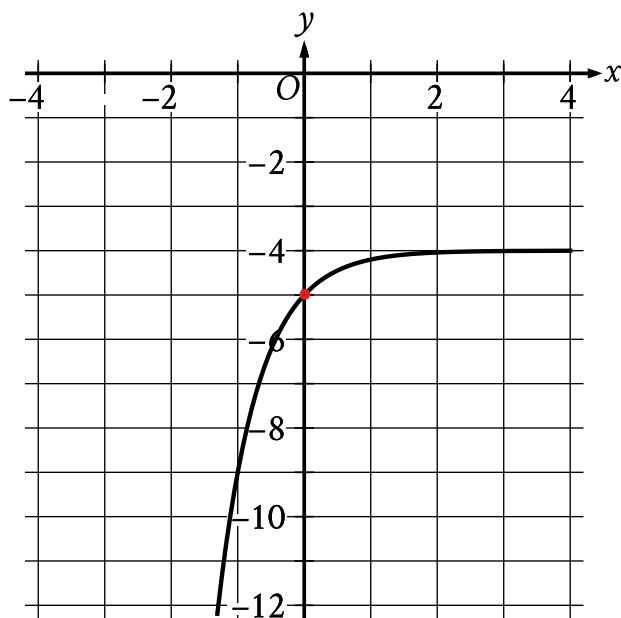


| Assessment | Test | Domain        | Skill               | Difficulty                          |
|------------|------|---------------|---------------------|-------------------------------------|
| SAT        | Math | Advanced Math | Nonlinear functions | <div></div> <div></div> <div></div> |

ID: 6abec9a8

1.1



What is the  $y$ -intercept of the graph shown?

A.  $(-1, -9)$

~~B.  $(0, -5)$~~

C.  $(0, -4)$

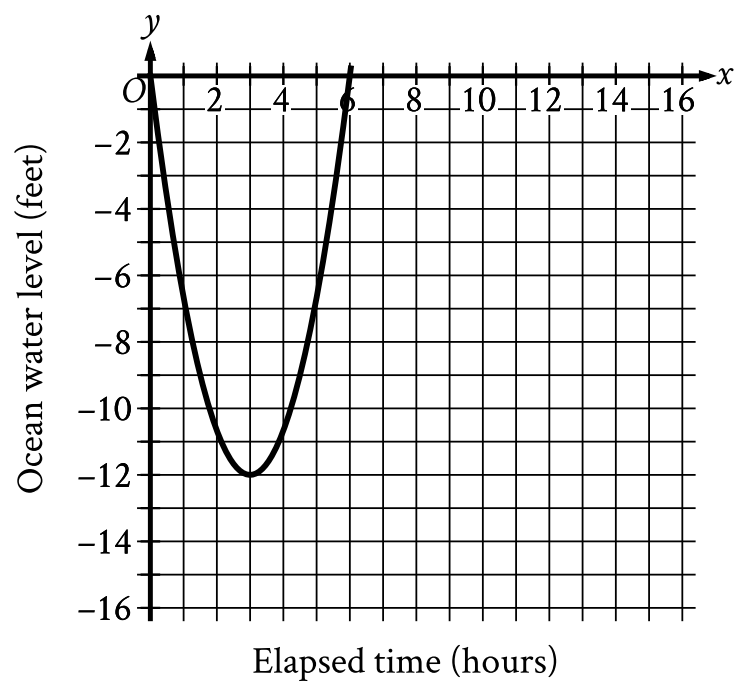
D.  $(0, 0)$

Question ID 1ee962ec

|            |      |               |                     |                                              |
|------------|------|---------------|---------------------|----------------------------------------------|
| Assessment | Test | Domain        | Skill               | Difficulty                                   |
| SAT        | Math | Advanced Math | Nonlinear functions | <div><div></div><div></div><div></div></div> |

ID: 1ee962ec

1.2



Scientists recorded data about the ocean water levels at a certain location over a period of 6 hours. The graph shown models the data, where  $y = 0$  represents sea level. Which table gives values of  $x$  and their corresponding values of  $y$  based on the model?

