

INTEGERS AND ABSOLUTE VALUE WORKSHEET

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UNDERSTANDING INTEGERS AND ABSOLUTE VALUES IS A FUNDAMENTAL ASPECT OF MATHEMATICS THAT LAYS THE GROUNDWORK FOR MORE ADVANCED CONCEPTS. AN INTEGERS AND ABSOLUTE VALUE WORKSHEET SERVES AS AN EXCELLENT TOOL FOR REINFORCING THESE CONCEPTS, PROVIDING STUDENTS WITH THE OPPORTUNITY TO PRACTICE AND SOLIDIFY THEIR UNDERSTANDING. THIS ARTICLE WILL DELVE INTO THE DEFINITIONS OF INTEGERS AND ABSOLUTE VALUES, EXPLORE THEIR PROPERTIES, AND PROVIDE VARIOUS EXERCISES AND EXAMPLES THAT CAN BE INCORPORATED INTO A WORKSHEET FORMAT.

UNDERSTANDING INTEGERS

INTEGERS ARE A SET OF NUMBERS THAT INCLUDE ALL WHOLE NUMBERS, BOTH POSITIVE AND NEGATIVE, AS WELL AS ZERO. THE SET OF INTEGERS CAN BE EXPRESSED MATHEMATICALLY AS FOLLOWS:

$$\mathbb{Z} = \{\dots, -3, -2, -1, 0, 1, 2, 3, \dots\}$$

PROPERTIES OF INTEGERS

1. CLOSURE PROPERTY: THE SUM OR PRODUCT OF ANY TWO INTEGERS IS ALSO AN INTEGER.
2. ASSOCIATIVE PROPERTY: THE WAY IN WHICH NUMBERS ARE GROUPED DOES NOT CHANGE THEIR SUM OR PRODUCT.
3. COMMUTATIVE PROPERTY: THE ORDER IN WHICH TWO INTEGERS ARE ADDED OR MULTIPLIED DOES NOT AFFECT THE RESULT.
4. IDENTITY PROPERTY: THE SUM OF AN INTEGER AND ZERO IS THE INTEGER ITSELF, AND THE PRODUCT OF AN INTEGER AND ONE IS THE INTEGER ITSELF.
5. INVERSE PROPERTY: EVERY INTEGER HAS AN ADDITIVE INVERSE. FOR EXAMPLE, THE ADDITIVE INVERSE OF 5 IS -5, AND VICE VERSA.

TYPES OF INTEGERS

INTEGERS CAN BE CLASSIFIED INTO DIFFERENT CATEGORIES BASED ON THEIR CHARACTERISTICS:

- POSITIVE INTEGERS: THESE ARE THE INTEGERS GREATER THAN ZERO (1, 2, 3, ...).
- NEGATIVE INTEGERS: THESE ARE THE INTEGERS LESS THAN ZERO (-1, -2, -3, ...).
- ZERO: ZERO IS CONSIDERED AN INTEGER THAT IS NEITHER POSITIVE NOR NEGATIVE.

UNDERSTANDING ABSOLUTE VALUE

THE ABSOLUTE VALUE OF AN INTEGER IS DEFINED AS ITS DISTANCE FROM ZERO ON THE NUMBER LINE, REGARDLESS OF DIRECTION. THE ABSOLUTE VALUE IS ALWAYS A NON-NEGATIVE NUMBER. IT IS DENOTED BY THE SYMBOL $|x|$, WHERE x IS THE INTEGER IN QUESTION.

EXAMPLES OF ABSOLUTE VALUES

- $|3| = 3$ (THE DISTANCE FROM 3 TO 0 IS 3)
- $|-3| = 3$ (THE DISTANCE FROM -3 TO 0 IS ALSO 3)
- $|0| = 0$ (THE DISTANCE FROM 0 TO 0 IS 0)

PROPERTIES OF ABSOLUTE VALUE

1. NON-NEGATIVITY: THE ABSOLUTE VALUE OF ANY INTEGER IS ALWAYS GREATER THAN OR EQUAL TO ZERO.
2. IDENTITY: THE ABSOLUTE VALUE OF A POSITIVE INTEGER IS THE INTEGER ITSELF, WHILE THE ABSOLUTE VALUE OF A NEGATIVE INTEGER IS ITS POSITIVE COUNTERPART.
3. MULTIPLICATIVE PROPERTY: $|a \times b| = |a| \times |b|$ FOR ANY INTEGERS a AND b .

4. ADDITIVE PROPERTY: $|a + b| \leq |a| + |b|$ (THIS IS KNOWN AS THE TRIANGLE INEQUALITY).

CREATING AN INTEGERS AND ABSOLUTE VALUE WORKSHEET

CREATING A WORKSHEET THAT FOCUSES ON INTEGERS AND ABSOLUTE VALUES CAN BE AN ENGAGING WAY FOR STUDENTS TO PRACTICE THEIR SKILLS. BELOW ARE SOME SECTIONS THAT CAN BE INCLUDED IN THE WORKSHEET, ALONG WITH SAMPLE PROBLEMS.

SECTION 1: IDENTIFYING INTEGERS

INSTRUCTIONS: CIRCLE THE INTEGERS FROM THE FOLLOWING LIST OF NUMBERS.

1. -5
2. 3.2
3. 0
4. 7
5. -1.5
6. 4
7. 2.8
8. -8

ANSWER KEY:

- INTEGERS: -5, 0, 7, -8

SECTION 2: ABSOLUTE VALUE COMPUTATION

INSTRUCTIONS: CALCULATE THE ABSOLUTE VALUE FOR EACH OF THE FOLLOWING INTEGERS.

