

Class Name : **Lacoste College Algebra Fall 2019**

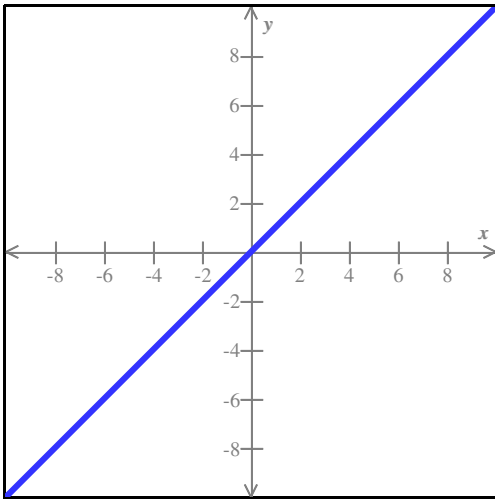
Instructor Name : **Master Templates**

Student Name : \_\_\_\_\_

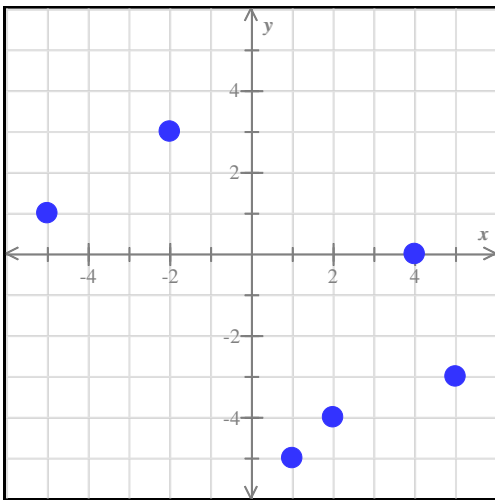
Instructor Note : **All practice problems for Exam 4. There are multiple versions so that you can try challenging problems more than once.**

### Question 1 of 36

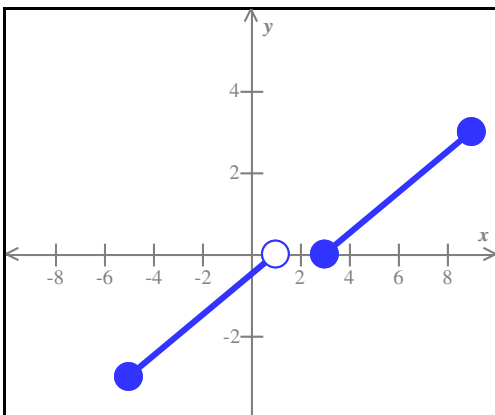
For each function graphed below, state whether it is one-to-one.



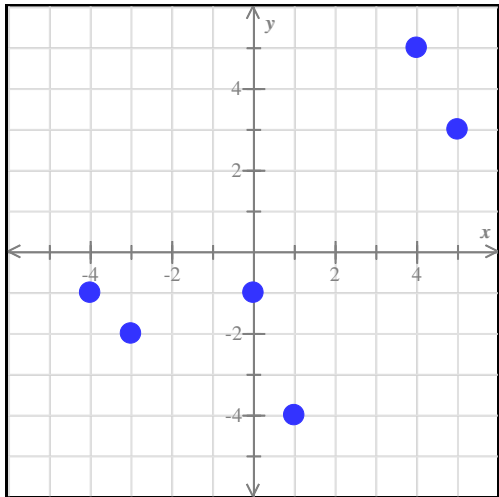
One-to-one?:  
Yes No



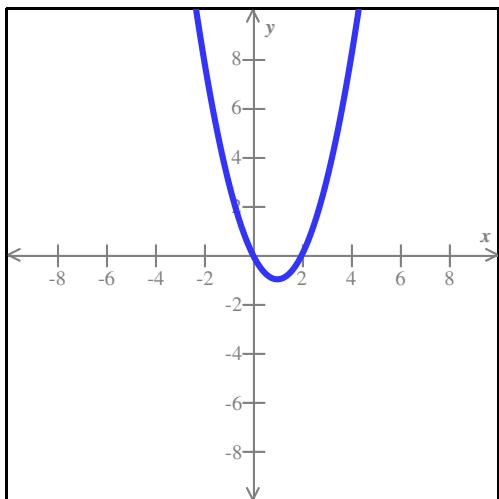
One-to-one?:  
Yes No



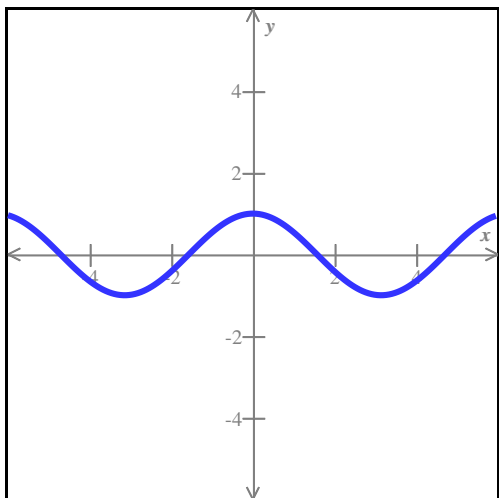
One-to-one?:  
Yes No



One-to-one?:  
Yes No



One-to-one?:  
Yes No



One-to-one?:  
Yes No

### Question 2 of 36

For each pair of functions  $f$  and  $g$  below, find  $f(g(x))$  and  $g(f(x))$ .  
Then, determine whether  $f$  and  $g$  are inverses of each other.

Simplify your answers as much as possible.

(Assume that your expressions are defined for all  $x$  in the domain of the composition.

You do *not* have to indicate the domain.)

(a)	$f(x) = \frac{2}{x}$	(b)	$f(x) = -x + 6$
	$g(x) = \frac{2}{x}$		$g(x) = x + 6$
	$f(g(x)) =$		$f(g(x)) =$
	$g(f(x)) =$		$g(f(x)) =$
	- $f$ and $g$ are inverses of each other		- $f$ and $g$ are inverses of each other
	- $f$ and $g$ are <i>not</i> inverses of each other		- $f$ and $g$ are <i>not</i> inverses of each other

### Question 3 of 36

The one-to-one functions  $g$  and  $h$  are defined as follows.

$$g = \{(-7, 6), (3, 7), (7, -3), (8, 0)\}$$

$$h(x) = 4x - 9$$

Find the following.