A.

| $x$ | $y$ |
|-----|-----|
| 0   | -12 |
| 0   | 3   |
| 3   | 6   |

✗

~~A.~~

| $x$ | $y$ |
|-----|-----|
| 0   | 0   |
| 3   | -12 |
| 6   | 0   |

~~✗~~

B.

| $x$ | $y$ |
|-----|-----|
| 0   | 0   |
| 3   | 12  |
| 0   | -6  |

✗

D.

| $x$ | $y$ |
|-----|-----|
| 0   | 0   |
| 12  | 3   |
| -6  | 0   |

✗

## Question ID 788bfd56

| Assessment | Test | Domain        | Skill               | Difficulty                                   |
|------------|------|---------------|---------------------|----------------------------------------------|
| SAT        | Math | Advanced Math | Nonlinear functions | <div><div></div><div></div><div></div></div> |

ID: 788bfd56

1.3

The function  $f$  is defined by  $f(x) = 4 + \sqrt{x}$ . What is the value of  $f(144)$ ?

- A. 0
- ~~B. 16~~
- C. 40
- D. 76

$$\begin{aligned}y &= 4 + \sqrt{144} \\ &= 16 \\ &\quad //\end{aligned}$$

Question ID b39d74a0

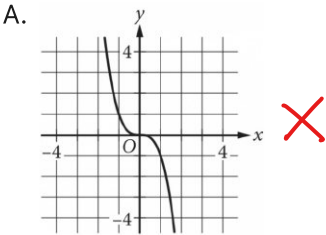
| Assessment | Test | Domain        | Skill               | Difficulty                                   |
|------------|------|---------------|---------------------|----------------------------------------------|
| SAT        | Math | Advanced Math | Nonlinear functions | <div><div></div><div></div><div></div></div> |

ID: b39d74a0

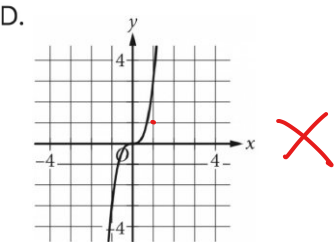
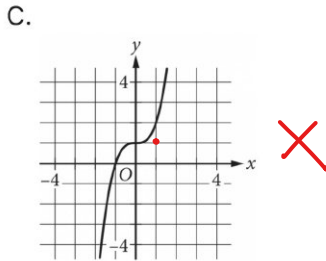
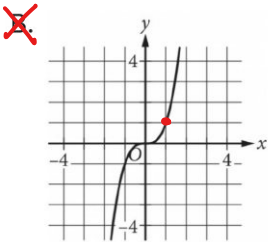
1.4

| $x$ | $y$ |
|-----|-----|
| 0   | 0   |
| 1   | 1   |
| 2   | 8   |
| 3   | 27  |

The table shown includes some values of  $x$  and their corresponding values of  $y$ . Which of the following graphs in the  $xy$ -plane could represent the relationship between  $x$  and  $y$  ?



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## Question ID 5377d9cf

| Assessment | Test | Domain        | Skill               | Difficulty                                   |
|------------|------|---------------|---------------------|----------------------------------------------|
| SAT        | Math | Advanced Math | Nonlinear functions | <div><div></div><div></div><div></div></div> |

ID: 5377d9cf

1.5

If  $f(x) = \frac{x^2 - 6x + 3}{x - 1}$ ,

what is  $f(-1)$ ?

~~A. -5~~

B. -2

C. 2

D. 5

$$\begin{aligned} y &= \frac{(-1)^2 - 6(-1) + 3}{-1 - 1} \\ &= -5 // \end{aligned}$$

## Question ID 75915e3c

| Assessment | Test | Domain        | Skill               | Difficulty                                   |
|------------|------|---------------|---------------------|----------------------------------------------|
| SAT        | Math | Advanced Math | Nonlinear functions | <div><div></div><div></div><div></div></div> |

ID: 75915e3c

1.6

$$f(x) = 2(3^x)$$

For the function  $f$  defined above, what is the value of  $f(2)$ ?

