

# The Absolute Value Function

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## The Absolute Value Function

Name \_\_\_\_\_

## Student Worksheet

Class \_\_\_\_\_

**Directions:** Answer the following questions in the space provided.

1. Define ***absolute value***:
2. Write the mathematical symbol used to define the ***absolute value*** of a number.
3. Define ***translation***:

### **Problem 1**

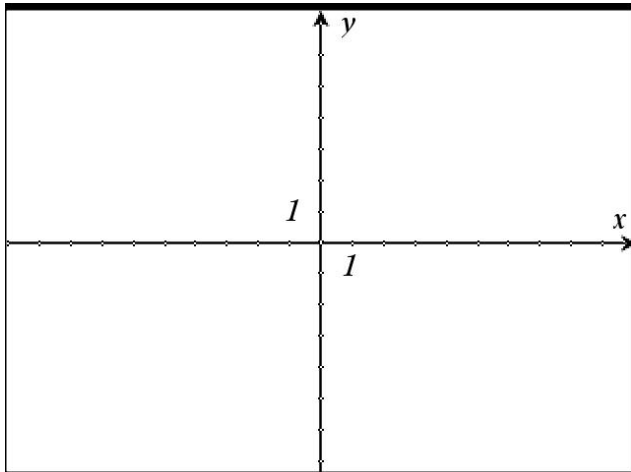
4. Copy the values of the indicated cells from the spreadsheet created on page 5 of Problem 1 into the table below. (Four positive values of "*xcoor*" and four negative values of "*xcoor*" should be recorded.)

<i>xcoor</i>	<i>distance</i>
1.	
2.	
3.	
4.	
23.	
24.	
25.	
26.	

5. What observation can be made about the sign of the x-coordinate (*xcoor*) compared to the sign of the distance this point is from the origin?
6. What observation can be made about the sign of a number if it is representing a *distance*?

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7. Make a sketch of the graph of the scatter plot on page 5 of Problem 1 on the diagram on the left.

8. The correct name of this function in symbolic form is: \_\_\_\_\_  
\_\_\_\_\_

## **Extension**

The absolute value function is composed of two separate linear functions for when  $x > 0$  and for when  $x < 0$ . Fill in the statements below:

a) When  $x \geq 0$ , the absolute value function takes on the linear function: \_\_\_\_\_

b) When  $x < 0$ , the absolute value function takes on the linear function: \_\_\_\_\_

## **Problem 2**

9. The coordinates of the fixed point are: \_\_\_\_\_

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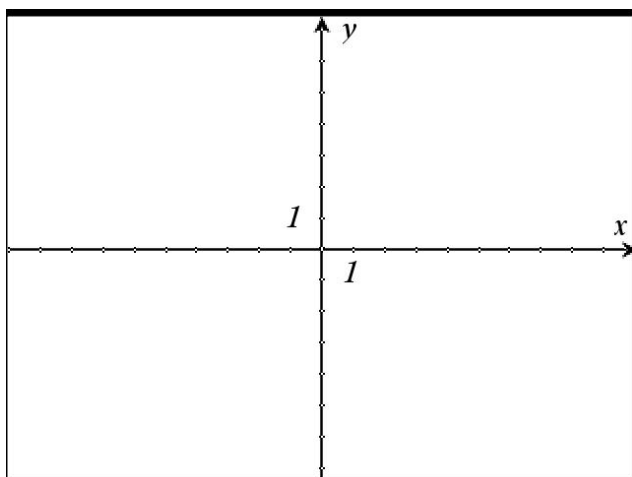
10. Copy the values in the indicated cells from the spreadsheet on page 4 of Problem 2 into the table below. (Four positive values of “*xcoor2*” and four negative values of “*xcoo2*” and their corresponding distance values should be recorded.)

<i>xcoor2</i>	<i>dist2</i>
1.	
2.	
3.	
4.	
23.	
24.	
25.	
26.	

11. What can be observed about the sign of the x-coordinate (*xcoor2*) compared to the sign of the distance that point is from the fixed point?

12. What observation can be made about the sign of a number if it is representing a *distance*?

13. What observation can be made about the change in the value of the x-coordinate (*xcoor2*) compared to the distance value?



14. Make a sketch of the graph of the scatter plot on page 4 of Problem 2 on the Cartesian Plane on the left.

15. The correct name of this function in symbolic form is: \_\_\_\_\_  
 \_\_\_\_\_

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16. What observation can be made about the function written in #15 and the x- coordinate of the fixed point?

17. Describe the difference between the graph sketched in Problem 1 and the graph sketched in Problem 2.

18. What is the mathematical term used to describe this type of graphical difference?

### **Problem 3**

Copy the values of the indicated cells from the spreadsheet created on page 4 of Problem 3 into the table below. (Four positive values of “*xcoor3*” and four negative values of “*xcoor3*” should be recorded.)