$g^{-1}(7) =$	
$h^{-1}(x) =$	
$(h \circ h^{-1})(7) =$	

### Question 4 of 36

Consider the function  $f(x) = \sqrt{3-x} + 6$  for the domain  $(-\infty, 3]$ .

Find  $f^{-1}(x)$ , where  $f^{-1}$  is the inverse of  $f$ .

Also state the domain of  $f^{-1}$  in interval notation.

**Question 5 of 36**

The one-to-one function  $f$  is defined below.

$$f(x) = 6 - x^3$$

Find  $f^{-1}(x)$ , where  $f^{-1}$  is the inverse of  $f$ .

**Question 6 of 36**

The one-to-one function  $f$  is defined below.

$$f(x) = \frac{3x}{x-7}$$

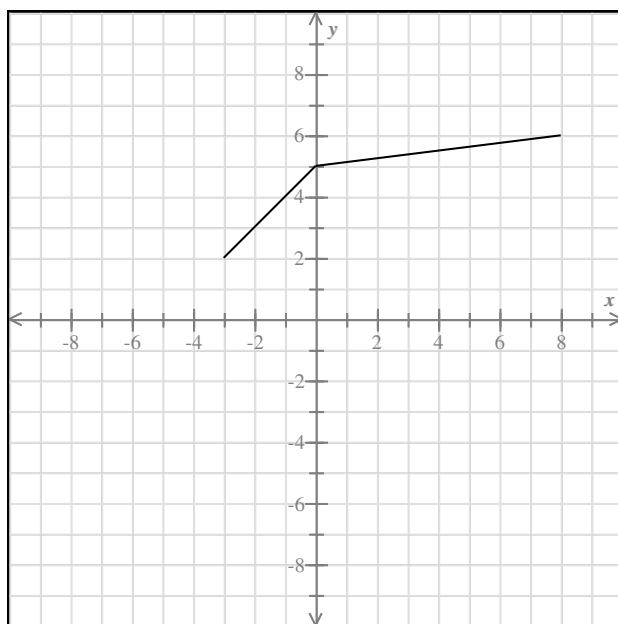
Find  $f^{-1}(x)$ , where  $f^{-1}$  is the inverse of  $f$ .

Also state the domain and range of  $f^{-1}$  in interval notation.

**Question 7 of 36**

Below is the entire graph of function  $f$ .

Graph  $f^{-1}$ , the inverse of  $f$ .



Question 8 of 36

The function  $h$  is defined by the following rule.

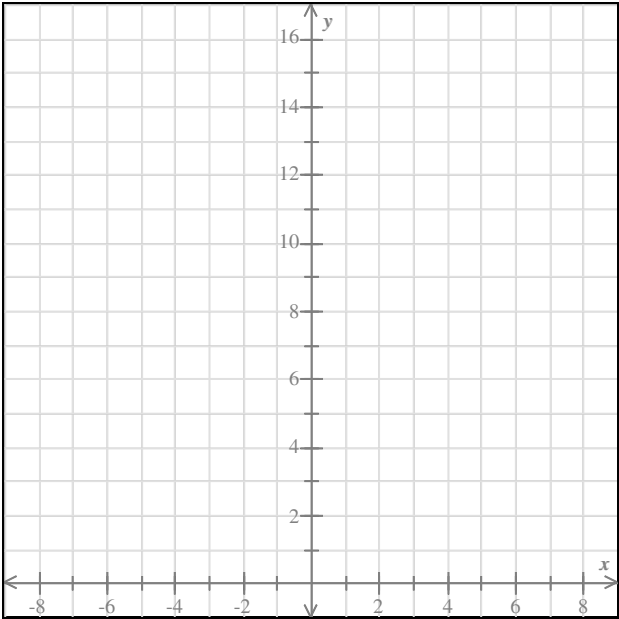
$$h(x)=\left(\frac{1}{6}\right)^x$$

Find  $h(x)$  for each  $x$ -value in the table.

$x$	$h(x)$
$-2$	<input type="text"/>
$-1$	<input type="text"/>
$0$	<input type="text"/>
$1$	<input type="text"/>
$2$	<input type="text"/>

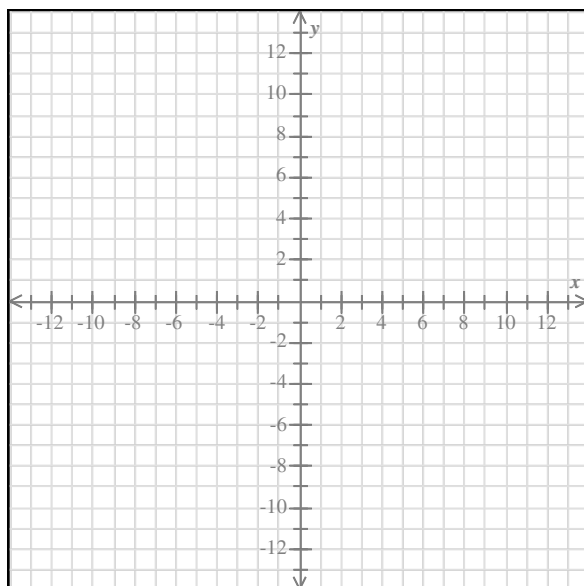
Question 9 of 36

Graph the exponential function  $f(x)=4^x$ .



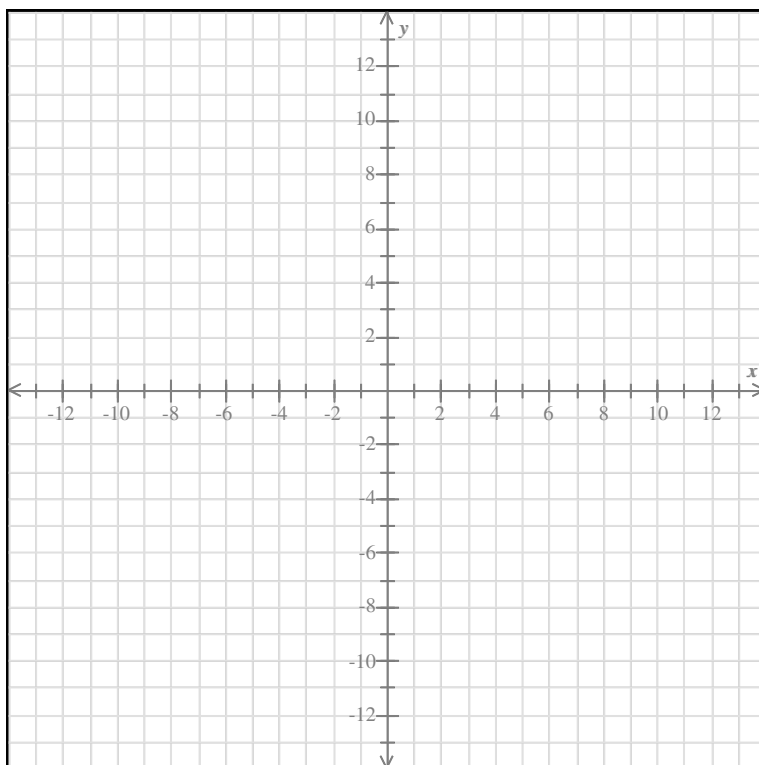
Question 10 of 36

Graph the exponential function  $f(x) = 3\left(\frac{3}{5}\right)^x$ .



