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Daily Warm-Ups

GENERAL MATH

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Level I

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The *Daily Warm-Ups* series is a wonderful way to turn extra classroom minutes into valuable learning time. The 180 quick activities—one for each day of the school year—practice general math skills. These daily activities may be used at the very beginning of class to get students into learning mode, near the end of class to make good educational use of that transitional time, in the middle of class to shift gears between lessons—or whenever else you have minutes that now go unused.

Daily Warm-Ups are easy-to-use reproducibles—simply photocopy the day's activity and distribute it. Or make a transparency of the activity and project it on the board. You may want to use the activities for extra-credit points or as a check on the math skills that are built and acquired over time.

However you choose to use them, *Daily Warm-Ups* are a convenient and useful supplement to your regular lesson plans. Make every minute of your class time count!

Integers

Integers are all the whole numbers and their opposites. For example, 3 and –3 are both integers. The positive integers may be written with a plus sign in front of them (such as +1, +2, +3), or without (such as 1, 2, 3). The negative integers are always marked with a negative sign (such as –3, –2, –1). The set of integers also includes zero, which is neither positive nor negative. The three periods used before and after a set of integers, called ellipses, indicate that the set of integers continues indefinitely in both directions.

Answer the following.

1. What integer best describes a drop of 20°?
2. What integer best describes an increase of 20°?
3. What integer best describes a location 300 feet above sea level?
4. What integer best describes a location 300 feet below sea level?
5. Draw a number line that includes the integers 1, 9, –5, 8, –2, and 2.
6. Draw a number line that includes the integers 0, 25, 50, –100, 150, –150, and –75.

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Absolute Value

Absolute value is a measure of how far a number is from zero on the number line. The symbol for absolute value is a pair of parallel, vertical lines, one to the left and one to the right of a number, as shown here: $|5|$ The absolute value of any positive number is just the number itself (for example, $|5| = 5$). The absolute value of any negative number is the number without the negative sign (for example, $|-5| = 5$). Absolute value is useful when you want to know an amount of change. For example, if the temperature in a place increases from 50°F to 70°F, the temperature change is clearly 20°F. But what if the temperature drops from 70°F to 50°F? Is the temperature change –20°F? No. The change is an absolute value. $|20| = |-20| = 20$.

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Find the absolute value of each number below.

1. 8
2. 56
3. –22
4. – 6
5. 100
6. –524
7. 66
8. –30
9. 99
10. –5

Comparing Integers

Consider the following set of integers: 4, 18, –3, 5, 12, 7, –8, 9, 21, 0, –2. They cover a broad range of numbers and include positive numbers, negative numbers, and zero. These numbers are also out of order. In order, they would appear as –8, –3, –2, 0, 4, 5, 7, 9, 12, 18, 21. We generally list integers from smallest to largest. It is important to remember that the greater the absolute value of a negative number, the "smaller" that number is. This means that we start our list with the negative numbers that have the largest absolute value and go by decreasing absolute value until we reach zero. Then we list positive integers by increasing absolute value.

Order each set of numbers below from smallest to largest.

1. 1, 1, 2, 2, 3, 3, 7, 8, 1, 3, 2, 5, 4, 6, 6, 1, 2, 1
2. 17, 18, 21, 20, 17, 17, 19, 19, 18, 20, 21, 21, 17, 18, 19, 17
3. 200, –25, 175, –100, –300, –75, 150, 50, 0
4. –12, –21, –30, –8, –16, –2, –33, –7
5. 1000, – 45, 654, 2, –306, 55, 921, –341

Adding Integers

Although you are already familiar with adding numbers, the way we look at the addition of integers is little bit different. An integer's absolute value depends on its distance from zero on the number line. If you take 5 and add a positive number such as 3 to it, you move three numbers to the right on the number line. This would put you on the number 8, and as you know, 5 + 3 = 8. If however, you take 5 and add –3 to it, you move three spaces to the left. This would put you on the number 2, and as you know, 5 – 3 = 2. However, you didn't subtract; you added a negative. The equation should be written as 5 + (–3) = 2. If you had started with –8 and added –3 to it, you would move three spaces to the left on the number line. This would put you on –11. The equation should be written as –8 + (–3) = –11.

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Solve the following addition problems.

1. 10 + 7
2. 10 + (–7)
3. –15 + 6
4. –12 + (– 4)
5. 25 + 60
6. 25 + (– 60)
7. –250 + 55
8. –250 + (–55)

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Subtracting Integers

Although you are already familiar with subtracting numbers, the subtraction of integers is a little different. An integer's absolute value depends on its distance from zero on the number line. If you take 10 and subtract a positive number such as 3 from it, you move three numbers to the left on the number line. This would put you on the number 7, and as you know, 10 – 3 = 7. If, however, you take 10 and subtract –3 from it, you move three spaces to the right. This would put you on the number 13, and as you know, 10 + 3 = 13. However, you didn't add; you subtracted a negative. The equation should be written as 10 – (–3) = 13. If you had started with –12 and subtracted –3 from it, you would move three spaces to the right on the number line. This would put you on –9. The equation should be written as –12 – (–3) = –9.

Solve the following subtraction problems.

