

Name:

Date:

WORKSHEET :



Absolute Value

- | | | | |
|-----|-------------------------|--------------------------|--------------------------|
| 1. | $ (-7) =$ | $ (-4) =$ | $ 57 =$ |
| 2. | $ 6 \times (-4) =$ | $ (-3) \times (-2) =$ | $ (-2) \times 10 =$ |
| 3. | $ (-8) + 5 =$ | $ (-8) - (-2) =$ | $ (-9) - 10 =$ |
| 4. | $ 8 \times (-2) =$ | $ (-2) \times 6 =$ | $ 1 \div (-7) =$ |
| 5. | $ (-1) \div (-2) =$ | $ 7 \times 4 =$ | $8 \times (-3) =$ |
| 6. | $ x = 2$
$x =$ | $ y = 5$
$y =$ | $ x = 10$
$x =$ |
| 7. | $\sqrt{2^2} =$ | $\sqrt{5^2} =$ | $\sqrt{10^2} =$ |
| 8. | $ x + 1 = 5$
$x =$ | $ x - 1 = 5$
$x =$ | $ x + 2 = 0$
$x =$ |
| 9. | $ 2x = 5$
$x =$ | $-2 x + 8 = 2$
$x =$ | $ 2x - 1 = 5$
$x =$ |
| 10. | $ 3y + 5 = y$
$y =$ | $ y - 5 = 2y$
$y =$ | $ -y + 5 = 2y$
$y =$ |

ANSWERS :



Absolute Value

1.	$ (-7) = 7$	$ (-4) = 4$	$ 57 = 57$
2.	$ 6 \times (-4) = 24$	$ (-3) \times (-2) = 6$	$ (-2) \times 10 = 20$
3.	$ (-8) + 5 = 3$	$ (-8) - (-2) = 6$	$ (-9) - 10 = -1$
4.	$ 8 \times (-2) = -16$	$ (-2) \times 6 = 12$	$ 1 \div (-7) = 1/7$
5.	$- (-1) \div (-2) = -1/2$	$ 7 \times 4 = 28$	$8 \times (-3) = 24$
6.	$ x = 2$ $x = \pm 2$	$ y = 5$ $y = \pm 5$	$ x = 10$ $x = \pm 10$
7.	$\sqrt{2^2} = \pm 2$	$\sqrt{5^2} = \pm 5$	$\sqrt{10^2} = \pm 10$
8.	$ x + 1 = 5$ Positive Case: $x + 1 = 5$ $x = 4$ Negative Case: $-(x + 1) = 5$ $-x - 1 = 5$ $-x = 6$ $x = -6$	$ x - 1 = 5$ Positive Case: $x - 1 = 5$ $x = 6$ Negative Case: $-(x - 1) = 5$ $-x + 1 = 5$ $-x = 4$ $x = -4$	$ x + 2 = 0$ Positive Case: $x + 2 = 0$ $x = -2$ Negative Case: $-(x + 2) = 0$ $-x - 2 = 0$ $-x = 2$ $x = -2$
	If it helps to understand:	"x is an absolute distance in either direction on the number line from a number"	
	"x is 5 away from -1"	"x is 5 away from +1"	"x is 0 away from -2"

9. $|2x| = 5$
 Positive Case:
 $2x = 5$
 $x = 5/2$
 Negative Case:
 $-(2x) = 5$
 $-2x = 5$
 $-x = 5/2$
 $x = -5/2$

$-2|x + 8| = 2$
 Positive Case:
 $-2(x + 8) = 2$
 $-2x = 18$
 $x = -9$
 Negative Case:
 $-2 \cdot -(x + 8) = 2$
 $2x + 16 = 2$
 $x = -7$
NO SOLUTION

$|2x - 1| = 5$
 Positive Case:
 $2x - 1 = 5$
 $2x = 6$
 $x = 6/2 = 3$
 Negative Case:
 $-(2x - 1) = 5$
 $-2x + 1 = 5$
 $-2x = 4$
 $x = 4/-2 = -2$

* There is no solution in this case because the absolute value cannot be a negative result. Plug the results back into the equation.

$-2|-9 + 8| = -2|-1| = -2(1)$

$\neq 2$

$-2|-7 + 8| = -2|1| = -2(1) \neq 2$

If it helps to understand:

"x is an absolute distance in either direction on the number line from a number"

Notice it gets increasingly complex to dissect the absolute value equation into a word phrase. This is less essential than being able to solve for the positive and negative case.

"The distance to x is 5/2 away from 0"

"The distance to x is 5/2 away from 1/2"

10. $|3y + 5| = y$
 Positive Case:
 $3y + 5 = y$
 $2y + 5 = 0$
 $2y = -5$
 $y = -5/2$
 Negative Case:
 $-(3y + 5) = y$
 $-3y - 5 = y$
 $-4y - 5 = 0$
 $-4y = 5$
 $y = -5/4$

$|y - 5| = 2y$
 Positive Case:
 $y - 5 = 2y$
 $-y - 5 = 0$
 $-y = 5$
 $y = -5$
 Negative Case:
 $-(y - 5) = 2y$
 $-y + 5 = 2y$
 $-3y + 5 = 0$
 $-3y = -5$
 $y = -5/-3 = 5/3$

$|-y + 5| = 2y$
 Positive Case:
 $-y + 5 = 2y$
 $-3y + 5 = 0$
 $-3y = -5$
 $y = -5/-3 = 5/3$
 Negative Case:
 $-(-y + 5) = 2y$
 $y - 5 = 2y$
 $-y - 5 = 0$
 $-y = 5$
 $y = 5/-1 = -5$

KEY CONCEPTS:

Absolute Value -

a. $|x| \geq 0$

b. $|x \times y| = |x| \times |y|$

c. $|x| = \sqrt{x^2}$ see line 7.

i) *The results of the square root of a value squared will be the same as an absolute value symbol. There will be a positive and negative result.*

d. Positive and negative solution case e.g. $|2| = \pm 2$ because $|2| = 2$ and $|-2| = 2$

e. Plug results back into equation to check answers

i) *No solution (and one or many) is a possible case that must be checked in every equation or inequality. see example in 9.*