Question 11 of 36

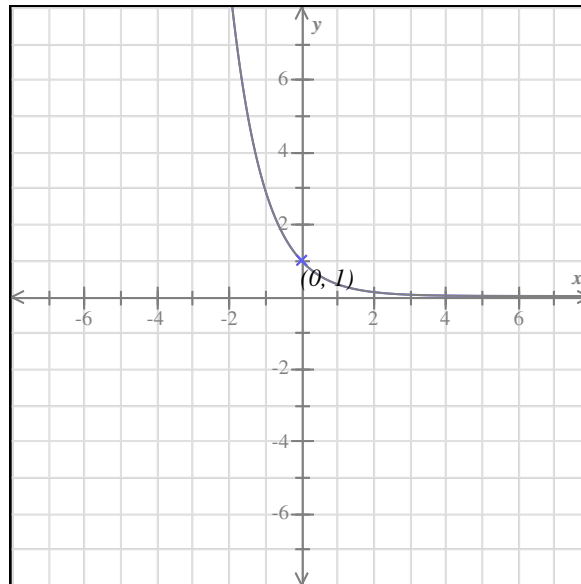
Graph the exponential function  $f(x) = \left(\frac{4}{3}\right)^{-x}$ .



Question 12 of 36

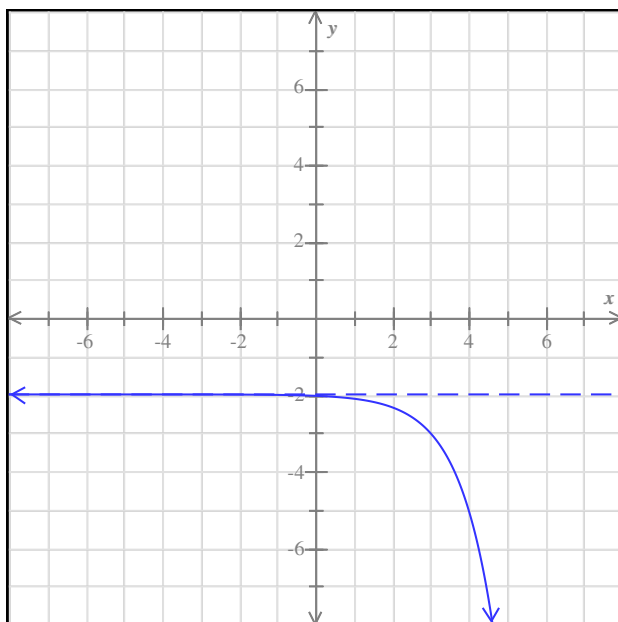
Below is the graph of  $y = \left(\frac{1}{3}\right)^x$ .

Translate it to become the graph of  $y = \left(\frac{1}{3}\right)^{x-2} + 1$ .



Question 13 of 36

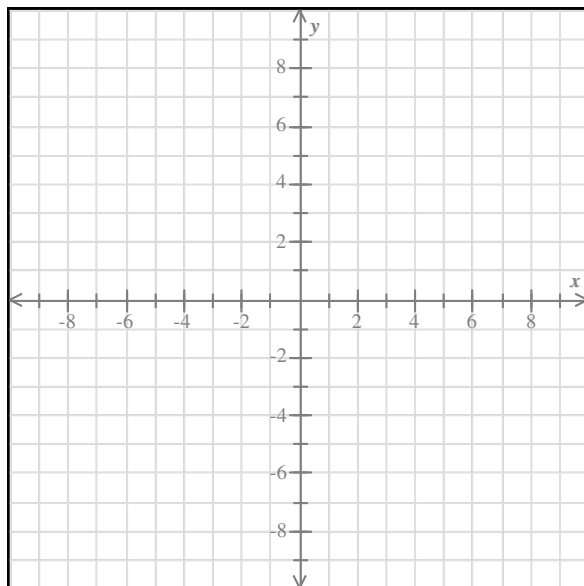
The graph of an exponential function is shown in the figure below.  
The horizontal asymptote is shown as a dashed line.  
Find the range and the domain.



Write your answers as inequalities, using  $x$  or  $y$  as appropriate.  
Or, you may instead click on "Empty set" or "All reals" as the answer.

### Question 14 of 36

Graph the function  $g(x) = 2^{x-2}$  and give its domain and range using interval notation.

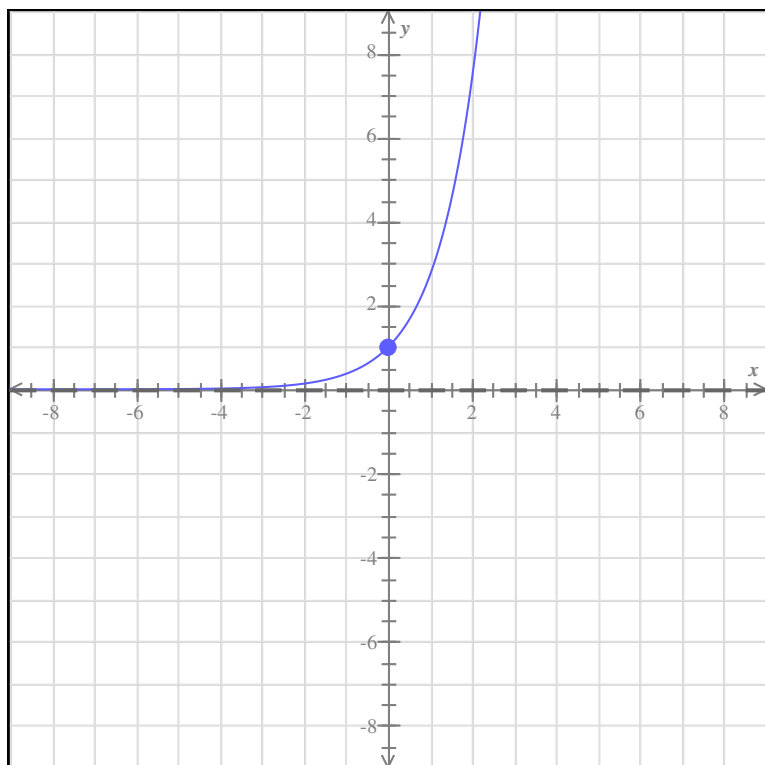


### Question 15 of 36

Below is the graph of  $y = e^x$ .

