

# Função Exponencial

## Provide the missing information.

- 1) Given a real number  $b$  where  $b > 0$  and  $b \neq 1$ , a function defined by  $f(x) = \underline{\hspace{2cm}}$  is called an exponential function.
- 2) The function defined by  $y = x^3$  (is/is not) an exponential function, whereas the function defined by  $y = 3^x$  (is/is not) an exponential function.
- 3) The graph of  $f(x) = \left(\frac{5}{3}\right)^x$  is (increasing/decreasing) over its domain.
- 4) The graph of  $f(x) = \left(\frac{3}{5}\right)^x$  is (increasing/decreasing) over its domain.
- 5) The domain of an exponential function  $f(x) = b^x$  is  $\underline{\hspace{2cm}}$ .
- 6) The range of an exponential function  $f(x) = b^x$  is  $\underline{\hspace{2cm}}$ .
- 7) All exponential functions  $f(x) = b^x$  pass through the point  $\underline{\hspace{2cm}}$ .
- 8) The horizontal asymptote of an exponential function  $f(x) = b^x$  is the line  $\underline{\hspace{2cm}}$ .
- 9) The function defined by  $f(x) = 1^x$  (is/is not) an exponential function.

10) As  $x \rightarrow \infty$ , the value of

$$\left(1 + \frac{1}{x}\right)^x \text{ approaches } \underline{\hspace{2cm}}.$$

11) The function  $f(x) = e^x$  is the exponential function base  $\underline{\hspace{1cm}}$  and is also called the  $\underline{\hspace{2cm}}$  exponential function.

12) The formula  $A = Pe^{rt}$  gives the amount  $A$  in an account after  $t$  years at an interest rate  $r$  under the assumption that interest is compounded  $\underline{\hspace{2cm}}$ .

## Evaluate the function at the given value of $x$ . Round to 4 decimal places if necessary.

13)  $f(x) = 6^x$ ;  $f(2.3)$

14)  $h(x) = \left(\frac{1}{4}\right)^x$ ;  $h(-3)$

15)  $f(x) = \left(\frac{1}{3}\right)^x$ ;  $f(0.3e)$

16)  $f(x) = 7^x$ ;  $f(\sqrt{6})$

## Graph the function and write the domain and range in interval notation.

17)  $f(x) = 7^x$

18)  $f(x) = \left(\frac{1}{3}\right)^x$

19)  $f(x) = \left(\frac{8}{3}\right)^x$

**Solve the problem.**

- 20) Use the graph of  $y = 2^x$  to graph the function. Write the domain and range in interval notation.

$$f(x) = 2^{x+1} - 4$$

- 21) Use the graph of  $y = 2^{-x}$  to graph the function. Write the domain and range in interval notation.

$$f(x) = 2^{-x}$$

- 22) Use the graph of  $y = \left(\frac{1}{2}\right)^x$  to graph the function. Write the domain and range in interval notation.

$$f(x) = \left(\frac{1}{2}\right)^{x+4} - 3$$

**Evaluate the function at the given value of  $x$ .**

**Round to 4 decimal places if necessary.**

23)  $f(x) = e^x$ ;  $f(0.6)$

**Use transformations of the graph  $y = e^x$  to graph the function. Write the domain and range in interval notation.**

24)  $f(x) = e^{x-1}$

25)  $f(x) = e^x - 1$

**Solve the problem.**

- 26) James wants to invest \$15,000. He can invest the money at 5% simple interest for 20 yr or he can invest at 4.6% with interest compounded continuously for 20 yr. Which option results in more total interest?

- 27) The atmospheric pressure on an object decreases as altitude increases. If  $a$  is the height (in km) above sea level, then the pressure  $P(a)$  (in mmHg) is approximated by  $P(a) = 760e^{-0.13a}$ . Determine the atmospheric pressure at 8.296 km. Round to the nearest whole unit.

