Exponential Functions: Chapter 6

Practice Questions	**Notes**
1. Solve $4^{5-x} = \frac{1}{256}$ for x A) 2 B) 4 C) 6 D) 9	D
2. Solve $3^{4x+3} = 81^{-3}$ A) -1.5 B) -2.5 C) -3.75 D) -5	C
3. To begin solving the equation $3^{x-2} = 4^{x-2}$, A) express both powers with a common base. B) take the logarithm of both sides of the equation. C) express both sides of the equation in exponential form. D) divide both sides of the equation by 3 and then subtract the exponents.	B
4. Which of the following equations could be used to algebraically solve the exponential equation $3^{x-1} = 9^{x-3}$? **A.** $3^{(x-1)} = 3^{(2x-3)}$ **B.** $3^{(x-1)} = 3^{(2x-6)}$ **C.** $9^{(2x-1)} = 9^{(x-3)}$ **D.** $9^{(2x-2)} = 9^{(x-3)}$	B

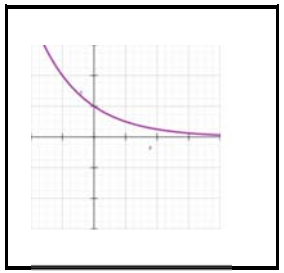
5. The point $P\ (x, 0.91)$ lies on the graph of the function $y = \left(\frac{3}{7}\right)^x - 4$. The value of x is:

A) –0.25
B) –1.88
C) –3.49
D) –3.54

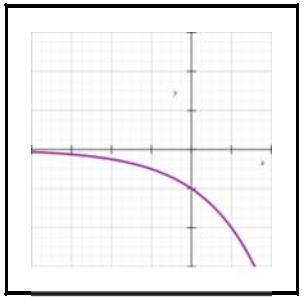
B

6. Which of the following graphs is $y = -2^x$

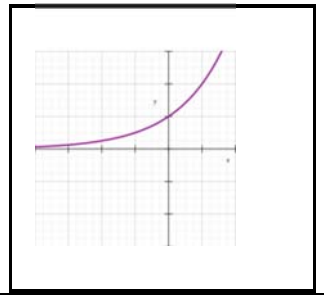
A)



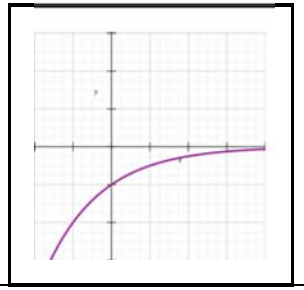
C)



B)



D)



C

7. *Use the following information to answer the question.*

From 1997 to 2008, the population of a particular town grew at an average rate of 5.4%/a. During this 11-year period, its population, P, can be modelled by the exponential function

$$P = x(1 + r)^n$$

where x is the population in 1997, r is the average annual growth rate, and n is the number of years since 1997. In 2008, the population was 14 030.

According to the model, the population of this town in 1997 was approximately

A) 121
B) 828
C) 1210
D) 7867

D

8. *Use the following information to answer the question.*

The 2010 earthquake in Haiti measured 7.0 on the Richter scale. In 2004, an earthquake off Indonesia measuring 9.1 on the same scale caused a tsunami. In order to compare the relative intensities, I, of these two earthquakes, the following formula may be used:

$$I = \frac{10^m}{10^n}$$

where m and n are the Richter scale values of each earthquake.

Compared to the earthquake in Haiti, the earthquake off Indonesia, to the nearest whole number, was _____ times stronger.

126

9. *Use the following information to answer the question.* Ahmed invested $1 000 for four years into an account that pays 3%/a, compounded annually. Which of the following functions models the value, V, of Ahmed's investment in four years time? **A.** $V = 1\,000(1.03)^4$ **B.** $V = 1\,000(0.03)^4$ **C.** $V = 1\,000(1.03)(4)$ **D.** $V = 1\,000(0.03)(4)$	A
10. The value of a particular car is decreasing at an average rate of 18%/a. The initial value of the car was $29 300. Which of the following exponential functions could be used to model the value of the car, $v(t)$, after t years? **A.** $v(t) = 5\,274(0.82)^t$ **B.** $v(t) = 5\,274(1.18)^t$ **C.** $v(t) = 29\,300(0.82)^t$ **D.** $v(t) = 29\,300(1.18)^t$ ***SE***	C
11. Sam deposits $100 into a savings account that pays 2.4%/a, compounded annually. A function that models the growth of the deposit is $$y = 100(1.024)^x$$ where y is the value of the investment, in dollars, and x is the number of years since the deposit was made. Determine how long, to the nearest year, that it will take for the investment to be worth at least $180.	25 years

12.

The half-life of carbon-14 is approximately 5 730 years. As a sample of carbon-14 decays, the percentage of carbon-14 remaining, P, at any time during the process can be modelled by the function

$$P = 100\left(\frac{1}{2}\right)^{\left(\frac{t}{5\,730}\right)}$$

where t is the approximate age of the sample, in years.

To the nearest year, determine the approximate age of the carbon-14 when 33% of the original amount remains in the sample.

9165 years

13.

A researcher discovered mould growing in a Petri dish in her laboratory. When first observed, the mould covered only 3% of the dish's surface. Every 24 h, the surface area of the mould doubles in size, as shown in the table below.

Time (h)	Area covered (%)
0	3
24	6
48	12
72	24

Write an exponential regression equation to model the growth of the mould over time.

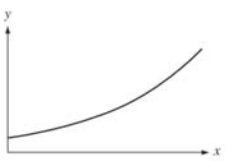
Determine the length of time, to the nearest tenth of an hour, that it will take for the Petri dish to be completely covered with mould.

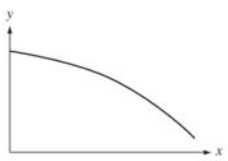
$y = 3(1.02930237\ldots)^x$

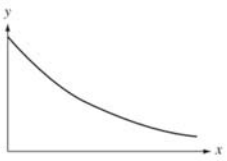
121.4 h

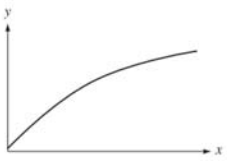
14.

A painting was purchased in 2012 for $10 000. If the painting appreciates in value at 5%/a, then which of the following graphs best models the value of this painting for the next 40 years?

A. 

B. 

C. 

D. 

A

15.