WebAssign
1.2 Funciones Esenciales (Homework)

David Corzo
Diferencial, section B, Spring 2019
Instructor: Christiaan Ketelaar

Current Score : 56 / 58   **Due :** Friday, February 8, 2019 11:59 PM CST**Last Saved : n/a Saving... ()**

The due date for this assignment is past. Your work can be viewed below, but no changes can be made.

Important! Before you view the answer key, decide whether or not you plan to request an extension. Your Instructor may *not* grant you an extension if you have viewed the answer key. Automatic extensions are not granted if you have viewed the answer key.

Request Extension

**1.** 6/6 points | Previous AnswersSCalc8 1.2.001.

Classify each function as a power function, root function, polynomial (state its degree), rational function, algebraic function, trigonometric function, exponential function, or logarithmic function.

(a) $f(x) = \log_3(x)$

○ algebraic function

◉ 🔑 logarithmic function

○ power function

○ rational function

○ trigonometric function

○ root function

○ exponential function

○ polynomial function of degree 2

✔

(b) $g(x) = \sqrt[6]{x}$

◉ 🔑 root function

○ trigonometric function

○ rational function

○ logarithmic function

○ exponential function

○ polynomial function of degree 2

✔

(c) $h(x) = \dfrac{2x^3}{1 - x^2}$

○ polynomial of degree 2

○ trigonometric function

○ power function

◉ 🔑 rational function

○ logarithmic function

○ root function

○ exponential function

✔

(d) $u(t) = 1 - 1.1t + 2.59t^2$

○ power function

○ trigonometric function

○ exponential function

○ root function

◉ 🔑 polynomial function of degree 2

○ logarithmic function

✔

(e) $v(t) = 5^t$

- ◯ logarithmic function
- ◉ 🔑 exponential function
- ◯ root function
- ◯ trigonometric function
- ◯ power function

✔

(f) $w(\theta) = \sin(\theta) \cos^5(\theta)$

- ◯ rational function
- ◯ polynomial function of degree 2
- ◯ exponential function
- ◉ 🔑 trigonometric function
- ◯ logarithmic function
- ◯ power function
- ◯ root function
- ◯ algebraic function

✔

Solution or Explanation

(a) $f(x) = \log_3(x)$ is a logarithmic function.

(b) $g(x) = \sqrt[6]{x}$ is a root function with $n = 6$.

(c) $h(x) = \dfrac{2x^3}{1 - x^2}$ is a rational function because it is a ratio of polynomials.

(d) $u(t) = 1 - 1.1t + 2.59t^2$ is a polynomial of degree 2 (also called a *quadratic function*).

(e) $v(t) = 5^t$ is an exponential function.

(f) $w(\theta) = \sin(\theta) \cos^5(\theta)$ is a trigonometric function.

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2. 5/6 points | Previous AnswersSCalc8 1.2.501.XP.

Classify each function.

(a) $y = \dfrac{x - 9}{x + 9}$

- ○ polynomial function of degree 9
- ◉ 🔑 rational function
- ○ exponential function
- ○ logarithmic function
- ○ power function
- ○ trigonometric function
- ○ root function

✔

(b) $y = x + \dfrac{x^2}{\sqrt{x - 5}}$

- ○ power function
- ○ exponential function
- ○ polynomial function of degree 5
- ○ 🔑 algebraic function
- ◉ root function
- ○ trigonometric function
- ○ rational function
- ○ logarithmic function

✖

(c) $y = 7^x$

- ○ trigonometric function
- ○ polynomial function of degree 7
- ○ root function
- ◉ 🔑 exponential function
- ○ power function
- ○ logarithmic function

✔

(d) $y = x^7$

- ○ logarithmic function
- ○ exponential function
- ○ trigonometric function
- ◉ 🔑 power function
- ○ root function

✔

(e) $y = 4t^6 + t^4 - \pi$

- ○ root function
- ○ rational function
- ○ trigonometric function
- ○ algebraic function
- ○ power function
- ○ logarithmic function
- ◉ 🔑 polynomial function of degree 6
- ○ exponential function

✔

(f) $y = \cos(\theta) + \sin(\theta)$

- ○ logarithmic function
- ○ root function
- ○ rational function
- ○ exponential function
- ○ algebraic function
- ◉ 🔑 trigonometric function
- ○ power function
- ○ polynomial function of degree 6

