

Algebra 2 - 1st Midterm Exam 2nd Semester Practice Test

- 1 An initial population of 445 quail increases at an annual rate of 32%. Write an exponential function to model the quail population after x years.
- 2 Solve: $5^{24-3x} = 125^{x+2}$
A) $9/2$ B) 3 C) $-1/3$ D) $-3/10$
- 3 Graph: $y = 2(4)^x$
- 4 Which is the first *incorrect* step in simplifying $\log_4 2 + \log_4 32$?
Step 1: $\log_4 2 + \log_4 32 = \log_4 (2 \cdot 32)$
Step 2: $\log_4 (2 \cdot 32) = \log_4 64$
Step 3: $\log_4 64 = 16$
- 5 Solve: $\log 5x + \log 9 = 2$.
- 6 Which of these is *not* equivalent to $\log_7 24$?
A) $\log_7 48 - \log_7 2$ C) $\log_7 2 + \log_7 4 + \log_7 3$
B) $\frac{\log 24}{\log 7}$ D) $(\log_7 8)(\log_7 3)$
- 7 A bag has 5 large red marbles, 6 large green marbles, and 4 small red marbles. What is the probability of drawing a small marble or a red marble?
- 8 Evaluate: $\log_6 \frac{1}{216}$
- 9 A bag has four marbles: one red, one yellow, one blue, and one green. Two marbles are taken from the bag. What is the probability that the two marbles are red and then green?
- 10 Write the equation in logarithmic form: $5^4 = 625$
- 11 Solve $5^{3x} + 4 = 12$.
- 12 Write $(a^{-3})^{-\frac{4}{3}}$ in simplest form.
- 13 What is the solution to the equation $4^{3x} = 97$?
- 14 Solve: $2e^{2x} - 3 + 7 = 15$
- 15 Calculate how long it takes for \$300 to double if interest is compounded continuously at 8.5%.

16 Which is the first *incorrect* step in simplifying $(14^{-5} \cdot 6^3)^2$?

Step 1: $(14^{-5} \cdot 6^3)^2 = \left(\frac{6^3}{14^5}\right)^2$

Step 2: $\left(\frac{6^3}{14^5}\right)^2 = \frac{(6^3)^2}{(14^5)^2}$

Step 3: $\frac{(6^3)^2}{(14^5)^2} = \frac{6^5}{14^7}$

17 Which of these is equivalent to $\log 225$?

A) $\log_5 3$

C) $\log_5 25 + \log_3 9$

B) $2 \log 3 + 2 \log 5$

D) $(\log 3)^2 (\log 5)^2$

18 Simplify: $\sqrt{2.89}$

A) 1.7

C) 1.45

B) 8.35

D) 10

19 Solve: $\sqrt{x - 10} - 2 = 7$

20 If $\log(12x + 40) = 2$, what is the value of x ?

21 Two bags contain white balls and yellow balls. The first bag contains 4 white balls and 2 yellow balls and the second bag contains 6 white balls and 8 yellow balls. A ball is drawn at random from each bag. What is the probability that both balls are white?

22 Simplify: $27^{\frac{2}{3}}$

23 Condense: $\log_6 28 - \log_6 7$

24 A certain radioactive element decays over time according to the equation $y = A \left(\frac{1}{2}\right)^{\frac{t}{12}}$, where

A = the number of grams present initially and t = time in days. If 64 grams were present initially, about how many grams will remain after 36 days?

- 25 Simplify: $\ln e^4 - 5 \ln 1$.
- 26 Expand: $\log_8 6b^4$
- 27 Solve $\ln(4 - x)^3 = 18$.
- 28 The table shows the number of squirrels in a particular forest t years after a forest fire. Write a function to model the situation in the form of $y = a(b)^t$.

