$

(Q15.) Which of the following is **true**?

- (A) $\log x = \log_e x$
- (B) $-\log x = \frac{1}{\log x}$
- (C) $\log(x + y) = \log(x) + \log(y)$
- (D) $\log \sqrt[3]{x} = \frac{1}{3} \log x$
- (E) $\log(0) = 0$

(Q16.) Expand $\log_5 \left(\frac{125}{y^2 z^7} \right)$

- (A) $3 - 2 \log_5(y) - 7 \log_5(z)$
- (B) $3 - 2 \log_5(y) + 7 \log_5(z)$
- (C) $5 - 2 \log_5(2y) - 7 \log_5(7z)$
- (D) $3 - \log_5(2y) + \log_5(7z)$

(Q17.) Expand $\log_b \frac{x^4}{\sqrt{y}}$

- (A) $4\log_b x - 4\log_b y$
- (B) $4\log_b x - \sqrt{\log_b y}$
- (C) $\frac{8\log_b x}{\sqrt{\log_b y}}$
- (D) $4\log_b x - \frac{1}{2}\log_b y$

(Q18.) Combine $\log(x) + \frac{1}{2}\log(y) - 5\log(z)$

- (A) $\log\left(\frac{x\sqrt{y}}{z^5}\right)$
- (B) $\log(x + \sqrt{y} - z^5)$
- (C) $\frac{\log(x)\log(\sqrt{y})}{\log(z^5)}$
- (D) $\log\left(\frac{\frac{1}{2}xy}{5z}\right)$

(Q19.) Combine: $\frac{5}{3}\log_2 x - 3\log_2 y - \log_2 z$

- (A) $\log_2\left(\frac{\sqrt[5]{x^3}}{y^3 z}\right)$
- (B) $\log_2\left(\frac{\sqrt[3]{x^5}}{3yz}\right)$
- (C) $\log_2\left(\frac{\sqrt[5]{x^3}}{3y - z}\right)$
- (D) $\log_2\left(\frac{\sqrt[3]{x^5}}{y^3 z}\right)$

(Q20.) Which of the following equations has **no solution**?

- (A) $\log_2(x) = -3$
- (B) $2^x = -8$
- (C) $\sqrt[3]{x} = -2$
- (D) $x^{\frac{1}{2}} = 0$
- (E) $x^3 = -27$

(Q21.) Solve $3^{9-3x} = 27$

(A) 9

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

(C) 2

(D) -2

(Q22.) Solve: $3^{x+6} = 4$

(A) $\frac{\log 3}{\log 4} + \log 6$

(B) $\frac{\log 3}{\log 4} + 6$

(C) $\frac{\log 4}{\log 3} - 6$

(D) $\log 4 - \log 3 - \log 6$

(Q23.) Solve: $6500(3)^{\frac{t}{12}} = 75000$

(A) 5.11

(B) 32.16

(C) 46.15

(D) 26.71

(Q24.) Solve $\log_2(14 - x) = 5$

(A) $x = -32$

(B) $x = -18$

(C) $x = 4$

(D) $x = -9$

(E) No Solution

(Q25.) Solve: $\log_9 4 + \log_9 x = 1$

(A) $x = \frac{4}{9}$

(B) $x = \sqrt[4]{9}$

(C) $x = \frac{1}{4}$

(D) $x = \frac{9}{4}$

(Q26.) Solve $\log_{36}(x+5) - \log_{36}(2x) = \frac{1}{2}$

(A) $x = \frac{5}{12}$

(B) $x = -1$

(C) $x = \frac{5}{11}$

(D) $x = 1$

(E) $x = \frac{8}{15}$

(Q27.) Solve: $\log_4(x) + \log_4(x - 6) = 2$

- (A) $x = 8$ only
- (B) $x = 2$ and $x = 8$
- (C) $x = -2$ only
- (D) $x = -8$ and $x = -2$

(Q28.) How long does it take for \$8,300 to double if it is deposited in an account that yields 8% interest rate and compounded **quarterly**? Hint: $A = P\left(1 + \frac{r}{n}\right)^{nt}$

- (A) 11.39 years
- (B) 10.39 years
- (C) 9.12 years
- (D) 8.75 years
- (E) 27.39 years

(Q29.) Solve the following, round your answer to 3 decimal places

(a) $3^x = 200$ **ANS:** _____

(b) $x^3 = 200$ **ANS:** _____

(c) $x^{\frac{1}{3}} = 5$ **ANS:** _____

(d) $\log_3(x) = 5$ **ANS:** _____

(Q30.) Solve $\log_{20}(x - 3) + \log_{20}(x - 2) = 1$ **ANS:** _____