✔
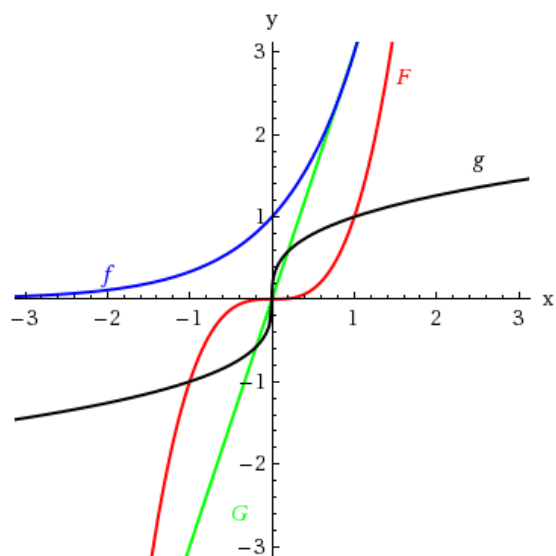
Solution or Explanation
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3. 4/4 points | Previous AnswersSCalc8 1.2.004.

Match each equation with its graph. Explain your choices. (Don't use a computer or graphing calculator.)

(a) $y = 3x$

○ f

◉ 🔑 G

○ F

○ g

✔

(b) $y = 3^x$

○ G

○ g

○ F

◉ 🔑 f

✔

(c) $y = x^3$

◉ 🔑 F

○ f

○ g

○ G

✔

(d) $y = \sqrt[3]{x}$

○ G

◉ 🔑 g

○ f

○ F

✔

Solution or Explanation

(a) The graph of $y = 3x$ is a line (choice G).

(b) $y = 3^x$ is an exponential function (choice f).

(c) $y = x^3$ is an odd polynomial function or power function (choice F).

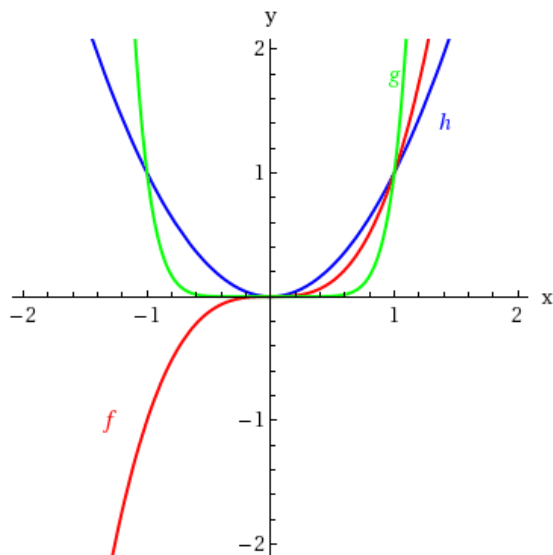(d) $y = \sqrt[3]{x} = x^{1/3}$ is a root function (choice g).

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4. 3/3 points | Previous AnswersSCalc8 1.2.003.

Match each equation with its graph. Explain your choices. (Don't use a computer or graphing calculator.)

(a) $y = x^2$

- ○ f
- ◉ 🔑 h ✔

(b) $y = x^3$

- ○ g
- ◉ 🔑 f
- ○ h ✔

(c) $y = x^8$

- ○ f
- ○ h
- ◉ 🔑 g ✔

Solution or Explanation

We notice from the figure that g and h are even functions (symmetric with respect to the y-axis) and that f is an odd function (symmetric with respect to the origin). So (b) $[y = x^3]$ must be f. Since g is flatter than h near the origin, we must have (c) $[y = x^8]$ matched with g and (a) $[y = x^2]$ matched with h.

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5. 2/2 points | Previous AnswersSCalc8 1.2.010.

Find expressions for the quadratic functions whose graphs are shown.

$$2(x-8)2$$

$f(x)$ =

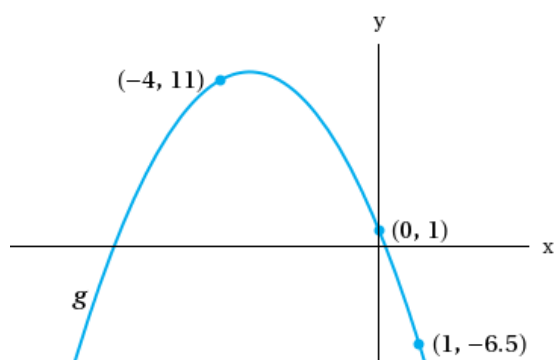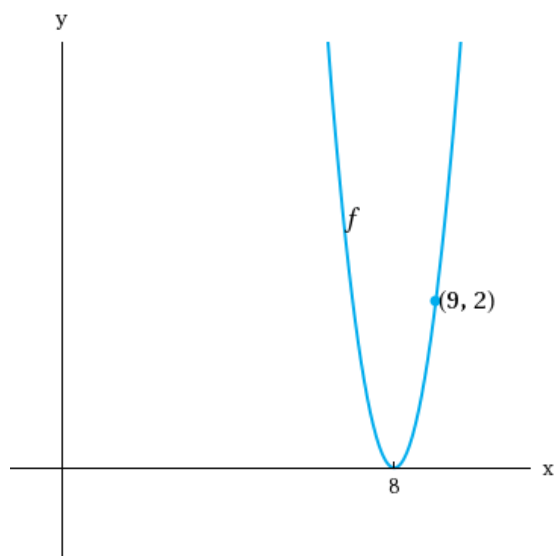✔ $2\left(x-8\right)^{2}$