Number of Squirrels

Years	Squirrels
0	10
1	40
2	160

- 29 Write the equation $\log_{13} 7 = \frac{3}{4}$ in exponential form.
- 30 Simplify: $(-3g^2h^4)^3(g^7h^6)^3$
- 31 What is the missing information?
 $\log 5x^{-7}y^4 = \underline{\hspace{2cm}}? \underline{\hspace{2cm}} = \log 5 - 7 \log x + 4 \log y$
- 32 Which of these is *not* equivalent to $\log_7 49^4$?
 A) $4 \log_7 49$
 B) 8
 C) 7^4
 D) $\log_7 49 + \log_7 49 + \log_7 49 + \log_7 49$
- 33 Use the properties of logarithms to evaluate $\log_2 8 + \log_2 20 - \log_2 5$.
- 34 Solve $\log(2x + 8) = 3$.
- 35 Condense: $3 \ln 8 + 3 \ln y$
- 36 Which function represents exponential growth?
 A) $f(x) = 18 \left(\frac{2}{3} \right)^x$
 B) $f(x) = 20x$
 C) $f(x) = (0.5)^x$
 D) $f(x) = -12^x$

37 Which is the first *incorrect* step in simplifying $(\log_2 10)(\log 2^2)$?

$$\text{Step 1: } (\log_2 10)(\log 2^2) = \left(\frac{\log 10}{\log 2}\right)(2 \log 2)$$

$$\text{Step 2: } \left(\frac{\log 10}{\log 2}\right)(2 \log 2) = \frac{2 \log 2}{\log 2}$$

$$\text{Step 3: } \frac{2 \log 2}{\log 2} = 2$$

38 Find the standard deviation of the data set. 14, 5, 11

39 Graph: $y = \left(\frac{1}{2}\right)^x$

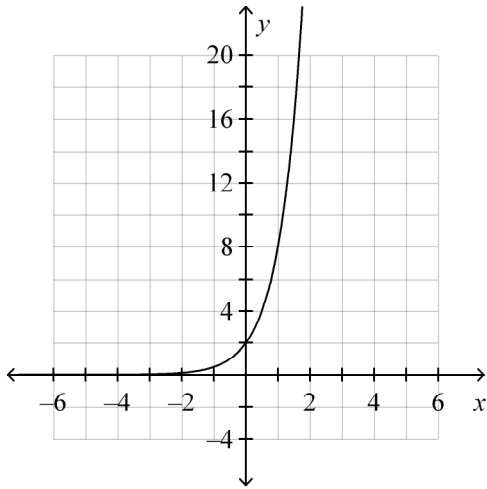
40 If $\log 3 \approx 0.477$ and $\log 5 \approx 0.699$, what is the approximate value of $\log 150$?

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Answer Section

1 $f(x) = 445(1.32)^x$

2 B

3



4 Step 3

5 2.22

6 D

7 $\frac{3}{5}$

8 -3

9 $\frac{1}{12}$

10 $\log_5 625 = 4$

11 $\frac{\log 8}{3 \log 5}$

12 a^4

13 $x = \frac{\log_{10} 97}{3 \log_{10} 4}$

14 $\frac{3 + \ln 4}{2}$

15 $\frac{\ln 2}{0.085}$ yrs

16 Step 3

17 B

18 A

19 91

20 5

21 $\frac{2}{7}$

22 9

23 $\log_6 4$

24 8 grams

25 4

26 $\log_8 6 + 4 \log_8 b$

27 $4 - e^6$

28 $y = 10(4)^t$

29 $13^{\frac{3}{4}} = 7$

30 $-27g^{27}h^{30}$

31 $\log 5 + \log x^{-7} + \log y^4$

32 C

33 5

34 496

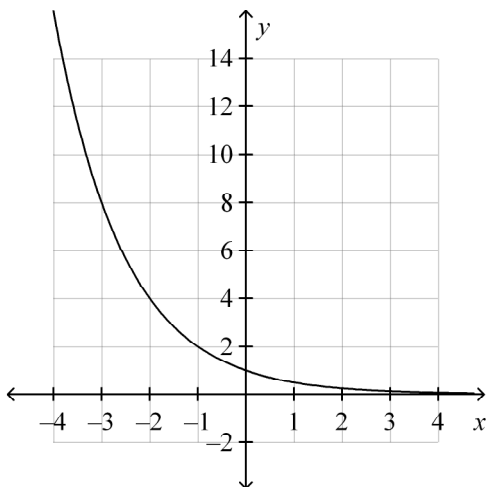
35 $\ln 512y^3$

36 D

37 Each step is correct.

38 6.5

39



40 2.176