Transform it to make the graph of  $y = -e^{x+2}$ .

Give the range and domain of  $y = -e^{x+2}$  using interval notation.



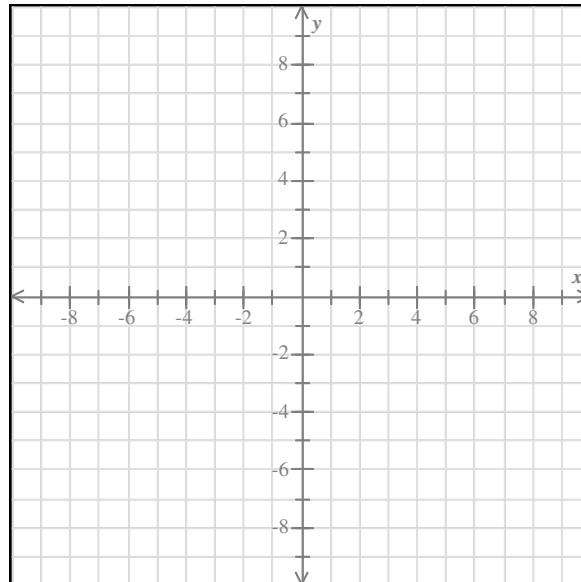


**Question 16 of 36**

Graph the following function.

$$g(x) = 2e^{x-3} - 3$$

To draw the graph, plot two points and the asymptotes (if any) of the graph. Then click on the graph icon.

**Question 17 of 36**

Use the ALEKS calculator to evaluate each expression.

Round your answers to the nearest thousandth.

Do not round any intermediate computations.

$$\left(\frac{4}{3}\right)^{2.7} =$$
$$1.25^{-0.2} =$$

**Question 18 of 36**

The dollar value  $v(t)$  of a certain car model that is  $t$  years old is given by the following exponential function.

$$v(t) = 19,900 (0.95)^t$$

Find the initial value of the car and the value after 11 years.

Round your answers to the nearest dollar as necessary.

### Question 19 of 36

Use the ALEKS calculator to evaluate each expression.  
Round your answers to the nearest thousandth.  
Do not round any intermediate computations.

$$e^{-0.45} =$$
$$175 e^{0.5} =$$

### Question 20 of 36

A can of soda is placed inside a cooler. As the soda cools, its temperature  $T(x)$  in degrees Celsius is given by the following function, where  $x$  is the number of minutes since the can was placed in the cooler.

$$T(x) = -4 + 22e^{-0.041x}$$

Find the initial temperature of the soda and its temperature after 18 minutes.  
Round your answers to the nearest degree as necessary.

Initial temperature:  °C

Temperature after 18 minutes:  °C

### Question 21 of 36

Suppose Heather places \$9500 in an account that pays 2% interest compounded each year.  
Assume that no withdrawals are made from the account.

Follow the instructions below. Do not do any rounding.

(a) Find the amount in the account at the end of 1 year.

\$\_\_\_\_\_

(b) Find the amount in the account at the end of 2 years.

\$\_\_\_\_\_

### Question 22 of 36

Suppose that \$2000 is invested at a rate of 4.2%, compounded semiannually. Assuming that no withdrawals are made, find the total amount after 10 years.

Do not round any intermediate computations, and round your answer to the nearest cent.

**Question 23 of 36**

Moneysaver's Bank offers a savings account that earns 4 % interest compounded *continuously*. If Ahmad deposits \$ 2600 , how much will he have in the account after seven years, assuming he makes no withdrawals?

Do not round any intermediate computations, and round your answer to the nearest cent.

**Question 24 of 36**

A biologist has a 5173 -gram sample of a radioactive substance. Find the mass of the sample after four hours if it decreases according to a *continuous exponential decay model*, at a relative rate of 6 % per hour.

Do not round any intermediate computations, and round your answer to the nearest tenth.

\_\_\_\_\_ grams

**Question 25 of 36**

Use the ALEKS calculator to evaluate each expression.

Round your answers to the nearest thousandth.

Do not round any intermediate computations.

$$\ln \sqrt{5} =$$

$$\log 27.2 =$$

**Question 26 of 36**

Rewrite each equation as requested.

- (a) Rewrite as an exponential equation.

$$\log_3 81 = 4$$

- (b) Rewrite as a logarithmic equation.

$$8^{-2} = \frac{1}{64}$$

(a)  $\square^{\square} = \square$

(b)  $\log_{\square} \square = \square$

**Question 27 of 36**

Rewrite each equation as requested.

- (a) Rewrite as an exponential equation.

$$\ln x = 9$$

- (b) Rewrite as a logarithmic equation.

$$e^y = 6$$

**Question 28 of 36**

Evaluate each expression.