$$-x2-6.5x+1$$

$g(x)$ =

✔ $-x^2 - 6.5x + 1$

Solution or Explanation

Click to View Solution

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6. 1/1 points | Previous AnswersSCalc8 1.2.005.

Find the domain of the function.

$$f(x) = \frac{9 \cos(x)}{1 - \sin(x)}$$

○ $\left\{ x \mid x \neq \pi + 2n\pi, \ n \text{ an integer} \right\}$

○ $\left\{ x \mid x \neq \frac{\pi}{2} + n\pi, \ n \text{ an integer} \right\}$

◉ 🔑 $\left\{ x \mid x \neq \frac{\pi}{2} + 2n\pi, \ n \text{ an integer} \right\}$

○ $\left\{ x \mid x \neq \frac{\pi}{4} + 2n\pi, \ n \text{ an integer} \right\}$

○ $\left\{ x \mid x \neq \frac{\pi}{4} + n\pi, \ n \text{ an integer} \right\}$

✔

Solution or Explanation

The denominator cannot equal 0, so $1 - \sin(x) \neq 0 \iff \sin(x) \neq 1 \iff x \neq \frac{\pi}{2} + 2n\pi$. Thus, the domain of $f(x) = \frac{9 \cos(x)}{1 - \sin(x)}$ is $\left\{ x \mid x \neq \frac{\pi}{2} + 2n\pi, \ n \text{ an integer} \right\}$.

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7. 6/6 points | Previous AnswersSCalc8 1.2.012.

Recent studies indicate that the average surface temperature of a planet has been rising steadily. Some scientists have modeled the temperature by the linear function $T = 0.01t + 8.75$, where T is temperature in °C and t represents years since 1900.

(a) What do the slope and T-intercept represent?

The slope is $\boxed{0.01}$ ✔ 🔑 $\boxed{0.01}$, which means that the average surface temperature of the planet is $\boxed{\text{increasing}}$ ✔ 🔑 $\boxed{\text{increasing}}$ at a rate of $\boxed{0.01}$ ✔ 🔑 $\boxed{0.01}$ °C per year. The T-intercept is $\boxed{8.75}$ ✔ 🔑 $\boxed{8.75}$, which presents the average surface temperature in the year $\boxed{1900}$ ✔ 🔑 $\boxed{1900}$.

(b) Use the equation to predict the planet's average surface temperature in 2040.
$\boxed{10.15}$ ✔ 🔑 $\boxed{10.15}$ °C

Solution or Explanation
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8. 3/4 points | Previous AnswersSCalc8 1.2.016.

Jason leaves Detroit at 3:00 PM and drives at a constant speed west along I-94. He passes Ann Arbor, 40 mi from Detroit, at 3:48 PM.