- 28) The population of bacteria culture was 2000 at noon, and was increasing at a rate of 10% per hour. The number can be found using the function

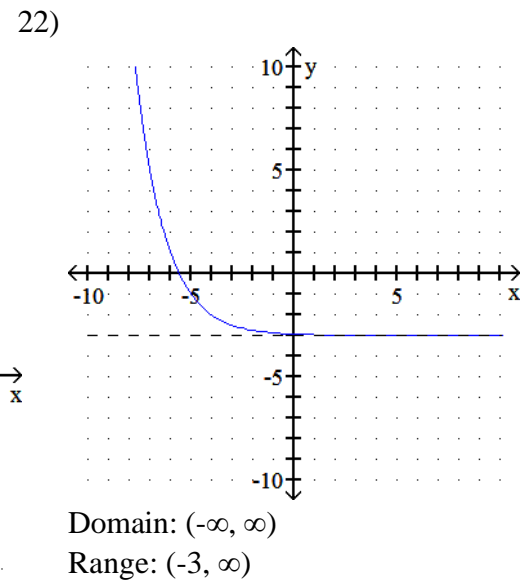
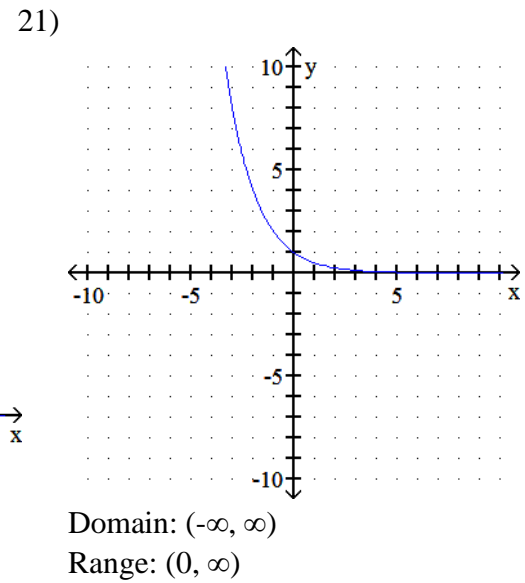
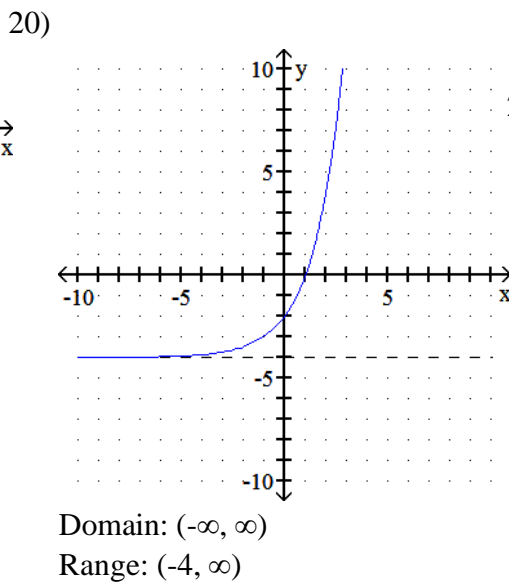
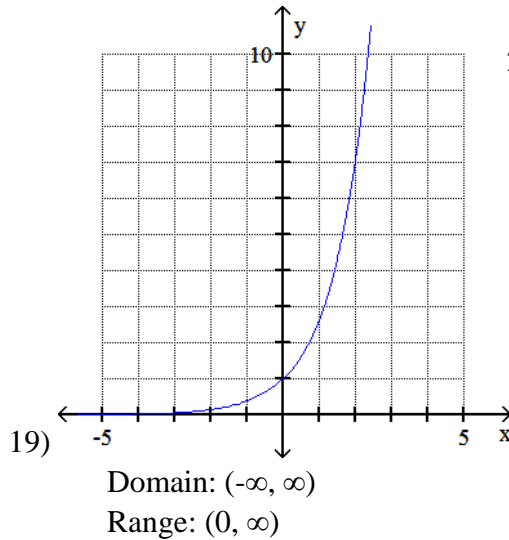
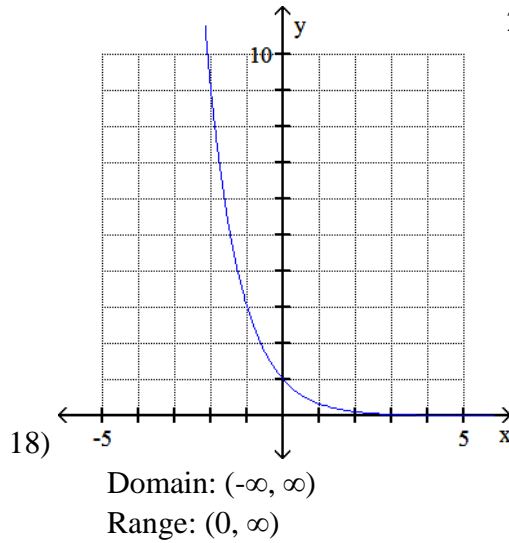
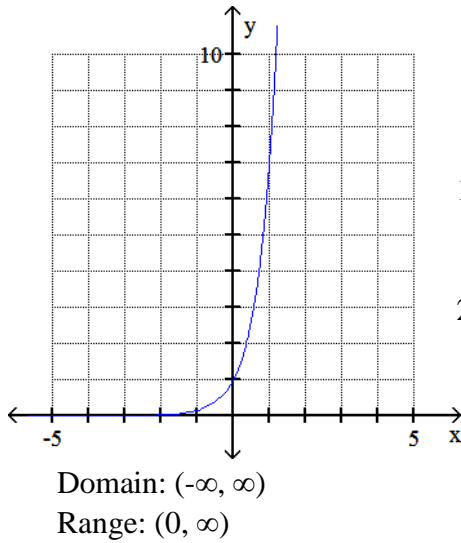
$$P(t) = 2,000(1.1)^t$$