- A. 9
- B. 12
- ~~C. 18~~
- D. 36

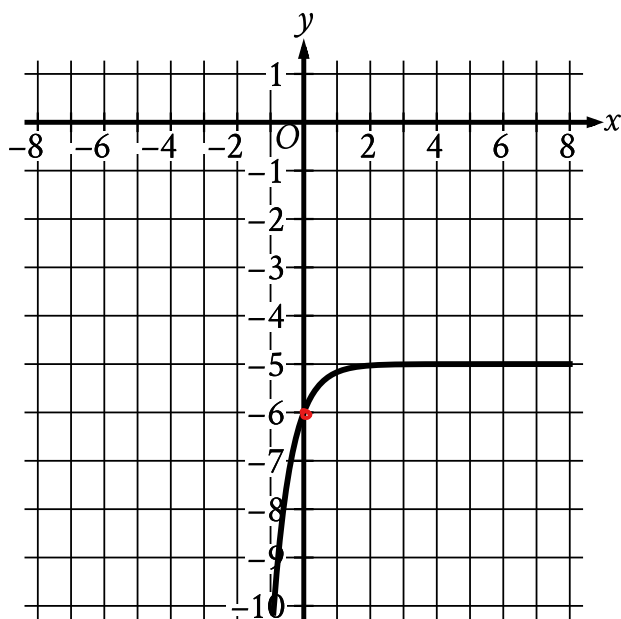
$$\begin{aligned} y &= 2(3)^2 \\ &= 18 // \end{aligned}$$

## Question ID 7160cbb3

| Assessment | Test | Domain        | Skill               | Difficulty                                   |
|------------|------|---------------|---------------------|----------------------------------------------|
| SAT        | Math | Advanced Math | Nonlinear functions | <div><div></div><div></div><div></div></div> |

ID: 7160cbb3

1.7



What is the y-intercept of the graph shown?

~~A.  $(0, -6)$~~

B.  $(-6, 0)$

C.  $(0, 0)$

D.  $(-5, -5)$

## Question ID 72ae8a87

| Assessment | Test | Domain        | Skill               | Difficulty                                   |
|------------|------|---------------|---------------------|----------------------------------------------|
| SAT        | Math | Advanced Math | Nonlinear functions | <div><div></div><div></div><div></div></div> |

ID: 72ae8a87

1.8

The function  $f(x) = 200,000(1.21)^x$  gives a company's predicted annual revenue, in dollars,  $x$  years after the company started selling light bulbs online, where  $0 < x \leq 10$ . What is the best interpretation of the statement " $f(5)$  is approximately equal to 518,748" in this context?

- ☒ A. 5 years after the company started selling light bulbs online, its predicted annual revenue is approximately 518,748 dollars.
- ☐ B. 5 years after the company started selling light bulbs online, its predicted annual revenue will have increased by a total of approximately 518,748 dollars.
- ☐ C. When the company's predicted annual revenue is approximately 518,748 dollars, it is 5 times the predicted annual revenue for the previous year.
- ☐ D. When the company's predicted annual revenue is approximately 518,748 dollars, it is 5% greater than the predicted annual revenue for the previous year.

## Question ID 09f58996

| Assessment | Test | Domain        | Skill               | Difficulty                                   |
|------------|------|---------------|---------------------|----------------------------------------------|
| SAT        | Math | Advanced Math | Nonlinear functions | <div><div></div><div></div><div></div></div> |

ID: 09f58996

1.9

The function  $f$  is defined by  $f(x) = 6 + \sqrt{x}$ . What is the value of  $f(36)$ ?

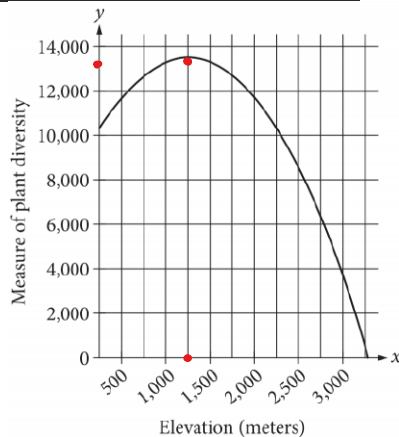
$$\begin{aligned}y &= 6 + \sqrt{36} \\&= 12 //\end{aligned}$$

# Question ID ebe4bde0

| Assessment | Test | Domain        | Skill               | Difficulty                                       |
|------------|------|---------------|---------------------|--------------------------------------------------|
| SAT        | Math | Advanced Math | Nonlinear functions | <div> <div></div> <div></div> <div></div> </div> |

ID: ebe4bde0

1.10



The quadratic function graphed above models a particular measure of plant diversity as a function of the elevation in a region of Switzerland. According to the model, which of the following is closest to the elevation, in meters, at which plant diversity is greatest?