(a) Express the distance d traveled in terms of the time t (in hours) elapsed.
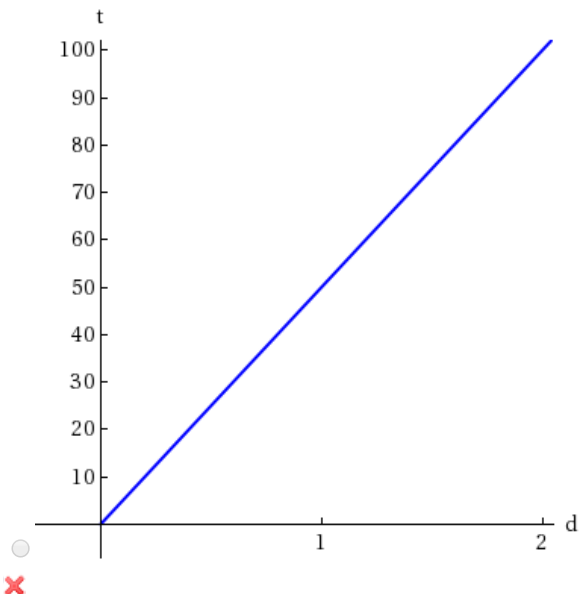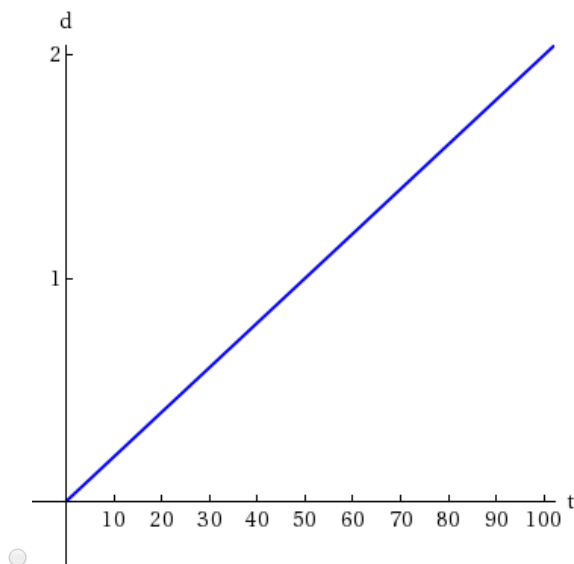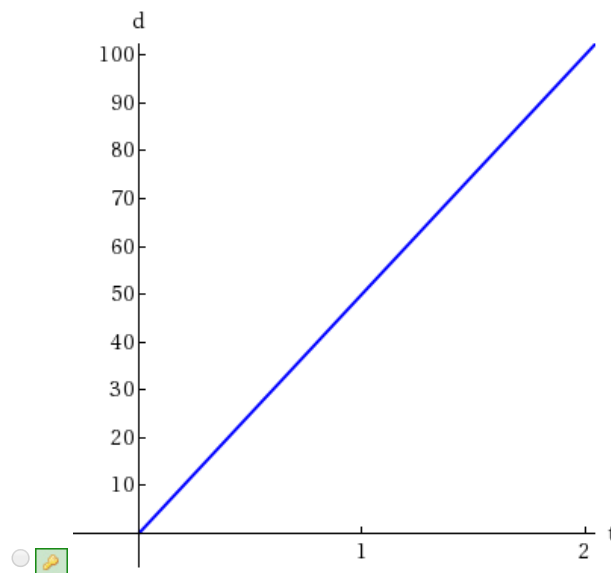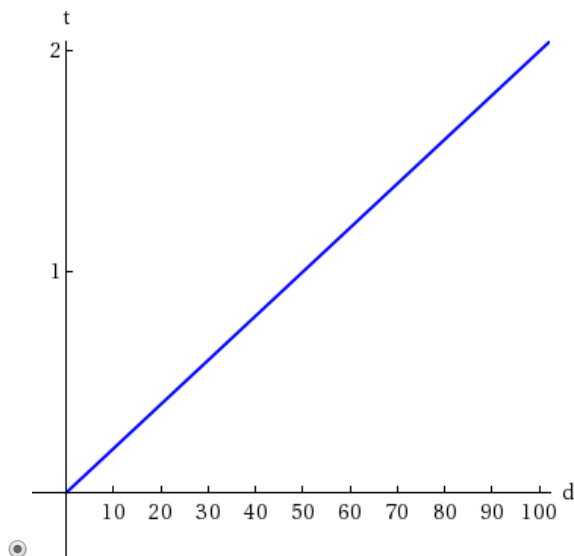
$d(t) =$

$$50t$$

✔ $50t$

(b) Draw the graph of the equation in part (a).

(c) What is the slope of this line?

50 ✔   50

What does it represent?

○ The slope represents the distance traveled in miles.

● 🔑 The slope represents the car's speed in miles per hour.

○ The slope represents the time traveled in hours.

✔

Solution or Explanation
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9. 6/6 points | Previous AnswersSCalc8 1.2.020.

The monthly cost of driving a car depends on the number of miles driven. Lynn found that in May it cost her $400 to drive 500 mi and in June it cost her $480 to drive 900 mi.

(a) Express the monthly cost C as a function of the distance driven d, assuming that a linear relationship gives a suitable model.
$C(d) =$
$$15d+300

✔ $0.2d + 300$

(b) Use part (a) to predict the cost of driving 1700 miles per month.
$ 640 ✔   640

(c) Draw the graph of the linear function.

