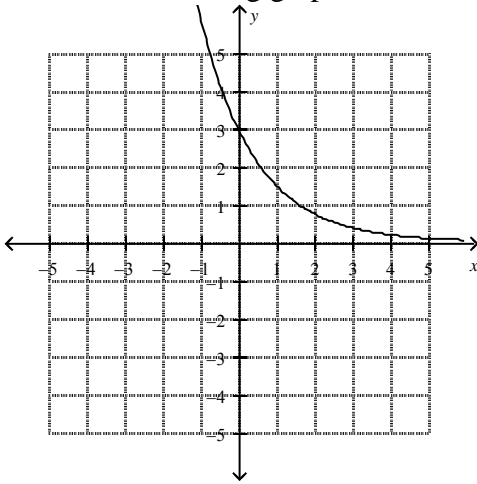


Multiple Choice

\_\_\_\_\_ 1. Which of the following is an exponential function?

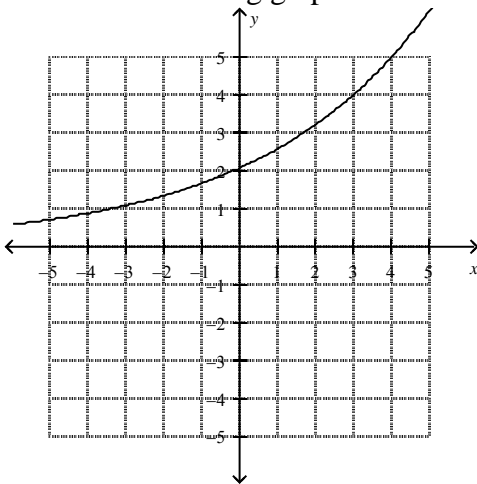
- A.  $f(x) = x^2$
- B.  $g(x) = (-1)^x$
- C.  $h(x) = 17^x$
- D.  $j(x) = 2^3 - x$

\_\_\_\_\_ 2. Match the following graph with its function.



- A.  $y = 3(0.5)^x$
- B.  $y = 2(1.25)^x$
- C.  $y = 0.5(3)^x$
- D.  $y = 2(0.75)^x$

\_\_\_\_\_ 3. Match the following graph with its function.



- A.  $y = 3(0.5)^x$
- B.  $y = 2(1.25)^x$
- C.  $y = 0.5(3)^x$
- D.  $y = 2(0.75)^x$

\_\_\_\_\_ 4. Identify the range of the exponential function  $y = 10^x$ .

- A.  $\{y \mid y < 0, y \in \mathbb{R}\}$
- B.  $\{y \mid y > 0, y \in \mathbb{R}\}$
- C.  $\{y \mid y \neq 0, y \in \mathbb{R}\}$
- D.  $\{y \mid y \in \mathbb{R}\}$

- \_\_\_\_\_ 5. Determine the y-intercept of the exponential function  $f(x) = 4\left(\frac{1}{2}\right)^x$ .
- 0
  - 1
  - 2
  - 4
- \_\_\_\_\_ 6. Which option best describes the behaviour of the exponential function  $f(x) = 4\left(\frac{1}{2}\right)^x$ ?
- increasing because  $a > 1$
  - decreasing because  $0 < a < 1$
  - increasing because  $b > 1$
  - decreasing because  $0 < b < 1$
- \_\_\_\_\_ 7. Express  $\left(\sqrt{32}\right)^{2x}$  as a power with a base of 2.
- $2^{5x}$
  - $2^{10x}$
  - $2^{2.5x}$
  - $2^{20x}$
- \_\_\_\_\_ 8. Express  $\left(\frac{1}{27}\right)^{x+1}$  as a power with a base of 3.
- $3^{3x-3}$
  - $3^{-3x-3}$
  - $3^{-3x+3}$
  - $3^{3x+3}$
- \_\_\_\_\_ 9. Solve the following exponential equation by writing both sides with the same base.  
 $2(3)^x = 162$
- $x = 2$
  - $x = 3$
  - $x = 4$
  - $x = 5$
- \_\_\_\_\_ 10. Solve the following exponential equation by writing both sides with the same base.  
 $2^{3-z} = \frac{1}{32}$
- $z = 7$
  - $z = 8$
  - $z = 9$
  - $z = 10$
- \_\_\_\_\_ 11. The population of a specific bacteria growing in a Petri dish is modelled by the function  
 $P(t) = 5000(2)^{\frac{t}{3}}$ , where  $P(t)$  represents the number of bacteria and  $t$  represents the time, in days, after the initial time. How long does it take for the population to double?
- 1 day
  - 2 days
  - 3 days
  - 9 days