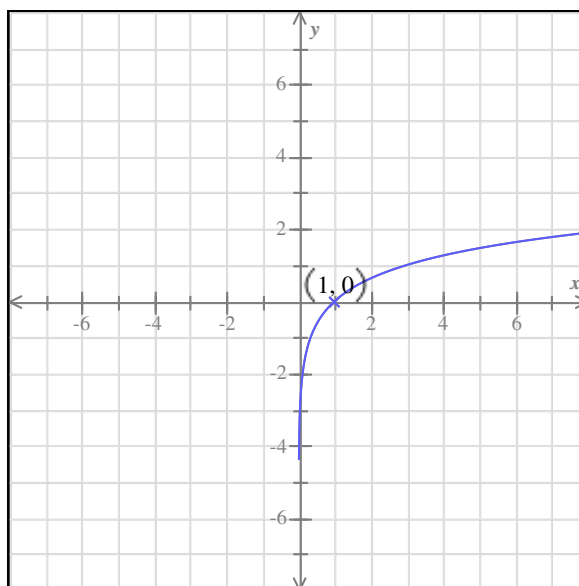
(a)  $\log_6 36 = \square$

(b)  $\log_4 \frac{1}{64} = \square$

**Question 29 of 36**

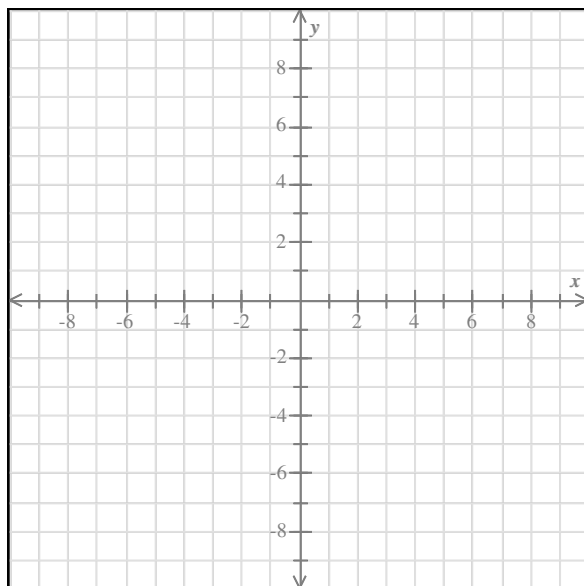
Below is the graph of  $y = \log_3 x$ .

Translate it to become the graph of  $y = \log_3 (x + 2) + 4$ .

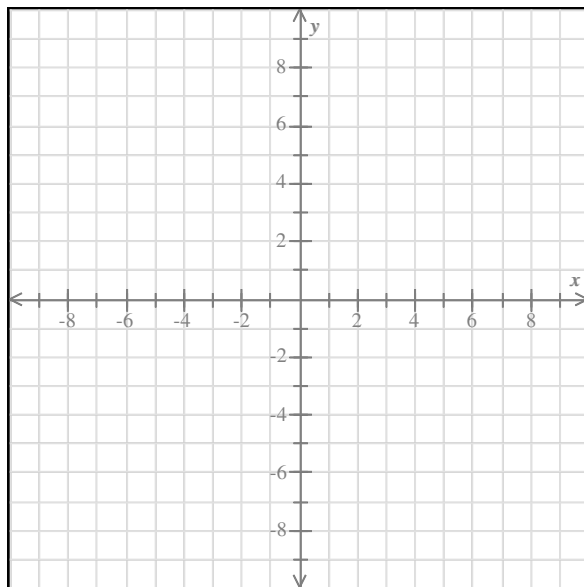


**Question 30 of 36**

Graph  $g(x) = 1 + \log_3 x$ .

**Question 31 of 36**

Graph the function  $g(x) = -3 + \log_2(x - 2)$  and give its domain and range using interval notation.

**Question 32 of 36**

Find the domain of the function.

$$f(x) = \ln(x^2 - 9)$$

Write your answer as an interval or union of intervals.

**Question 33 of 36**

Fill in the missing values to make the equations true.

(a)  $\log_3 4 - \log_3 7 = \log_3 \square$

(b)  $\log_9 \square + \log_9 7 = \log_9 56$

(c)  $2 \log_7 5 = \log_7 \square$

**Question 34 of 36**

Use the properties of logarithms to expand  $\log(y^5 x)$ .

Each logarithm should involve only one variable and should not have any exponents.  
Assume that all variables are positive.

**Question 35 of 36**

Write the expression as a single logarithm.

$$6 \log_m y - \frac{1}{4} \log_m z + 5 \log_m w$$

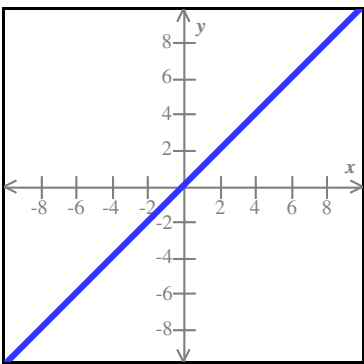
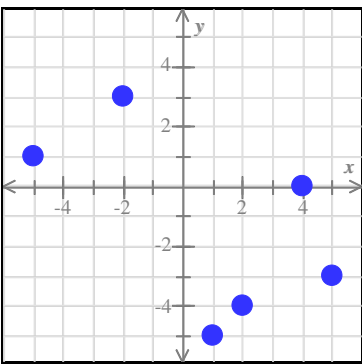
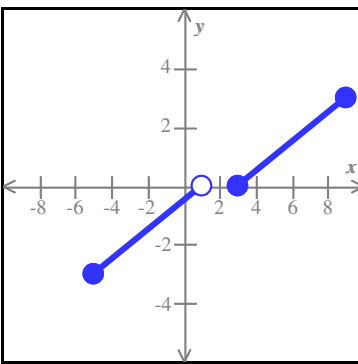
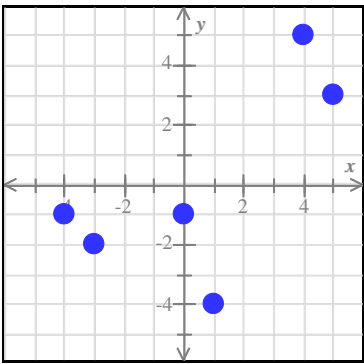
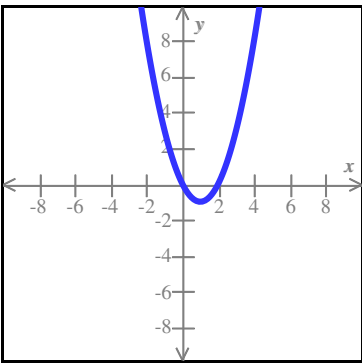
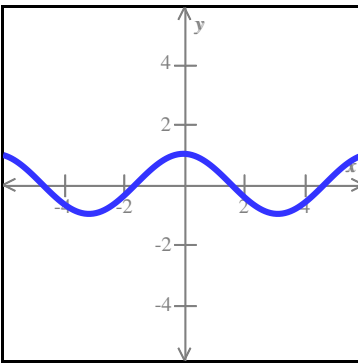
**Question 36 of 36**

Use the change of base formula to compute  $\log_7 4$ .

Round your answer to the nearest thousandth.

