

Consider the rational function:

$$f(x) = \frac{x^2 - 4}{(x^2 - x - 6)}$$

- (1) What is the domain of $f(x)$?
- (2) What are the vertical asymptotes of $f(x)$?
- (3) What are the removable discontinuities of $f(x)$?
- (4) What is the horizontal asymptote of $f(x)$?
- (5) What are the zeros of $f(x)$?
- (6) What is the y -intercept of $f(x)$?

1

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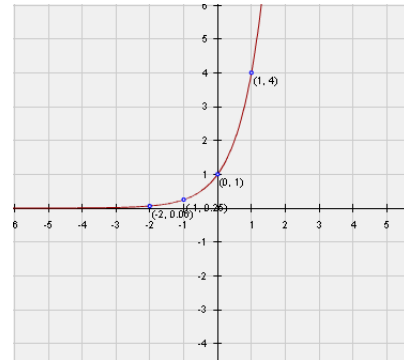
2

Consider the following exponential function:

$$f(x) = 3 \cdot \left(\frac{5}{3}\right)^{-2x} + 3$$

- (1) List the transformations of the base graph of $f(x)$
- (2) What is the asymptote of $f(x)$?
- (3) Determine the y -intercept of $f(x)$.
- (4) Sketch a graph of $f(x)$.

3



- (1) Determine an equation of the form $y = Cb^x$ for the above graph.

4

A piece of machinery, initially purchased for \$25,000, decreases in value by 1.4% per year. Determine a model of the form $v = k \cdot b^t$ that can be used to predict the value of this machinery if t is measured in years.

5

How much money should you invest at 7.5% compounded quarterly so that you have \$10,000 after 5 years?

6

Card 2: (1) All reals except $x = 2, -3$

(2) $x = 2, x = 3$

(3) None

(4) $y = 0$

(5) $(4, 0)$

(6) $(0, 4)$

Card 1: (1) All reals except $x = -2, 3$

(2) $x = 3$

(3) $(-2, -4)$

(4) $y = 1$

(5) $(2, 0)$

(6) $(0, 2)$

2

1

Card 4: $f(x) = 4^x$

Card 3: (1) Right by 2, stretch by 3, up 3

(2) $y = 3$

(3) 4.08

4

3

Card 6: \$6896.80

Card 5: $v = 25000 \cdot (0.986)^t$

6

5

Solve for x :

$$\frac{e^{x+5}}{x^{3x}} = e^{x-1}$$

7

Samantha invested \$300 in an investment account that earned 4.6% interest compounded continuously for 40 years. How much money is in the account after 40 years?

8

A species of snake was introduced in an area 10 years ago. It is estimated that there are 3500 snakes in the area now, and the population has a relative exponential growth rate of 7% per year. How many snakes will there be 20 years from now?

9

Write the following as a logarithm:

(1) $2^x = 3$

(2) $245^{\frac{1}{2}} = x$

(3) $b^x = y$

10

Write the following as an exponential:

(1) $\log_2(3) = x$

(2) $\log_{245} x = \frac{1}{2}$

(3) $\log_b y = x$

11

Consider the equation:

$$f(x) = \log_3(x + 11)$$

(1) What is the domain of $f(x)$?

(2) What is the range of $f(x)$?

(3) What is the asymptote of $f(x)$?

12

Card 8: \$1888.96

Card 7: $x=2$

8

7

Card 10: (1) $\log_2(3) = x$
(2) $\log_{245} x = \frac{1}{2}$
(3) $\log_b y = x$

Card 9: 14194

10

9

Card 12: (1) $(-11, \infty)$
(2) All real numbers
(3) $x = -11$

Card 11: (1) $2^x = 3$
(2) $245^{\frac{1}{2}} = x$
(3) $b^x = y$

12

11

Determine the inverse of:

(1) $f(x) = 3^{x-7} + 2$

(2) $g(x) = \ln(x-4) + 3$

(3) $h(x) = 2\log_5(x+5) - 4$

13

Expand:

(1) $\log_5\left(\frac{ab^2}{5cd}\right)$

(2) $\ln\left(\frac{e^2}{3}\right)$

(3) $\log_7\left(\frac{7abc}{d^2}\right)$

14

Write as a single logarithm:

(1) $\log_5(x) + 2\log_5(y) - \log_5(z) - 1$

(2) $\ln(x) + \frac{1}{3}\ln(27) - \ln(y) + \ln(z)$

(3) $\log_7(x) - \log_7(3) + 4\log_7(y) - 1$

15

How long would it take to double your investment if you invest \$2,000 at 7.5% compounded quarterly?

16

Suppose 128 ounces of a radioactive substance exponentially decays to 28 ounces in 6 hours. What is the half-life of the substance?

17

Card 14: Hehehe

Card 13: (1) $\log_3(x-2)+7$
(2) $e^{x-3}+4$
(3) $5^{\frac{x}{2}}-5$

14

13

Card 16: 9.32 years

Card 15: Yeah!

16

15

Card 17: -25.33%