- A. 13,500
- B. 3,000
- ~~C. 1,250~~
- D. 250

$$\begin{aligned} \text{Max } X &= 1,250 // \\ \text{Max } Y &= 13,500 \text{ and} \end{aligned}$$

Question ID d46da42c

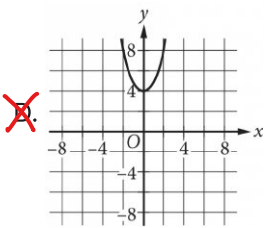
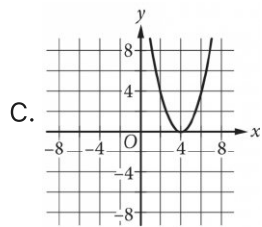
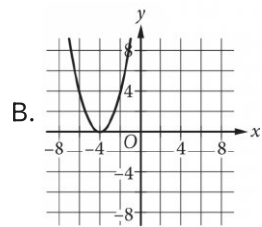
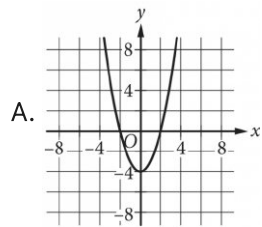
| Assessment | Test | Domain        | Skill               | Difficulty                                   |
|------------|------|---------------|---------------------|----------------------------------------------|
| SAT        | Math | Advanced Math | Nonlinear functions | <div><div></div><div></div><div></div></div> |

ID: d46da42c

1.11

$f(x) = x^2 + 4$

The function  $f$  is defined as shown. Which of the following graphs in the  $xy$ -plane could be the graph of  $y = f(x)$  ?



Desmos

## Question ID 79ba511a

| Assessment | Test | Domain        | Skill               | Difficulty                                   |
|------------|------|---------------|---------------------|----------------------------------------------|
| SAT        | Math | Advanced Math | Nonlinear functions | <div><div></div><div></div><div></div></div> |

ID: 79ba511a

1.12

The function  $f$  is defined by  $f(x) = x^3 + 15$ . What is the value of  $f(2)$ ?

A. 20

B. 21

~~C. 23~~

D. 24

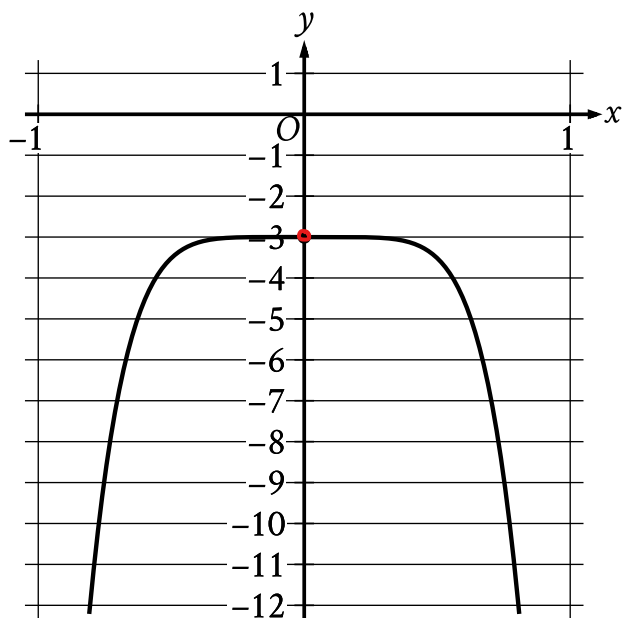
$$\begin{aligned}y &= 2^3 + 15 \\&= 23 \\&\quad //\end{aligned}$$