# Practice Problems for Exam 4 Version #2 Answers for class Lacoste College Algebra Fall 2019

## Question 1 of 36

			
One-to-one?	<input checked="" type="radio"/> Yes <input type="radio"/> No	<input checked="" type="radio"/> Yes <input type="radio"/> No	<input checked="" type="radio"/> Yes <input type="radio"/> No
			
One-to-one?	<input type="radio"/> Yes <input checked="" type="radio"/> No	<input type="radio"/> Yes <input checked="" type="radio"/> No	<input type="radio"/> Yes <input checked="" type="radio"/> No

## Question 2 of 36

<p>(a) <math>f(x) = \frac{2}{x}, x \neq 0</math></p> <p><math>g(x) = \frac{2}{x}, x \neq 0</math></p> <p><math>f(g(x)) = x</math></p> <p><math>g(f(x)) = x</math></p> <p><input checked="" type="radio"/> <math>f</math> and <math>g</math> are inverses of each other</p> <p><input type="radio"/> <math>f</math> and <math>g</math> are <i>not</i> inverses of each other</p>	<p>(b) <math>f(x) = -x + 6</math></p> <p><math>g(x) = x + 6</math></p> <p><math>f(g(x)) = -x</math></p> <p><math>g(f(x)) = -x + 12</math></p> <p><input type="radio"/> <math>f</math> and <math>g</math> are inverses of each other</p> <p><input checked="" type="radio"/> <math>f</math> and <math>g</math> are <i>not</i> inverses of each other</p>
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Question 3 of 36

