

1. Classify the following statement as either true or false.

The graph of $f(x) = a^x$ always passes through the point $(0,1)$.

Choose the correct answer below.

- ☐ A. True, because $a^1 = 0$ for any number $a \neq 0$.
- ☐ B. False, because $a^0 = 0$ for any number $a \neq 0$.
- ☐ C. False, because $a^0 = a$ for any number $a \neq 0$.
- ☐ D. True, because $a^0 = 1$ for any number $a \neq 0$.
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2. Classify the following statement as either true or false.

The graph of $f(x) = 2^{x-3}$ looks just like the graph of $y = 2^x$, but it is translated 3 units to the left.

Choose the correct answer below.

- ☐ A. False, because by graphing both the functions on the same graph it is found that the graph of $f(x) = 2^{x-3}$ is shifted 3 units to the right.
- ☐ B. False, because by graphing both the functions on the same graph it is found that the graph of $f(x) = 2^{x-3}$ is shifted 2 units to the left.
- ☐ C. True, because by graphing both the functions on the same graph it is found that the graph of $f(x) = 2^{x-3}$ is shifted 3 units to the left.
- ☐ D. False, because by graphing both the functions on the same graph it is found that the graph of $f(x) = 2^{x-3}$ is same as $y = 2^x$.
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3. Classify the following statement as either true or false.

The graph of $y = 3^x$ gets close to, but never touches, the y-axis.

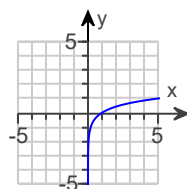
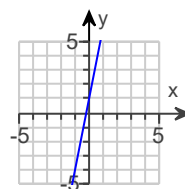
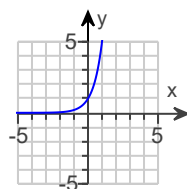
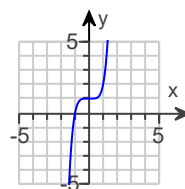
Choose the correct answer below.

- ☐ A. False, because as x increases arbitrarily the graph touches the y-axis.
- ☐ B. True, because $x = 0$ is not in the domain of $f(x)$.
- ☐ C. True, because $y = 0$ is not in the range of $f(x)$.
- ☐ D. False, because at $x = 0$ the graph crosses the y-axis.
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4. Graph the equation on paper, and then choose the correct graph.

$$y = f(x) = 5^x$$

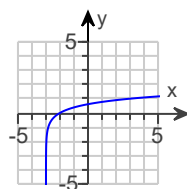
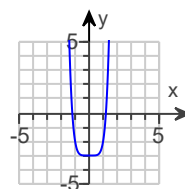
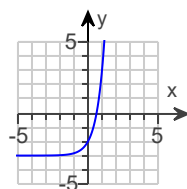
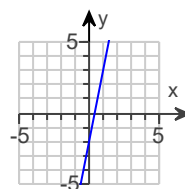
Choose the correct graph.

☐ A.

☐ B.

☐ C.

☐ D.


5. Graph the equation on paper, and then choose the correct graph.

$$y = 6^x - 3$$

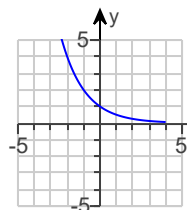
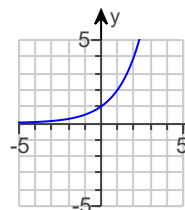
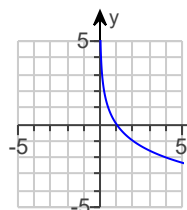
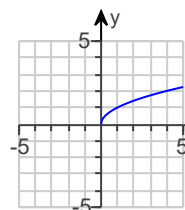
Choose the correct graph.

☐ A.

☐ B.

☐ C.

☐ D.


6. Graph the equation on paper, and then choose the correct graph on the right.

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

Choose the correct graph.

☐ A.

☐ B.

☐ C.

☐ D.


7. Following an unexplained decline in the number of birds of prey on his property, a farmer sees a drastic rise in its small mammal population.

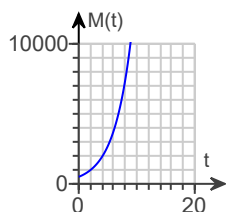
The function $M(t) = 500(1.4)^t$ can be used to estimate the number of small mammals on the premises within t years if hawks, owls, and similar birds fail to return.

Estimate the number of small mammals in the area 4 years after the birds' decline.

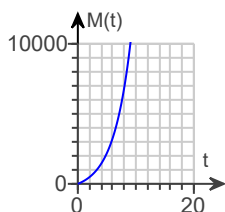
_____ small mammals
(Round to the nearest whole number.)

Which is the correct graph of the function?

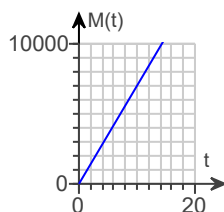
☐ A.



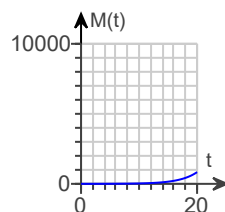
☐ B.



☐ C.



☐ D.



8. Beginning in 1988, infestations of zebra mussels began to threaten water treatment facilities, power plants, and entire ecosystems. The function $A(t) = 10 \cdot 33^t$ can be used to estimate the number of square centimeters of lake bottom that will be covered with mussels t years after an infestation covering 10 cm^2 first occurs.

a) How many square centimeters of lake bottom will be covered with mussels 2 yr after an infestation covering 10 cm^2 first appears?

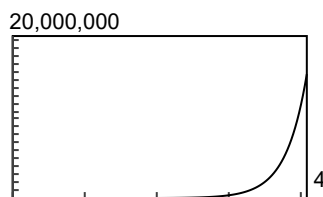
_____ cm^2

How many square centimeters of lake bottom will be covered with mussels 4 yr after an infestation covering 10 cm^2 first appears?

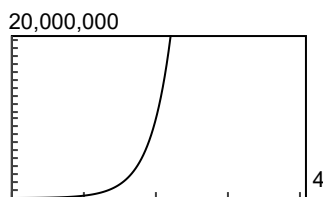
_____ cm^2

b) Graph the function. Choose the correct answer below.

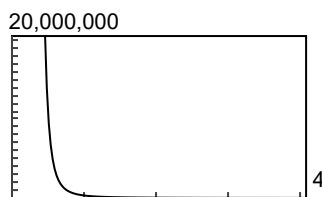
☐ A.



☐ B.



☐ C.



9. Solve $5^{7x} = 125$.

The solution is $x =$ _____.
(Type an integer or a simplified fraction.)

10. Solve $27^x = 243$.

The solution is $x =$ _____.
(Simplify your answer. Type an integer or a fraction.)

11. Solve $3^{x+5} = 81$.

The solution is $x =$ _____.

(Simplify your answer. Type an integer or a fraction.)

12. Solve the following equation.

$$25^x = 625^{3x+10}$$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- ☐ A. The solution(s) is/are _____.
(Simplify your answer. Use a comma to separate answers as needed.)
- ☐ B. The solution is not a real number.