What does the slope represent?

◉ 🔑 It represents the cost (in dollars) per mile.

○ It represents the cost (in dollars) of driving.

○ It represents the fixed cost (amount she pays even if she does not drive).

○ It represents the distance (in miles) traveled.
                                                                                    ✔

(d) What does the C-intercept represent?

○ It represents the cost (in dollars) per mile.

○ It represents the distance (in miles) traveled.

◉ 🔑 It represents the fixed cost (amount she pays even if she does not drive).

○ It represents the cost (in dollars) of driving.
                                                                                    ✔

(e) Why does a linear function give a suitable model in this situation?

○ A linear function is suitable because the monthly cost increases as the number of miles driven decreases.

○ A linear function is suitable because the monthly cost increases even if the miles driven is constant.

◉ 🔑 A linear function is suitable because the monthly cost increases as the number of miles driven increases.

○ A linear function is suitable because the monthly cost is fixed despite the fact that the miles driven may vary.

✔

Solution or Explanation
Click to View Solution

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10. 2/2 points | Previous AnswersSCalc8 1.2.021.

For each scatter plot, decide what type of function you might choose as a model for the data.

(a)

○ root function, of the form $f(x) = \sqrt{x} + c$

○ logarithmic function, of the form $f(x) = a \ln(bx) + c$

○ exponential function, of the form $f(x) = a e^{bx} + c$

◉ 🔑 trigonometric function, of the form $f(x) = a \cos(bx) + c$

○ linear function, of the form $f(x) = mx + b$

✔

(b)

○ trigonometric function, of the form $f(x) = a \cos(bx) + c$

○ root function, of the form $f(x) = \sqrt{x} + c$

◉ 🔑 linear function, of the form $f(x) = mx + b$

○ exponential function, of the form $f(x) = a e^{bx} + c$

○ logarithmic function, of the form $f(x) = a \ln(bx) + c$

✔

Solution or Explanation
(a) The data appear to be periodic and a sine or cosine function would make the best model. A model of the form $f(x) = a \cos(bx) + c$ seems appropriate.

(b) The data appear to be decreasing in a linear fashion. A model of the form $f(x) = mx + b$ seems appropriate.

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11. 1/1 points | Previous AnswersSCalc8 1.2.029.

Many physical quantities are connected by *inverse square laws*, that is, by power functions of the form $f(x) = kx^{-2}$. In particular, the illumination of an object by a light source is inversely proportional to the square of the distance from the source. Suppose that after dark you are in a room with just one lamp and you are trying to read a book. The light is too dim and so you move halfway to the lamp. How much brighter is the light?

4 ✔ 🔑 4 times as bright

Solution or Explanation

If x is the original distance from the source, then the illumination is $f(x) = kx^{-2} = k/x^2$. Moving halfway to the lamp gives us an illumination of $f\left(\frac{1}{2}x\right) = k\left(\frac{1}{2}x\right)^{-2} = k(2/x)^2$, so the light is 4 times as bright.

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12. 1/1 points | Previous AnswersSCalc8 1.2.JIT.001.MI.

Solve the equation for the indicated variable.

$P = 2l + 2w;$ for w

$$P2-l$$

$w = $

$\dfrac{P - 2l}{2}$ ✔

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13.8/8 points | Previous AnswersSCalc8 1.2.JIT.004.