	$g^{-1}(7) = 3$	
	$h^{-1}(x) = \frac{x+9}{4}$	
	$(h \circ h^{-1})(7) = 7$	

Question 4 of 36

$$f^{-1}(x) = 3 - (x - 6)^2 \text{ for the domain } [6, \infty)$$

Question 5 of 36

$$f^{-1}(x) = \sqrt[3]{6-x}$$

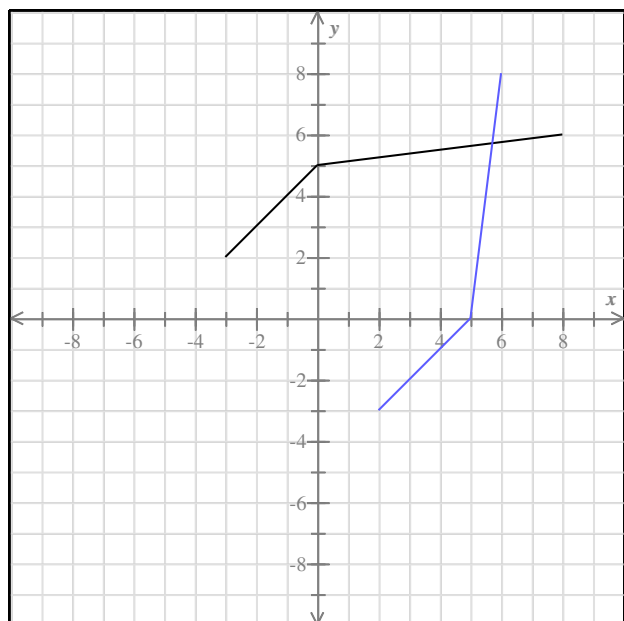
Question 6 of 36

$$f^{-1}(x) = \frac{7x}{x-3}$$

Domain of  $f^{-1} : (-\infty, 3) \cup (3, \infty)$

Range of  $f^{-1} : (-\infty, 7) \cup (7, \infty)$

Question 7 of 36

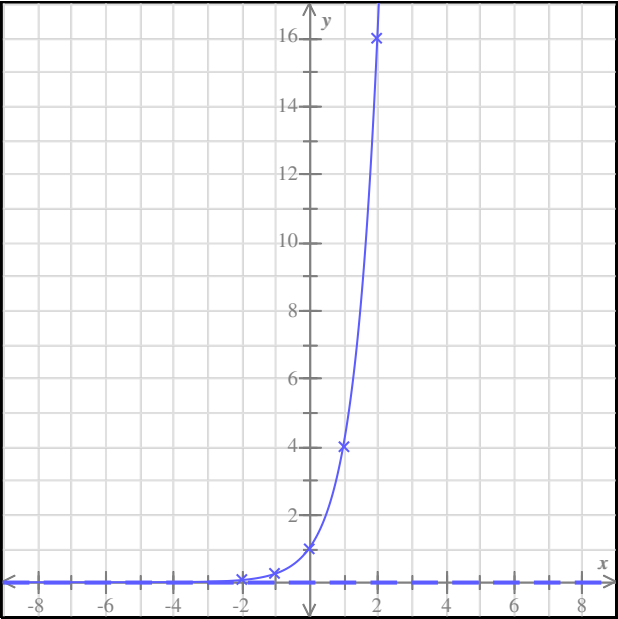




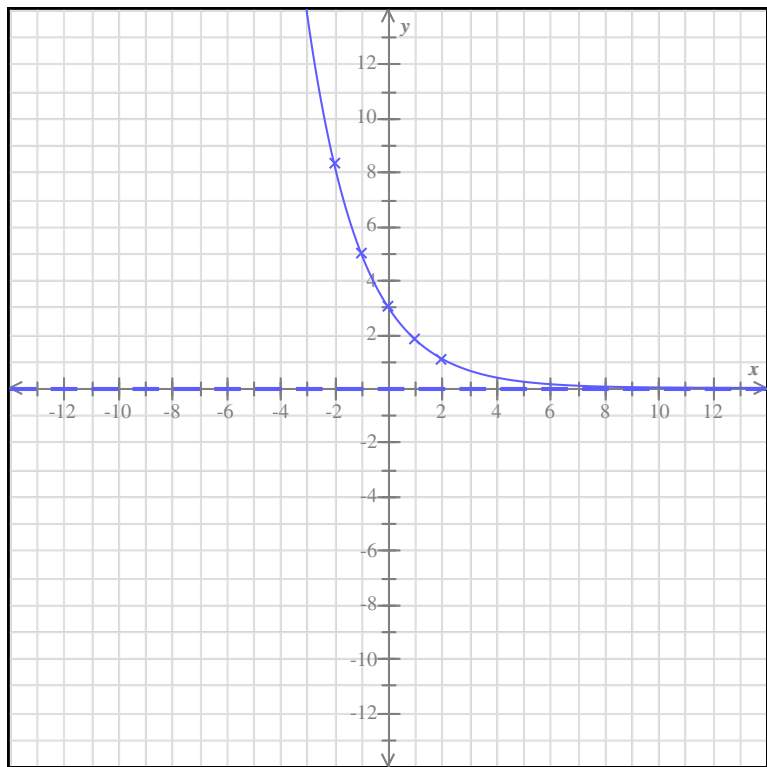
Question 8 of 36

$x$	$h(x)$
$-2$	$36$
$-1$	$6$
$0$	$1$
$1$	$\frac{1}{6}$
$2$	$\frac{1}{36}$

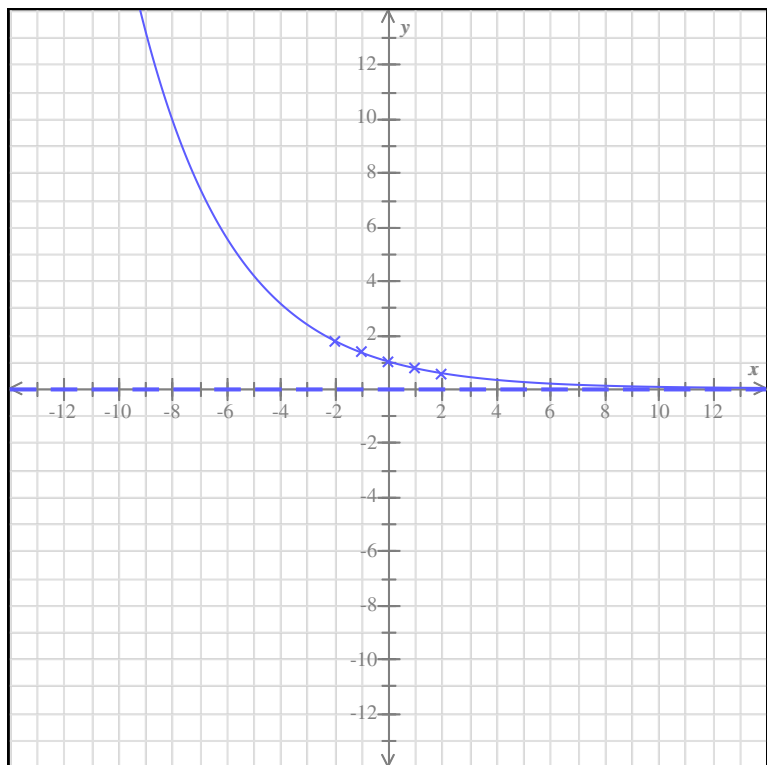
Question 9 of 36



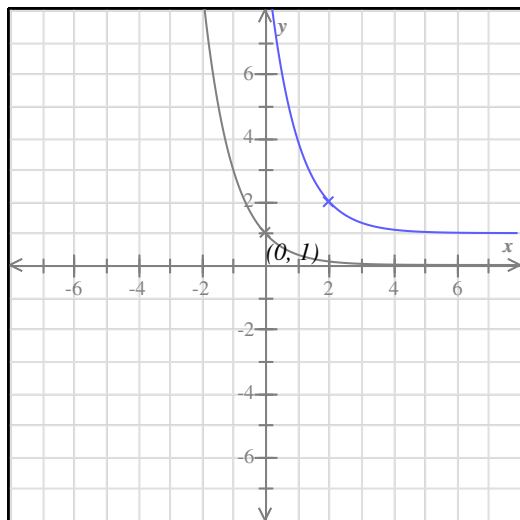
Question 10 of 36



**Question 11 of 36**



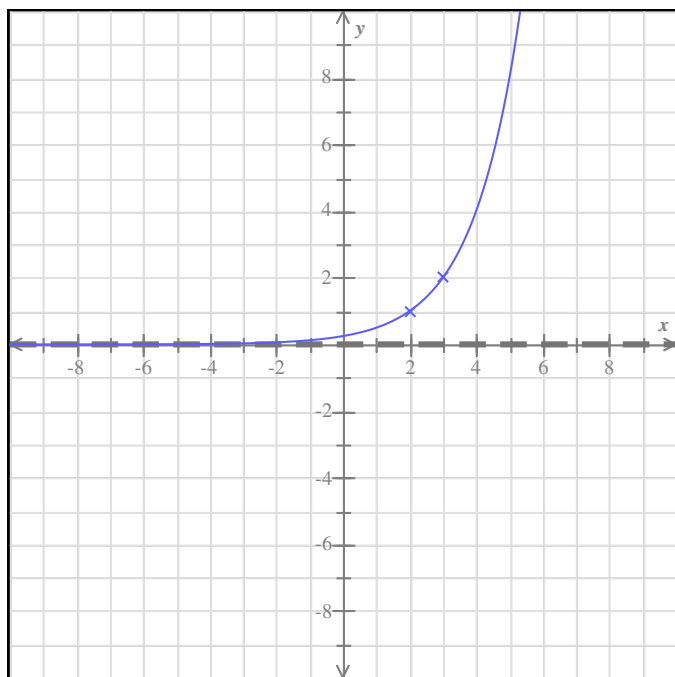
**Question 12 of 36**



### Question 13 of 36

- (a) range:  $y < -2$
- (b) domain: All reals

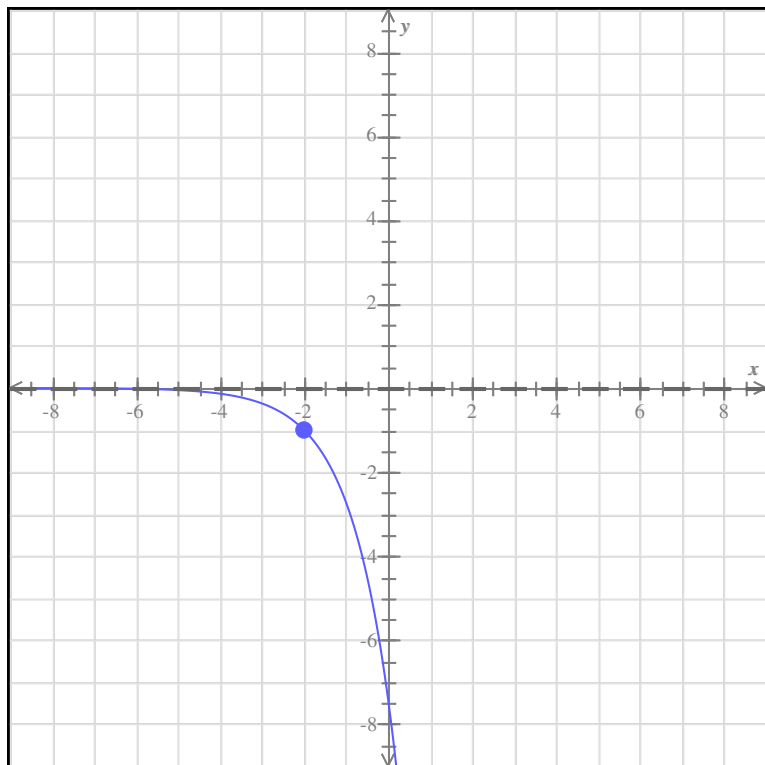
### Question 14 of 36



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

Range:  $(0, \infty)$

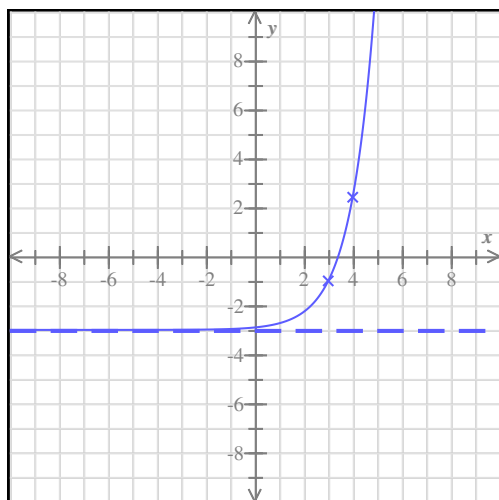
Question 15 of 36



Range:  $(-\infty, 0)$

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

Question 16 of 36



Question 17 of 36

$$\left(\frac{4}{3}\right)^{2.7} = 2.174$$

$$1.25^{-0.2} = 0.956$$

**Question 18 of 36**

Initial value: \$19,900