## Question ID 50418728

| Assessment | Test | Domain        | Skill               | Difficulty                                   |
|------------|------|---------------|---------------------|----------------------------------------------|
| SAT        | Math | Advanced Math | Nonlinear functions | <div><div></div><div></div><div></div></div> |

ID: 50418728

1.13



The graph of the polynomial function  $f$ , where  $y = f(x)$ , is shown. The  $y$ -intercept of the graph is  $(0, y)$ . What is the value of  $y$ ?

$$y = -3 //$$

## Question ID ee05c84e

| Assessment | Test | Domain        | Skill               | Difficulty                                   |
|------------|------|---------------|---------------------|----------------------------------------------|
| SAT        | Math | Advanced Math | Nonlinear functions | <div><div></div><div></div><div></div></div> |

ID: ee05c84e

1.14

$$f(x) = (x + 0.25x)(50 - x)$$

The function  $f$  is defined above. What is the value of  $f(20)$ ?

- A. 250
- B. 500
- ~~C. 750~~
- D. 2,000

$$\begin{aligned} y &= (20 + 0.25(20))(50 - 20) \\ &= 750 // \end{aligned}$$

Question ID 39652e93

| Assessment | Test | Domain        | Skill               | Difficulty                                   |
|------------|------|---------------|---------------------|----------------------------------------------|
| SAT        | Math | Advanced Math | Nonlinear functions | <div><div></div><div></div><div></div></div> |

ID: 39652e93

1.15

The function  $f$  is defined by  $f(x) = \frac{16}{x}$ . What is the value of  $f(x)$  when  $x = 17$ ?

- ~~A.  $\frac{16}{17}$~~
- B.  $\frac{17}{16}$
- C. 16
- D. 17

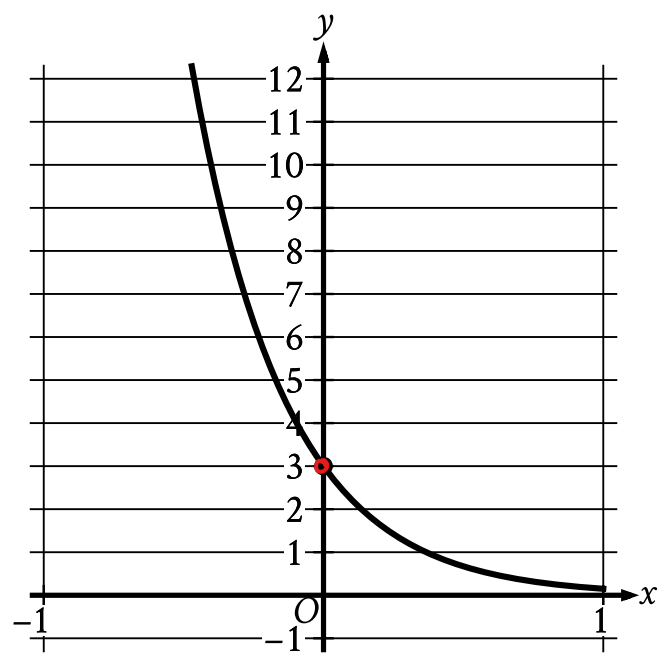
$y = \frac{16}{17}$

Question ID 02c67921

| Assessment | Test | Domain        | Skill               | Difficulty                                   |
|------------|------|---------------|---------------------|----------------------------------------------|
| SAT        | Math | Advanced Math | Nonlinear functions | <div><div></div><div></div><div></div></div> |

ID: 02c67921

1.16



The graph of the exponential function  $f$  is shown, where  $y = f(x)$ . The y-intercept of the graph is  $(0, y)$ . What is the value of  $y$ ?

$y = 3 //$

Question ID 04b985e6

| Assessment | Test | Domain        | Skill               | Difficulty                                   |
|------------|------|---------------|---------------------|----------------------------------------------|
| SAT        | Math | Advanced Math | Nonlinear functions | <div><div></div><div></div><div></div></div> |

ID: 04b985e6

1.17

The kinetic energy, in joules, of an object with mass **9** kilograms traveling at a speed of  $v$  meters per second is given by the function  $K$ , where  $K(v) = \frac{9}{2}v^2$ . Which of the following is the best interpretation of  $K(34) = 5,202$  in this context?