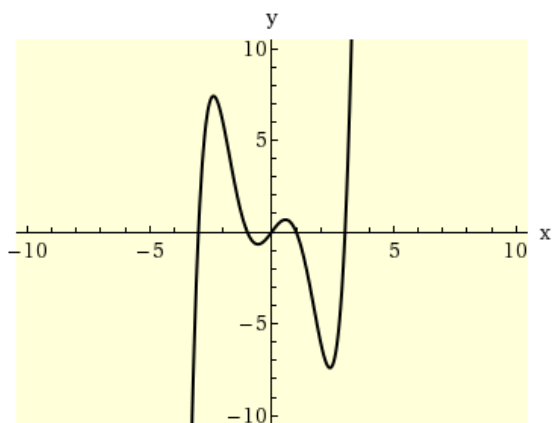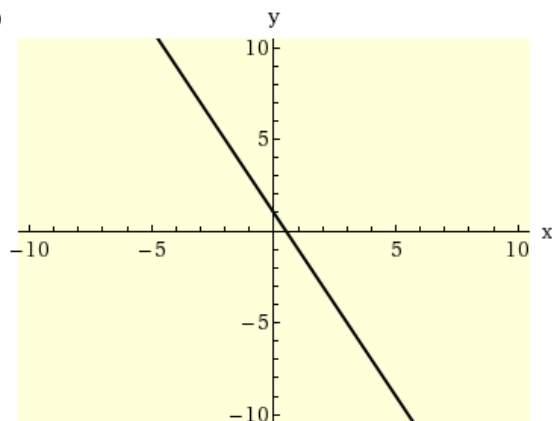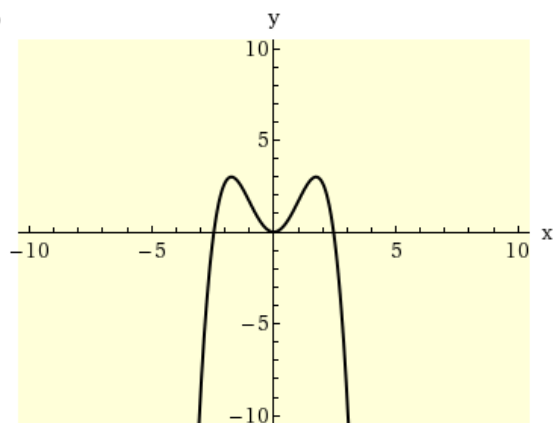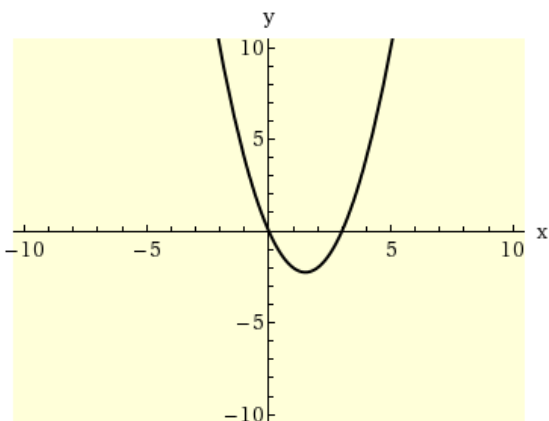Match the polynomial function with its graph.

(a)

- ○ $f(x) = -2x + 1$
- ○ $f(x) = -2x^2 - 9x$
- ○ $f(x) = \frac{1}{3}-x^4 + 2x^2$
- ⦿ 🔑 $f(x) = x^4 + 3x^3$
- ○ $f(x) = x^2 - 3x$
- ○ $f(x) = 2x^3 - 3x + 1$
- ○ $f(x) = \frac{1}{3}-x^3 + x^2 \frac{4}{3}-$
- ○ $f(x) \frac{1}{5}-x^5 - 2x^3 \frac{9}{5}-x$

✔

(b)

○ $f(x) = -2x + 1$

○ $f(x) = -2x^2 - 9x$

○ $f(x) = \frac{1}{3}-x^4 + 2x^2$

○ $f(x) = x^4 + 3x^3$

○ $f(x) = x^2 - 3x$

○ $f(x) = 2x^3 - 3x + 1$

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

○ $f(x) \frac{1}{5}-x^5 - 2x^3 \frac{9}{5}-x$

✔

(c)

○ $f(x) = -2x + 1$

○ $f(x) = -2x^2 - 9x$

○ $f(x) = \frac{1}{3}-x^4 + 2x^2$

○ $f(x) = x^4 + 3x^3$

○ $f(x) = x^2 - 3x$

○ $f(x) = 2x^3 - 3x + 1$

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

◉ 🔑 $f(x) \frac{1}{5}-x^5 - 2x^3 \frac{9}{5}-x$

✔

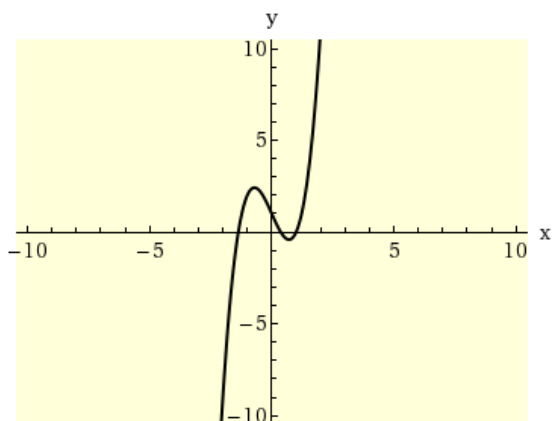(d)