where  $t$  is the number of hours past noon. Predict the population 6 hours later, at 6 PM to the nearest whole number.

Answer Key

Testname: SECTION 4.2 EXERCISES

- 1)  $b^x$
- 2) is not; is
- 3) increasing
- 4) decreasing
- 5)  $(-\infty, \infty)$
- 6)  $(0, \infty)$
- 7)  $(0, 1)$
- 8)  $y = 0$
- 9) is not
- 10)  $e$
- 11)  $e$  ; natural
- 12) continuously
- 13) 61.6237
- 14) 64
- 15) 0.4082
- 16) 117.5057
- 17)

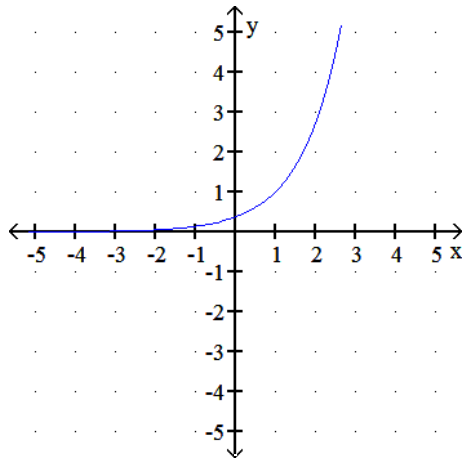


23) 1.8221

Answer Key

Testname: SECTION 4.2 EXERCISES

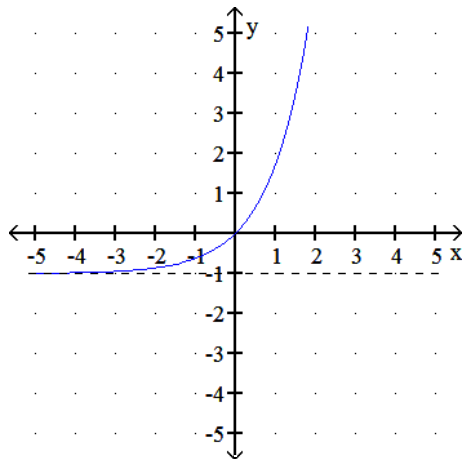
24)



Domain:  $(-\infty, \infty)$

Range:  $(0, \infty)$

25)



Domain:  $(-\infty, \infty)$

Range:  $(-1, \infty)$

26) 4.6%

compounded continuously

results in more total interest

27) 258 mmHg

28) 3,543