Absolute value, inequalities, and addition of signed numbers worksheet.

Professor Luis Fernández

Absolute value

Remember: The absolute value of a number is the number without its sign. Another way: it is the distance from the number to 0.

It is denoted by two vertical bars. For example, "$|-5|$" means "absolute value of (-5)".

For example, $|12| = 12$, and $|-7| = 7$.

Practice exercises

1. $|11| =$

2. $|-7| =$

3. $|-12| =$

4. $|-234| =$

5. $|56| =$

6. $|32| =$

7. $|0| =$

8. $|5 - |6 - 3|| =$

9. $||5 + 2| - |7 + 5|| =$

10. $||2 - 5| - |3 - 7|| =$

Inequalities

Remember:

- "$<$" means "less than". For example, "$5 < 8$" means "5 less than 8".
- "$>$" means "greater than". For example, "$6 > 2$" means "6" greater than "2".

To remember which symbol to use, remember that the large side of the symbol "$<$" or "$>$" corresponds to the larger number, and the small side to the smaller number.

Practice exercises. Fill in the blanks with the appropriate symbol "$<$" or "$>$".

1. $5 \square 7$

2. $8 \square 1$

3. $-5 \square 2$

4. $-3 \square 0$

5. $-6 \square -7$

6. $-23 \square -6$

7. $12 \square -13$

8. $-5 \square 3$

9. $5 \square 7$

10. $8 \square 1$

11. $-3 \square -7$

12. $12 \square 1$

13. $-16 \square 7$

14. $24 \square -45$

Opposite of a number

Remember: The opposite of a number is the number with the opposite sign. For example, the opposite of 5 is -5 and the opposite of -9 is 9.

It is denoted by writing a $-$ sign in front. For example, "$-(-5)$" means "the opposite of (-5)", and "$-(-(-7))$" means "the opposite of the opposite of (-7)".

Practice exercises. Find the value of the following.

1. $-(-3) =$

2. $-9 =$

3. $-(-3) =$

4. $-(-(-(-9))) =$

5. $-(-67) =$

6. $-(-(-(-(-(-12))))) =$

Addition of signed numbers

Remember: to add two signed numbers,

- If the numbers have the same sign, the numbers are working together: add their absolute values and put the same sign that the numbers have.
- If the numbers have different sign, they are working against each other: subtract their absolute values and put the sign of the one with greater absolute value.

Examples:

$5 + (-6)$. The numbers have different sign, so they are competing. Subtract their absolute values: $6 - 5 = 1$. Since (-6) has greater absolute value than 5, (-6) wins, so the sum will have a negative sign. Therefore, $5 + (-6) = (-1)$.

$(-4) + (-5)$. The numbers have the same sign (negative), so they are working together. They join forces, so we add them: $4 + 5 = 9$. Finally, the sign is the common sign they have, giving $(-4) + (-5) = (-9)$.

Practice exercises. Find each sum.

1. $(-5) + 9 =$

2. $(-6) + (-2) =$

3. $(-5) + 5 =$

4. $(-7) + 12 =$

5. $(-3) + (-5) =$

6. $15 + (-2) =$

7. $17 + (-15) =$

8. $(-47) + 37 =$

9. $23 + (-34) =$

10. $(-19) + 9 =$

11. $43 + (-5) =$

12. $4 + (-16) =$

13. $6 + (-17) =$

14. $4 + (-18) =$

15. $16 + (-6) =$

16. $13 + (-9) =$

17. $(-41) + (-6) =$

18. $(-18) + (-8) =$

19. $12 + (-7) =$

20. $(-12) + 9 =$

21. $4 + (-5) =$

22. $4 + 5 =$

23. $(-4) + (-5) =$

24. $(-4) + 5 =$

25. $0 + (-6) =$

26. $0 + 9 =$

27. $(-41) + 0 =$

28. $18 + 0 =$

29. $15 + (-154) =$

30. $(-64) + (-32) =$