⦿ 🔑 $f(x) = -2x + 1$

◯ $f(x) = -2x^2 - 9x$

◯ $f(x) = \frac{1}{3}-x^4 + 2x^2$

◯ $f(x) = x^4 + 3x^3$

◯ $f(x) = x^2 - 3x$

◯ $f(x) = 2x^3 - 3x + 1$

◯ $f(x) = \frac{1}{3}-x^3 + x^2 \frac{4}{3}-$
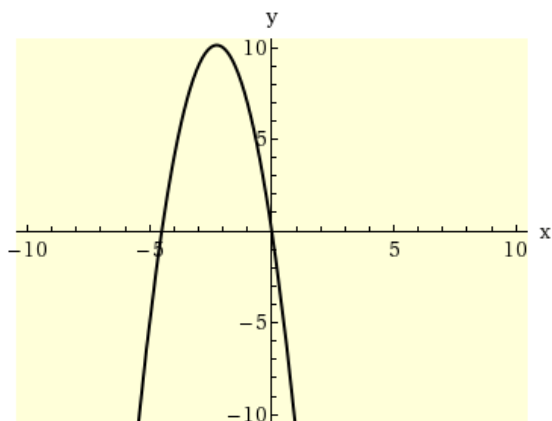
◯ $f(x) \frac{1}{5}-x^5 - 2x^3 \frac{9}{5}-x$

✔

(e)

◯ $f(x) = -2x + 1$

◯ $f(x) = -2x^2 - 9x$

⦿ 🔑 $f(x) = \frac{1}{3}-x^4 + 2x^2$

◯ $f(x) = x^4 + 3x^3$

◯ $f(x) = x^2 - 3x$

◯ $f(x) = 2x^3 - 3x + 1$

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

◯ $f(x) \frac{1}{5}-x^5 - 2x^3 \frac{9}{5}-x$

✔

(f)

○ $f(x) = -2x + 1$

○ $f(x) = -2x^2 - 9x$

○ $f(x) = \frac{1}{3}-x^4 + 2x^2$

○ $f(x) = x^4 + 3x^3$

◉ 🔑 $f(x) = x^2 - 3x$

○ $f(x) = 2x^3 - 3x + 1$

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

○ $f(x) \frac{1}{5}-x^5 - 2x^3 \frac{9}{5}-x$

✔

(g)

○ $f(x) = -2x + 1$

○ $f(x) = -2x^2 - 9x$

○ $f(x) = \frac{1}{3}-x^4 + 2x^2$

○ $f(x) = x^4 + 3x^3$

○ $f(x) = x^2 - 3x$

◉ 🔑 $f(x) = 2x^3 - 3x + 1$

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

○ $f(x) \frac{1}{5}-x^5 - 2x^3 \frac{9}{5}-x$

✔

(h)

⊙ $f(x) = -2x + 1$

⊙ 🔑 $f(x) = -2x^2 - 9x$

⊙ $f(x) = \frac{1}{3}-x^4 + 2x^2$

⊙ $f(x) = x^4 + 3x^3$

⊙ $f(x) = x^2 - 3x$

⊙ $f(x) = 2x^3 - 3x + 1$

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

⊙ $f(x) \frac{1}{5}-x^5 - 2x^3 \frac{9}{5}-x$

✔

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14. 2/2 points | Previous AnswersSCalc8 1.2.JIT.007.

Use the quadratic formula and a calculator to find all real solutions, correct to three decimals. (If there is no real solution, enter NO REAL SOLUTION.)

$$2.831x^2 - 4.512x = 6.219$$

$x = $ | -0.886 | ✔   🔑 | -0.886 | (smaller value)

$x = $ | 2.480 | ✔   🔑 | 2.480 | (larger value)

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15. 1/1 points | Previous AnswersSCalc8 1.2.JIT.005.

Describe the right-hand and left-hand behavior of the graph of the polynomial function. (Select all that apply.)

$$f(x) = 3x^5 - 7x + 5.5$$

☑ 🔑 The graph rises to the right.

☐ The graph falls to the right.

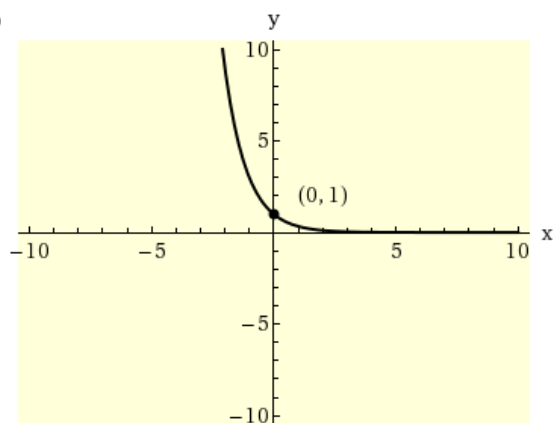☐ The graph rises to the left.