1. 10 – 7
2. 10 – (–7)
3. –15 – 6
4. –12 – (– 4)
5. 25 – 60
6. 25 – (–60)
7. –250 – 55
8. –250 – (–55)

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Multiplying Integers

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Multiplication is repeated addition. For example, $4 \times 8 = 8 + 8 + 8 + 8 = 32$. This tells us that four 8s add up to 32. Multiplying a positive integer by a positive integer will move the value of the product toward the right on the number line. For example, $8 \times 3 = 24$. Multiplying a positive integer by a negative integer will move the total product to the left on the number line. For example, $8 \times (-3) = -24$. Multiplying a negative integer by a negative integer will move the value of the product to the right on the number line. For example, $-10 \times (-4) = 40$.

Remember, when two numbers of the same sign are multiplied, the product is positive. When two numbers of opposite signs are multiplied, the product is negative.

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Solve the following multiplication problems.

1. 4×16
2. 5×-8
3. -10×-3
4. 9×11
5. 11×-16
6. -25×25
7. 525×10
8. 5×-2500

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Dividing Integers

Division is repeated subtraction. For example, $28 \div 7 = 28 - 7 - 7 - 7 - 7 = 0$. This tells us that you can subtract 7 out of 28 four times. Division of integers follows the same basic rules as multiplication of integers. Dividing a positive integer by a positive number will produce a positive quotient. For example, $21 \div 7 = 3$. Dividing a positive integer by a negative number will produce a negative quotient. For example, $24 \div (-3) = -8$. Dividing a negative integer by a negative number will produce a positive quotient. For example, $-20 \div (-4) = 5$.

When two numbers of the same sign are divided, the quotient is positive. When two numbers of opposite signs are divided, the quotient is negative.

Solve the following division problems.

1. $800 \div 20$
2. $800 \div -20$
3. $-800 \div -20$
4. $54 \div 9$
5. $66 \div -11$
6. $-225 \div -25$
7. $2004 \div 6$
8. $2030 \div -35$

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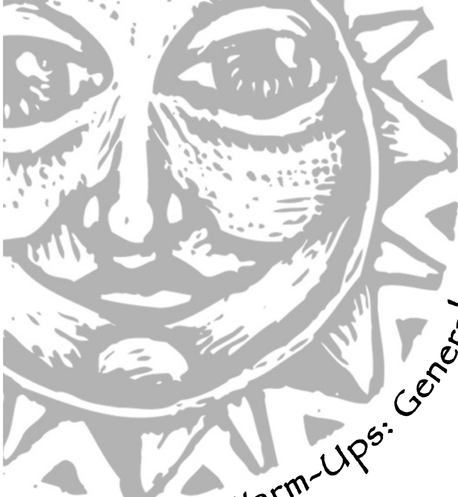
Prime Factors

When two numbers are multiplied together, those two numbers are called **factors.** A **prime number** is a whole number that is greater than 1 and that has only two unique factors, the number itself and 1. For example, 5 is a prime number because its only factors are 1 and 5. 6 is not a prime number because its factors are 1 and 6, as well as 2 and 3. The number 6 is a composite number. A **composite number** is a whole number greater than 1 that has more than two factors.

Determine if each of the following numbers is prime, composite, or neither. If the number is composite, list all the factors for that number.

1. 5
2. 9
3. 12
4. 0
5. 35
6. 16
7. 8
8. 50
9. 19
10. 0.5
11. 1
12. 10
13. 15
14. 17



Powers and Exponents

A number such as 3^2 has a base number (3) and an exponent (2). A number that is shown as a combination of a base and an exponent is called a **power.** Powers are a shorter way of writing some longer expressions.

For example: $5 \times 5 = 5^2$

$6 \times 6 \times 6 \times 6 = 6^4$

$a \bullet a \bullet a = a^3$

$X \bullet X \bullet X \bullet Y \bullet Y \bullet Y \bullet Y = X^3Y^4$

Show the following in exponent form.

1. $9 \times 9 \times 9 \times 9$
2. $h \bullet h \bullet h \bullet h \bullet h \bullet h \bullet h$
3. $m \bullet m \bullet n \bullet n \bullet n \bullet n \bullet n$
4. $10 \times 10 \times 10$

Answer the following.

5. Write the prime factors of 36 in exponent form.
6. What is the value of the expression 5^4?
7. What is a^3 if $a = 4$?
8. Which of the following has the largest value: 2^5, 3^4, 4^5, or 5^4?

Square Roots

A factor that you multiply by itself to get a number is called the **square root** of that number. For example, the square root of 36 is 6 because 6×6 equals 36. A **perfect square** is a number whose square root is a whole number. 64, 100, and 9 are all examples of perfect squares. The mathematical symbol for a square root is called a radical and looks like this: $\sqrt{}$. Used in an example, $\sqrt{81} = 9$.

Some square roots are not whole numbers. For example, the square root of 12 is approximately 3.46. In a case such as this, you may need to use a calculator to find the square root of a number.

Find the square root of each number below.

1. 4
2. 121
3. 16
4. 49
5. 36
6. 50
7. 85
8. 5000
9. 1,000,000
10. 268.96

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