Value after 11 years: \$11,319

**Question 19 of 36**

$$e^{-0.45} = 0.638$$

$$175 e^{0.5} = 288.526$$

**Question 20 of 36**

Initial temperature: 18 °C

Temperature after 18 minutes: 7 °C

**Question 21 of 36**

(a) Find the amount in the account at the end of 1 year.

\$9690

(b) Find the amount in the account at the end of 2 years.

\$9883.80

**Question 22 of 36**

\$3030.71

**Question 23 of 36**

\$3440.14

**Question 24 of 36**

4069.2 grams

**Question 25 of 36**

$$\ln \sqrt{5} = 0.805$$

$$\log 27.2 = 1.435$$

Question 26 of 36

(a)  $3^4 = 81$

(b)  $\log_8 \frac{1}{64} = -2$

Question 27 of 36

(a)  $e^9 = x$

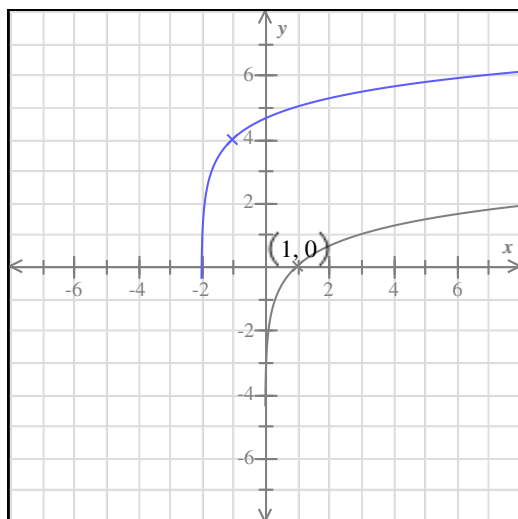
(b)  $\ln 6 = y$

Question 28 of 36

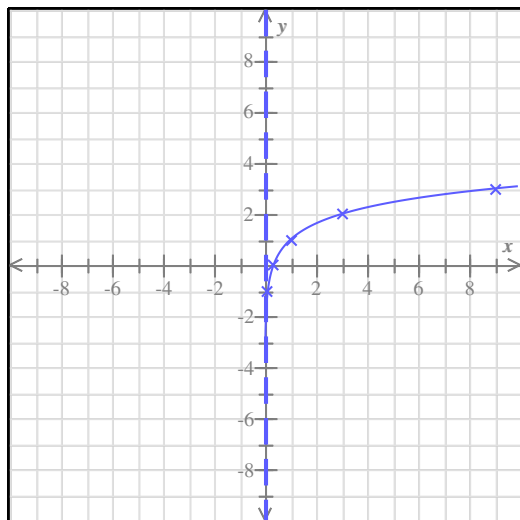
(a)  $\log_6 36 = 2$

(b)  $\log_4 \frac{1}{64} = -3$

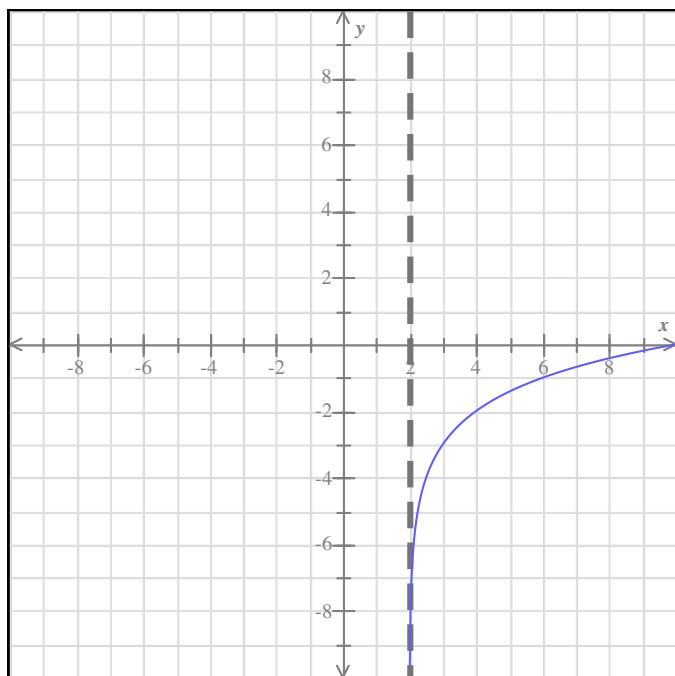
Question 29 of 36



Question 30 of 36



**Question 31 of 36**



**Domain:**  $(2, \infty)$

**Range:**  $(-\infty, \infty)$

**Question 32 of 36**

Domain:  $(-\infty, -3) \cup (3, \infty)$

**Question 33 of 36**

(a)  $\log_3 4 - \log_3 7 = \log_3 \frac{4}{7}$

(b)  $\log_9 8 + \log_9 7 = \log_9 56$

(c)  $2 \log_7 5 = \log_7 25$

**Question 34 of 36**

$$\log(y^5 x) = 5 \log y + \log x$$

**Question 35 of 36**

$$\log_m \left( \frac{y^6 w^5}{\frac{1}{z^4}} \right)$$

**Question 36 of 36**

0.712