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## Practice quiz on the Cartesian Plane

PUNTOS TOTALES DE 5

1. Which of the following points in the Cartesian Plane is on the  $y$ -axis?

1 / 1 puntos

- ☐  $(5, 0)$
- ☒  $(0, -5)$
- ☐  $(-5, 0)$
- ☐  $(1, 1)$



Correcto

The  $y$ -axis is defined to be all points in the Cartesian plane with zero as  $x$ -coordinate. The point  $(0, -5)$  meets that requirement.

2. Find the distance between the points  $A = (2, 2)$  and  $C = (3, 3)$ :

1 / 1 puntos

- ☒  $\sqrt{2}$
- ☐ 2
- ☐ 0
- ☐ 1



Correcto

Recall that the distance between points  $(a, b)$  and  $(c, d)$  is  $\sqrt{(c-a)^2 + (d-b)^2}$ .

In this case  $(a, b) = (2, 2)$  and  $(c, d) = (3, 3)$ , so the distance is  $\sqrt{(3-2)^2 + (3-2)^2} = \sqrt{2}$ .

3. Find the point-slope form of the equation of the line that goes between  $A = (1, 1)$  and  $B = (5, 3)$ :

1 / 1 puntos

- ☒  $y - 1 = \frac{1}{2}(x - 1)$
- ☐  $y - 1 = \frac{1}{2}(x - 5)$
- ☐  $y - 3 = \frac{1}{2}(x - 1)$
- ☐  $y = \frac{1}{2}x$



Correcto



☐  $y - 3 = \frac{1}{2}(x - 1)$

☐  $y = \frac{1}{2}x$

✓ Correcto

The point-slope form for the equation of a line with slope  $m$  that goes through the point  $(x_0, y_0)$  is  $y - y_0 = m(x - x_0)$

In this case, the slope  $m = \frac{3 - 1}{5 - 1} = \frac{1}{2}$

We can choose either  $A$  or  $B$  for the point on the line, but in neither case do we get this chosen answer.

4. Which of the following points is on the line with equation:

1 / 1 puntos

$y - 1 = 2(x - 2)$ ?

☐  $(2, 3)$

☒  $(2, 1)$

☐  $(0, 0)$

☐  $(3, 2)$

✓ Correcto

If we plug in 1 for  $y$  and 2 for  $x$  in the equation of the line, we make a true statement,  $0 = 0$ , so this point lies on the line.

5. Suppose that a line  $\ell$  has slope 2 and goes through the point  $(-1, 0)$ . What is the  $y$ -intercept of  $\ell$ ?

1 / 1 puntos

☐ 1

☐ 0

☐ -1

☒ 2

✓ Correcto

Recall that the  $y$ -intercept of  $\ell$  is the  $y$ -coordinate of where  $\ell$  hits the  $y$ -axis.

Since  $(-1, 0) \in \ell$ , the point on  $\ell$  with  $x = 0$  is obtained by running one unit from  $(-1, 0)$  while rising two units.

This gives  $y = 2$  as the  $y$ -intercept.

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## Practice quiz on Types of Functions

PUNTOS TOTALES DE 6

1. Suppose that  $A = \{1, 2, 10\}$  and  $B = \{4, 8, 40\}$ . Which of the following formulae do *not* define a function  $f : A \rightarrow B$ ?

1 / 1 puntos

- ☐  $f(1) = 4, f(2) = 4, \text{ and } f(10) = 4.$
- ☒  $f(1) = 5, f(2) = 8, \text{ and } f(10) = 40.$
- ☐  $f(a) = 4a, \text{ for each } a \in A$
- ☐  $f(1) = 4, f(2) = 40, \text{ and } f(10) = 8.$

✓ Correcto

A function  $f : A \rightarrow B$  is a rule which assigns an element  $f(a) \in B$  to each  $a \in A$ . In this case, unfortunately,  $f(1) = 5 \notin B$ .

2. Suppose that  $A$  contains every person in the VBS study (see the second video in the course if you're confused here!). Suppose that  $Y = \{+, -\}$  and  $Z = \{H, S\}$

1 / 1 puntos

Suppose that  $T : A \rightarrow Y$  is the function which gives  $T(a) = +$  if person  $a$  tests positive and  $T(a) = -$  if they test negative.

Suppose that  $D : A \rightarrow Z$  is the function which gives  $D(a) = H$  if person  $a$  actually has VBS and  $D(a) = S$  if the person actually has no VBS.

Which of the following must be true of person  $a$  if we have a false positive?

- ☐  $T(a) = + \text{ and } D(a) = S$
- ☒  $T(a) = + \text{ and } D(a) = H$
- ☐  $T(a) = - \text{ and } D(a) = S$
- ☐  $T(a) = - \text{ and } D(a) = H$

✓ Correcto

Recall that a false positive is a positive test result (so  $T(a) = +$ ) which is misleading because the person actually does not have the disease ( $D(a) = S$ ).

3. Consider the function  $g : \mathbb{R} \rightarrow \mathbb{R}$  defined by  $g(x) = x^2 - 1$ . Which of the following points are *not* on the graph of  $g$ ?