☑ 🔑 The graph falls to the left.

✔

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16. 4/4 points | Previous AnswersSCalc8 1.2.JIT.008.
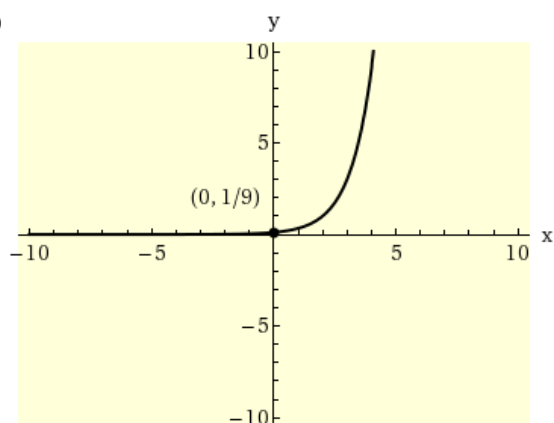
Match the exponential function with its graph.

(a)

- ○ $f(x) = 3^x$
- ○ $f(x) = 3^x + 1$
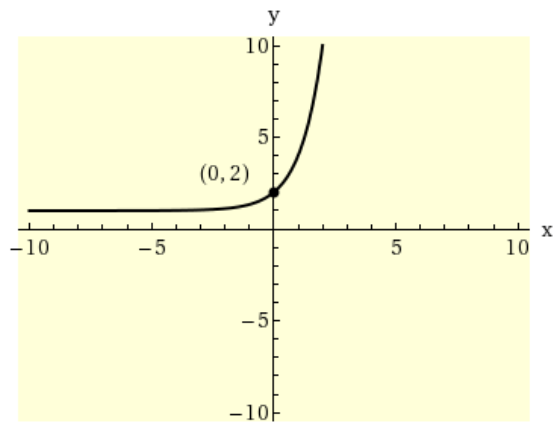- ◉ 🔑 $f(x) = 3^{-x}$
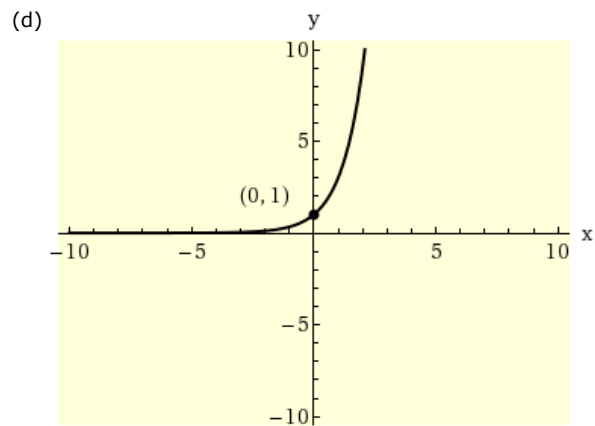- ○ $f(x) = 3^{x-2}$

✔

(b)

- ◉ 🔑 $f(x) = 3^{x-2}$
- ○ $f(x) = 3^{-x}$
- ○ $f(x) = 3^x + 1$
- ○ $f(x) = 3^x$

✔

(c)

- ○ $f(x) = 3^{x-2}$
- ○ $f(x) = 3^x$
- ○ $f(x) = 3^{-x}$
- ◉ 🔑 $f(x) = 3^x + 1$ ✔

(d)

- ○ $f(x) = 3^x + 1$
- ◉ 🔑 $f(x) = 3^x$
- ○ $f(x) = 3^{-x}$
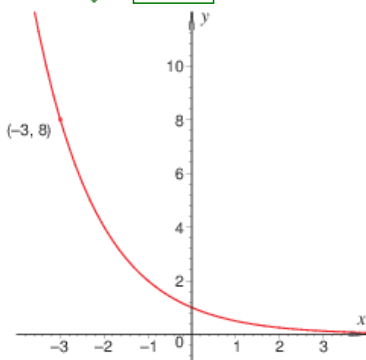- ○ $f(x) = 3^{x-2}$ ✔

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17. 1/1 points | Previous AnswersSCalc8 1.2.JIT.010.MI.

Find the exponential function $f(x) = a^x$ whose graph is given.

$$(12)x

$f(x)$ =

$$\left(\frac{1}{2}\right)^x$$ ✔

Need Help? [Read It] [Watch It] [Master It] [Talk to a Tutor]