\_\_\_\_\_ 12. The following data set involves exponential growth. Determine the missing value from the table.

$x$	0	1	2	3	4	5	6
$y$	0.16	0.40	1.00	2.50		15.63	39.06

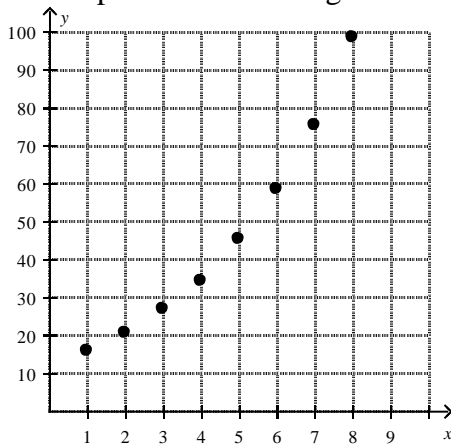
- A. 6.25
- B. 5.00
- C. 7.50
- D. 8.75

\_\_\_\_\_ 13. Determine the equation of the exponential regression function for the data.

$x$	0	1	2	3	4	5
$y$	74.8	60.2	47.8	38.3	30.8	24.4

- A.  $y = 75(0.8)^x$
- B.  $y = 75(1.6)^x$
- C.  $y = 60(0.8)^x$
- D.  $y = 60(1.6)^x$

\_\_\_\_\_ 14. A scatter plot is drawn using a data set.



Identify the equation of the curve of best fit.

- A.  $y = 12(1.3)^x$
- B.  $y = 12(0.3)^x$
- C.  $y = 4(1.5)^x$
- D.  $y = 4(0.5)^x$

\_\_\_\_\_ 15. The equation of the exponential function that models a data set is  $y = 6.8(1.03)^x$ . Determine the range of this function.

- A.  $\{y \mid y > 0, y \in \mathbf{R}\}$
- B.  $\{y \mid y \in \mathbf{R}\}$
- C.  $\{y \mid y > 6.8, y \in \mathbf{R}\}$
- D.  $\{y \mid y > 1.03, y \in \mathbf{R}\}$

\_\_\_\_\_ 16. An investment can be modelled by the following growth function, where  $x$  represents the time in years:

$$y = 2500(1.018)^x. \text{ What was the principal invested?}$$

- A. \$1250
- B. \$2500
- C. \$18
- D. \$1018

- \_\_\_\_\_ 17. An investment can be modelled by the following growth function, where  $x$  represents the time in years:  
 $y = 2500(1.018)^x$ . What was the annual interest rate for the investment?

- A. 25%
- B. 1.018%
- C. 18%
- D. 1.8%

- \_\_\_\_\_ 18. Eli invested \$1000 at 3%/a compounded quarterly.

Define an exponential growth function for this investment in the form

$$A(n) = P(1 + i)^n$$

where  $n$  represents the number of compounding periods.

- A.  $A(n) = 1000(1.003)^n$
- B.  $A(n) = 1000(1.0075)^n$
- C.  $A(n) = 1000(1.03)^n$
- D.  $A(n) = 4000(1.03)^n$

- \_\_\_\_\_ 19. Denis recently spent \$1280 on a new laptop for his home business. He read that the depreciation rate for this model laptop is 25%.  
 How much money should Denis expect to sell his laptop for in three years?