1 / 1 puntos



3. Consider the function  $g : \mathbb{R} \rightarrow \mathbb{R}$  defined by  $g(x) = x^2 - 1$ . Which of the following points are *not* on the graph of  $g$ ? 1 / 1 puntos

- ☒  $(2, -1)$
- ☐  $(0, -1)$
- ☐  $(-1, 0)$
- ☐  $(1, 0)$

**Correcto**  
Recall that the graph of  $g$  consists of all points  $(x, y)$  such that  $y = g(x)$ . Here  $g(2) = 3 \neq -1$ , so the point  $(2, -1)$  is *not* on the graph of  $g$ .

4. Let the point  $A = (2, 4)$ . Which of the following graphs does *not* contain the point  $A$ ? 1 / 1 puntos

- ☐ The graph of  $f(x) = 2x$
- ☐ The graph of  $g(x) = x + 2$
- ☒ The graph of  $h(x) = x - 1$
- ☐ The graph of  $s(x) = x^2$

**Correcto**  
The graph of  $h$  consists of all points  $(x, y)$  such that  $y = h(x)$ . Here  $h(2) = 1 \neq 4$ , so the point  $(2, 4)$  is *not* on the graph of  $h$ .

5. Suppose that  $h(x) = -3x + 4$ . Which of the following statements is true? 1 / 1 puntos

- ☐ All statements are correct
- ☐  $h$  is a strictly increasing function
- ☐  $h$  is neither a strictly increasing function nor a strictly decreasing function.
- ☒  $h$  is a strictly decreasing function

**Correcto**  
A function  $h$  is called strictly decreasing if whenever  $a < b$ , then  $h(a) > h(b)$   
  
Since the graph of  $h$  is a line with negative slope, this is in fact true!

6. Suppose that  $f : \mathbb{R} \rightarrow \mathbb{R}$  is a strictly increasing function, with  $f(3) = 15$  1 / 1 puntos

Which of the following is a possible value for  $f(3.7)$ ?

☐ 11.7



Recall that the graph of  $g$  consists of all points  $(x, y)$  such that  $y = g(x)$ ; here  $g(x) = 0$  if  $x = 2$ , so the point  $(2, -1)$  is **not** on the graph of  $g$ .

4. Let the point  $A = (2, 4)$ . Which of the following graphs does *not* contain the point  $A$ ?

1 / 1 puntos

- ☐ The graph of  $f(x) = 2x$
- ☐ The graph of  $g(x) = x + 2$
- ☒ The graph of  $h(x) = x - 1$
- ☐ The graph of  $s(x) = x^2$

✓ Correcto

The graph of  $h$  consists of all points  $(x, y)$  such that  $y = h(x)$ . Here  $h(2) = 1 \neq 4$ , so the point  $(2, 4)$  is *not* on the graph of  $h$ .

5. Suppose that  $h(x) = -3x + 4$ . Which of the following statements is true?

1 / 1 puntos

- ☐ All statements are correct
- ☐  $h$  is a strictly increasing function
- ☐  $h$  is neither a strictly increasing function nor a strictly decreasing function.
- ☒  $h$  is a strictly decreasing function

✓ Correcto

A function  $h$  is called strictly decreasing if whenever  $a < b$ , then  $h(a) > h(b)$

Since the graph of  $h$  is a line with negative slope, this is in fact true!

6. Suppose that  $f : \mathbb{R} \rightarrow \mathbb{R}$  is a strictly increasing function, with  $f(3) = 15$

1 / 1 puntos

Which of the following is a possible value for  $f(3.7)$ ?

- ☐ 14.7
- ☐ 3
- ☐ -3
- ☒ 17

✓ Correcto

A function  $f$  is called strictly increasing if whenever  $a < b$ , then  $f(a) < f(b)$ .

Since  $f(3) = 15$  is given and  $3 < 3.7$ , it must be that  $15 < f(3.7)$ , and this answer satisfies that.

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CALIFICACIÓN  
84,61 %

## Graded quiz on Cartesian Plane and Types of Function

CALIFICACIÓN DEL ÚLTIMO ENVÍO  
84.61%

1. Which of the following points in the Cartesian Plane have positive  $x$ -coordinate and negative  $y$ -coordinate? 1 / 1 puntos

- ☐  $(-4, 5)$
- ☐  $(0, 0)$
- ☐  $(5, 7)$
- ☒  $(7, -1)$

✓ Correcto  
The  $x$ -coordinate,  $7$ , is positive, and the  $y$ -coordinate,  $-1$ , is negative.

2. Which of the following points is in the first quadrant of the Cartesian Plane? 1 / 1 puntos

- ☐  $(5, -1)$
- ☐  $(-5, 1)$
- ☒  $(7, 11)$
- ☐  $(-4, -7)$

✓ Correcto  
The first quadrant is defined to be all points in the Cartesian plane whose coordinates are both positive.

3. Let  $A, B, C, D$  be points in the Cartesian Plane, and let the set  $S = \{B, C, D\}$  1 / 1 puntos

Suppose that the distances from  $A$  to  $B, C, D$  are  $5.3, 2.1$ , and  $11.75$ , respectively.