- ☒ A. The object traveling at ~~34~~ meters per second has a kinetic energy of **5,202** joules.
- ☐ B. The object traveling at ~~340~~ meters per second has a kinetic energy of **5,202** joules.
- ☐ C. The object traveling at ~~5,202~~ meters per second has a kinetic energy of **34** joules.
- ☐ D. The object traveling at ~~23,409~~ meters per second has a kinetic energy of **34** joules.

Question ID 1863e3be

| Assessment | Test | Domain        | Skill               | Difficulty                                   |
|------------|------|---------------|---------------------|----------------------------------------------|
| SAT        | Math | Advanced Math | Nonlinear functions | <div><div></div><div></div><div></div></div> |

ID: 1863e3be

1.18

The *y*-intercept of the graph of  $y = x^2 + 31$  in the *xy*-plane is  $(0, y)$ . What is the value of *y*?

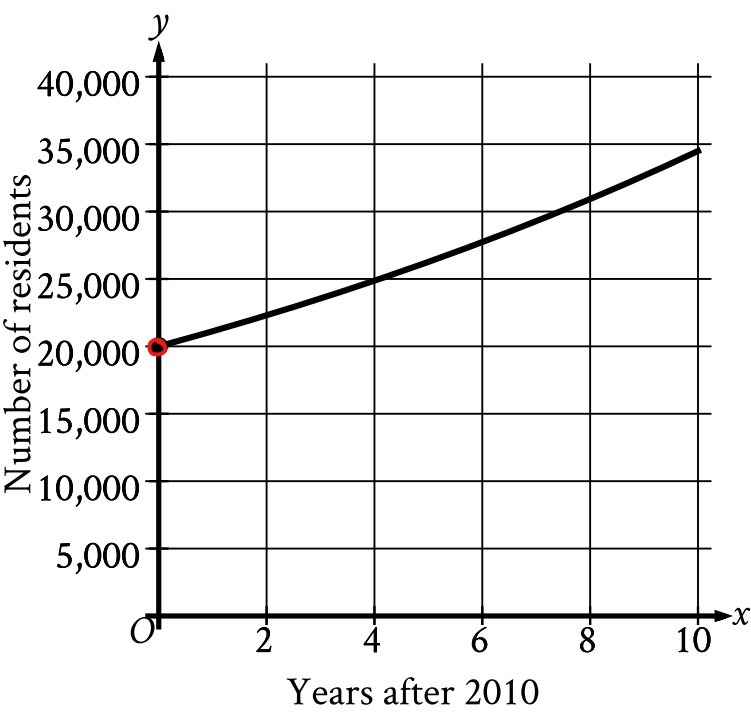
$$y = 0^2 + 31$$
$$= 31$$
$$//$$

Question ID 2d394c28

| Assessment | Test | Domain        | Skill               | Difficulty                                   |
|------------|------|---------------|---------------------|----------------------------------------------|
| SAT        | Math | Advanced Math | Nonlinear functions | <div><div></div><div></div><div></div></div> |

ID: 2d394c28

1.19



The graph shown models the number of residents of a certain city  $x$  years after 2010. How many residents does this model estimate the city had in 2010?

- A. 0
- B. 2,000
- ~~C. 20,000~~
- D. 25,000

Question ID 2fec8bf4

| Assessment | Test | Domain        | Skill               | Difficulty                                   |
|------------|------|---------------|---------------------|----------------------------------------------|
| SAT        | Math | Advanced Math | Nonlinear functions | <div><div></div><div></div><div></div></div> |

ID: 2fec8bf4

1.20

$P(t) = 1,800(1.02)^t$

The function  $P$  gives the estimated number of marine mammals in a certain area, where  $t$  is the number of years since a study began. What is the best interpretation of  $P(0) = 1,800$  in this context?

- A. The estimated number of marine mammals in the area was ~~102~~ when the study began.
- ~~B.~~ The estimated number of marine mammals in the area was **1,800** when the study began.
- C. The estimated number of marine mammals in the area increased by **102** each year during ~~the study.~~
- D. The estimated number of marine mammals in the area increased by **1,800** each year during ~~the study.~~