- A. \$540
- B. \$960
- C. \$320
- D. \$740

20. Solve the following exponential equation by writing both sides with the same base.

$$\sqrt{1000} = 10^{2x-1}$$

21. A research lab has a 12 mg sample of a radioactive substance. The amount of the substance,  $A(t)$ , left in the sample can be modelled by the half-life function

$$A(t) = 12 \left( \frac{1}{2} \right)^{\frac{t}{85}}$$

where  $t$  represents the time, in days, after the initial time.

How long does it take for the sample to reduce to one quarter its initial amount?

22. Determine whether the following data set involves exponential growth, exponential decay, or neither. Explain how you know.

$x$	1	2	3	4	5	6
$y$	5	15	45	135	405	1215

23. The fish population in Loon Lake is modelled by the equation

$$P(t) = 2500(0.92)^t$$

where  $P(t)$  represents the number of fish and  $t$  represents the time, in years, since 2010.

Estimate the fish population in 2030.

24. Complete the table of values for a \$350 investment earning 2.5%/a compounded monthly.

<b>Time (months)</b>	0	1	2	3
<b>Value (\$)</b>	350.00	350.73		

25. Nina invested \$3000 at 1.3%/a compounded weekly.

Define an exponential growth function for this investment in the form

$$A(n) = P(1 + i)^n, \text{ where } n \text{ represents the number of compounding periods.}$$

26. A vehicle was purchased for \$15 000 in 2005. The book value of the vehicle can be modelled by the exponential function  
 $y = 15\,000(0.82)^x$   
where  $y$  represents the value in dollars and  $x$  represents the time, in years, after 2005.

a) How does the value of the vehicle change over time? Explain how you know.

b) Estimate the value of the vehicle in 2015. Show your work.

27. Use what you know about the exponential function  $y = \left(\frac{1}{2}\right)^x$  to predict the number of  $x$ -intercepts, the  $y$ -intercept, the end behaviour, increasing or decreasing, the domain, and the range of the following functions:

a)  $y = \left(\frac{1}{2}\right)^x$

b)  $y = 4(3)^x$

28. Solve the equation and verify your answer by substitution. Show your work.

$$6(8)^{5-x} = 3072$$

29. Solve the equation and verify your answer by substitution. Show your work.

$$8^{x+1} = 32^{x-1}$$

30. Thorium-227 has a half-life of 18.4 days. The remaining amount of a 50-mg sample of thorium-227 can be modelled by the equation

$$A(t) = 50\left(\frac{1}{2}\right)^{\frac{t}{18.4}}$$

where  $A(t)$  is the amount of thorium-227 remaining, in milligrams, and  $t$  is the time in days. Determine the amount of thorium-227 remaining after 10 days, to the nearest milligram. Show your work.

31. 234 bi-weekly payments are required to pay off a loan. How many years does this represent?

32. A student repaid a total of \$2393.36 for a loan including the principal and interest. If the interest rate was 6% compounded monthly for 3 years, what was the principal amount of the loan, to the nearest dollar?

33. Karen is going to invest \$1250.00. She has 2 options:

A. 7%/a compounded annually for 2 years

B. 6%/a compounded monthly for 2 years

Which option should she choose? Explain.

34. Zachary borrowed \$3500 at a rate of 8% compounded semi-annually for 3 years. How much interest will be charged for borrowing the money?

35. Solve for  $x$ : a)  $6^{3x+2} = 1$

b)  $5^{x^2+2x} = 125$

36. The amount of a substance,  $A(t)$ , left in a sample is modeled by  $A(t) = A_0\left(\frac{1}{2}\right)^{\frac{t}{3}}$ , where  $t$  represents the time, in weeks, after the initial time. If there are 5 mg remaining after 6 days, how much was present initially?