<i>xcoor3</i>	<i>dist3</i>
1.	
2.	
3.	
4.	
23.	
24.	
25.	
26.	

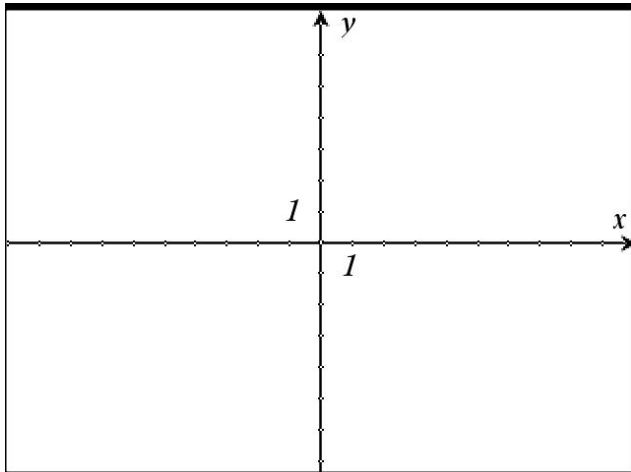
19. What observation can be made about the sign of the x-coordinate (*xcoor3*) compared to the sign of the distance that point is from the fixed point?

20. What observation can be made about the sign of a number if it is representing a *distance*?

21. What observation can be made about the change in value of the x-coordinate (*xcoor3*) compared to the distance (*dist3*) value?

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22. Make a sketch of the graph of the scatter plot on page 4 of Problem 3 on the diagram on the left.

23. The correct name of this function in symbolic form is: \_\_\_\_\_  
\_\_\_\_\_

24. What observation can be made about the function written in #23 and the x- coordinate of the fixed point?

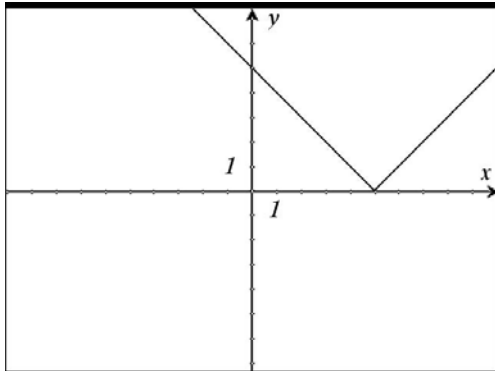
25. Describe the difference between the graph sketched in Problem 2 and the graph sketched in Problem 3 (Use correct mathematical language).

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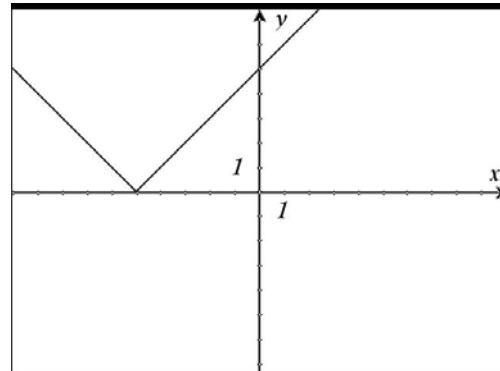
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## Exercises:

1) Write the name of the function for the following graphs in the space provided.

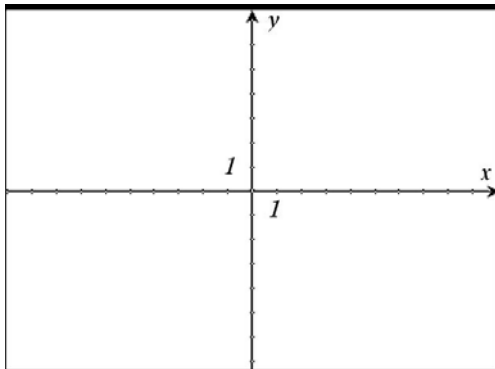


a) \_\_\_\_\_

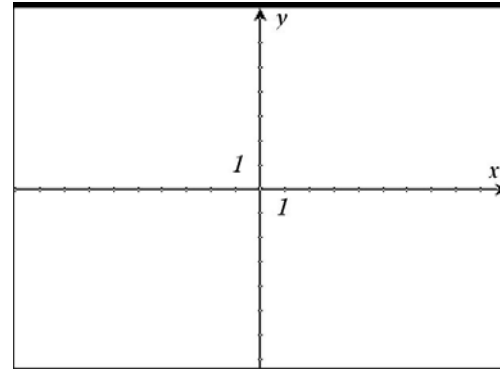


b) \_\_\_\_\_

2) Sketch the graph for the function indicated.



a)  $f(x) = |x + 4|$



b)  $f(x) = |x - 4|$

## More Extensions

For the graph of the function to have a *vertical translation* take place, what adjustment must be made to the graph of  $f(x) = |x|$  ?