Which of the following points is the nearest neighbor to the point  $A$  in the set  $S$ ?

- ☐ A
- ☐ D
- ☐ B

4. Find the distance between the points  $A = (2, 2)$  and  $B = (-1, -2)$ .

1 / 1 puntos

- ☐ 1
- ☐ 25
- ☐ -25
- ☒ 5

✓ Correcto

Recall that the distance between points  $(a, b)$  and  $(c, d)$  is  $\sqrt{(c-a)^2 + (d-b)^2}$

In this case we have:

$$\sqrt{(-1-2)^2 + (-2-2)^2} = \sqrt{(-3)^2 + (-4)^2} = \sqrt{25} = 5$$

5. Find the slope of the line segment between the points  $A = (0, 1)$  and  $B = (1, 0)$ .

0 / 1 puntos

- ☐ -1
- ☐ 1
- ☒  $\sqrt{2}$
- ☐ 0

! Incorrecto

If you got here, you probably computed the distance between  $A$  and  $B$  by mistake!

6. Find the point-slope form of the equation of the line with slope  $-2$  that goes through the point  $(5, 4)$ .

1 / 1 puntos

- ☒  $y - 4 = -2(x - 5)$
- ☐  $y - 5 = -2(x - 4)$
- ☐  $(5, 4)$
- ☐  $y - 4 = 2(x - 5)$

✓ Correcto

The point-slope form for the equation of a line with slope  $m$  that goes through the point  $(x_0, y_0)$  is  $y - y_0 = m(x - x_0)$ .

In this case, the slope  $m = -2$  is given and the point  $(5, 4)$  on the line is given.

7. Which of the following equations is for a line with the same slope as  $y = -3x + 2$ ?

1 / 1 puntos

- ☒  $y = -3x - 8$
- ☐  $y = 5x$
- ☐  $y = 8x - 3$
- ☐  $y = 5x + 2$

✓ Correcto

The slope-intercept formula for a line is  $y = mx + b$ , where  $m$  is the slope and  $b$  is the  $y$ -coordinate of the point where the line hits the  $y$ -axis.

This line has slope  $m = -3$  which is the same slope as the given line.

8. Which of the following equations is for a line with the same  $y$ -intercept as  $y = -3x + 2$ ?

1 / 1 puntos

- ☒  $y = 5x + 2$
- ☐  $y = 5x$
- ☐  $y = 8x - 3$
- ☐  $y = -3x - 8$

✓ Correcto

The the slope-intercept formula for a line is  $y = mx + b$ , where  $m$  is the slope and  $b$  is the  $y$ -coordinate of the point where the line hits the  $y$ -axis. This line has a  $y$ -intercept of 2 which is the same as the given line.

9. How many lines contain both the point  $A = (1, 1)$  and the point  $B = (2, 2)$ ?

1 / 1 puntos

- ☐ None
- ☐ infinitely many
- ☒ 1
- ☐ 2

✓ Correcto

The line with equation  $y = x$  is the one and only line that meets the stated requirements.

10. Suppose that we have two sets,  $A = \{a, b\}$  and  $Z = \{x, y\}$ . How many different functions  $F : A \rightarrow Z$  are possible?

0 / 1 puntos



10. Suppose that we have two sets,  $A = \{a, b\}$  and  $Z = \{x, y\}$ . How many different functions  $F : A \rightarrow Z$  are possible?

0 / 1 puntos

- ☒ There are infinitely many
- ☐ 1
- ☐ There are none
- ☐ 4



Incorrecto

The set  $A$  is finite, and each element in  $A$  can only be transformed into finitely many choices of element in  $Z$ .

11. How many graphs contain both the point  $A = (0, 0)$  and the point  $B = (1, 1)$

1 / 1 puntos

- ☐ 2
- ☐ None
- ☐ 1
- ☒ Infinitely many



Correcto

The graphs of  $f(x) = x$ ,  $g(x) = x^2$ ,  $h(x) = x^3$ ,  $s(x) = x^4, \dots$  all contain both  $A$  and  $B$

12. Suppose that  $g : \mathbb{R} \rightarrow \mathbb{R}$  is a continuous function whose graph intersects the  $x$ -axis more than once. Which of the following statements is true?

1 / 1 puntos

- ☐  $g$  is strictly increasing.
- ☒  $g$  is neither strictly increasing nor strictly decreasing.
- ☐  $g$  is strictly decreasing.
- ☐ All of the above.



Correcto

The function  $g$  fails the horizontal line test, so it can neither be strictly increasing nor strictly decreasing.

13. Find the slope of the line segment between the points  $A = (1, 1)$  and  $B = (5, 3)$ .

1 / 1 puntos

- ☐ 2
- ☐ 4

---

13. Find the slope of the line segment between the points  $A = (1, 1)$  and  $B = (5, 3)$ .

1 / 1 puntos

- ☐ 2
- ☐ 4
- ☐  $\sqrt{20}$
- ☒  $\frac{1}{2}$

✓ Correcto

The slope of this line segment is  $\frac{3-1}{5-1} = \frac{1}{2}$ , where  $3 - 1$  is the rise and  $5 - 1$  is the run.

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