1. $|4| = ?$
2. $|-10| = ?$
3. $|0| = ?$
4. $|7| = ?$
5. $|-2| = ?$

ANSWER KEY:

1. 4
2. 10
3. 0
4. 7
5. 2

SECTION 3: WORD PROBLEMS INVOLVING INTEGERS AND ABSOLUTE VALUES

INSTRUCTIONS: SOLVE THE FOLLOWING WORD PROBLEMS.

1. THE TEMPERATURE DROPPED TO -15 DEGREES CELSIUS OVERNIGHT. WHAT IS THE ABSOLUTE VALUE OF THIS TEMPERATURE?
2. A FOOTBALL TEAM LOST 4 GAMES AND WON 9 GAMES. WHAT IS THE INTEGER REPRESENTATION OF THEIR NET WINS?
3. A SUBMARINE IS LOCATED 200 METERS BELOW SEA LEVEL. WHAT IS THE ABSOLUTE VALUE OF THE SUBMARINE'S DEPTH?

ANSWER KEY:

1. $|-15| = 15$ DEGREES CELSIUS
2. $9 - 4 = 5$ NET WINS
3. $|-200| = 200$ METERS

SECTION 4: COMPARING ABSOLUTE VALUES

INSTRUCTIONS: DETERMINE WHICH INTEGER HAS A GREATER ABSOLUTE VALUE AND EXPLAIN YOUR REASONING.

1. $|8|$ OR $|-5|$?
2. $|-12|$ OR $|9|$?
3. $|0|$ OR $|-3|$?

ANSWER KEY:

1. $|8|$ ($8 > 5$)
2. $|-12|$ ($12 > 9$)
3. $|-3|$ ($0 < 3$)

SECTION 5: INTEGER OPERATIONS

INSTRUCTIONS: PERFORM THE FOLLOWING OPERATIONS AND EXPRESS THE ANSWER AS AN INTEGER.

1. $-3 + 5 = ?$
2. $7 - 10 = ?$
3. $-6 \times 3 = ?$
4. $|-8| + 4 = ?$
5. $2 - |-5| = ?$

ANSWER KEY:

1. 2
2. -3
3. -18
4. 12
5. -3

CONCLUSION

AN INTEGERS AND ABSOLUTE VALUE WORKSHEET IS AN ESSENTIAL EDUCATIONAL RESOURCE THAT HELPS STUDENTS UNDERSTAND AND APPLY THESE IMPORTANT MATHEMATICAL CONCEPTS. BY PRACTICING WITH INTEGERS AND THEIR ABSOLUTE VALUES, STUDENTS CAN DEVELOP A STRONGER FOUNDATION IN MATHEMATICS, WHICH IS CRUCIAL FOR SUCCESS IN MORE ADVANCED TOPICS. WORKSHEETS THAT INCLUDE A VARIETY OF EXERCISES, FROM IDENTIFYING INTEGERS TO SOLVING WORD PROBLEMS, CAN ENGAGE STUDENTS AND ENHANCE THEIR LEARNING EXPERIENCE. AS EDUCATORS, IT IS VITAL TO PROVIDE DIVERSE OPPORTUNITIES FOR PRACTICE AND APPLICATION, AS THIS WILL CULTIVATE A DEEPER UNDERSTANDING AND APPRECIATION FOR MATHEMATICS IN STUDENTS.

FREQUENTLY ASKED QUESTIONS

WHAT IS THE ABSOLUTE VALUE OF -7?

THE ABSOLUTE VALUE OF -7 IS 7.

HOW DO YOU ADD TWO INTEGERS WITH DIFFERENT SIGNS?

TO ADD TWO INTEGERS WITH DIFFERENT SIGNS, SUBTRACT THE ABSOLUTE VALUES AND TAKE THE SIGN OF THE INTEGER WITH THE LARGER ABSOLUTE VALUE.

WHAT IS THE ABSOLUTE VALUE OF 0?

THE ABSOLUTE VALUE OF 0 IS 0.

HOW CAN I SOLVE AN EQUATION INVOLVING ABSOLUTE VALUES?

TO SOLVE AN EQUATION WITH ABSOLUTE VALUES, SET UP TWO SEPARATE EQUATIONS: ONE FOR THE POSITIVE CASE AND ONE FOR THE NEGATIVE CASE.

CAN ABSOLUTE VALUES BE NEGATIVE?

NO, ABSOLUTE VALUES ARE ALWAYS NON-NEGATIVE.

WHAT IS THE RESULT OF $|-5 + 3|$?

THE RESULT OF $|-5 + 3|$ IS $|-2|$, WHICH EQUALS 2.

WHAT IS THE DIFFERENCE BETWEEN INTEGERS AND ABSOLUTE VALUES?

INTEGERS ARE WHOLE NUMBERS THAT CAN BE POSITIVE, NEGATIVE, OR ZERO, WHILE ABSOLUTE VALUES REPRESENT THE DISTANCE OF A NUMBER FROM ZERO ON THE NUMBER LINE, ALWAYS NON-NEGATIVE.

HOW DO YOU FIND THE ABSOLUTE VALUE OF AN INTEGER IN A WORKSHEET?

TO FIND THE ABSOLUTE VALUE OF AN INTEGER IN A WORKSHEET, SIMPLY REMOVE ANY NEGATIVE SIGN IN FRONT OF THE NUMBER.

WHAT IS THE ABSOLUTE VALUE OF THE INTEGER 12?

THE ABSOLUTE VALUE OF 12 IS 12.

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