



Name: \_\_\_\_\_

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Date: \_\_\_\_\_ Grade: \_\_\_\_\_

# Basic Math Skills

## Diagnostic

Welcome to the Diagnostic for Basic Math Skills. Work every problem that is within your capability. Do not stop if you encounter a problem you can not work. Go on to the next problem until you have completed the entire diagnostic.

Work the following problems and write the answer in the appropriate place.

1.1. 
$$\begin{array}{r} 5921 \\ - 64 \\ \hline \end{array}$$

1.2. 
$$12 \overline{)145}$$

1.3. 
$$\begin{array}{r} 753 \\ \times 47 \\ \hline \end{array}$$

1.4.  $423 + 98 + 722 + 3 = \underline{\hspace{2cm}}$

1.5.  $2 \text{ km} = \underline{\hspace{2cm}} \text{ m.}$

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2.1. Multiply the following fractions.  $\frac{2}{7} \times \frac{5}{3} \times \frac{2}{5} = \underline{\hspace{2cm}}$

2.2. Divide the following fractions.  $\frac{4}{5} \div \frac{2}{5} = \underline{\hspace{2cm}}$

2.3.  $50\% = \underline{\hspace{2cm}}$  (fraction).

2.4. Show mathematically: the ratio of four to five. \_\_\_\_\_



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2.5.  $\frac{1}{0} =$  \_\_\_\_\_

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3.1. Perform the indicated operation.  $10 - 3 - -4 + 21 - +3 =$  \_\_\_\_\_

3.2. Simplify the following expression.  $3 \times 6 \times (-1) \times (2) \times (-2) =$  \_\_\_\_\_

3.3. Work the following problem.  $2\{4 - 4[2(1 + 1) - 10] + 1\} =$  \_\_\_\_\_

3.3.  $x - 3 = 6$        $x =$  \_\_\_\_\_

3.4.  $289^0 =$  \_\_\_\_\_

3.5. A meeting room in a large building is 40 ft wide and 30 ft long. The area of the room is \_\_\_\_\_ sq. ft.

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4.1. The measures of \_\_\_\_\_ angles add to  $180^\circ$ .  
(a) complementary                      (b) supplementary                      (c) right

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4.2. Angles whose measures add to  $90^\circ$  are \_\_\_\_\_ angles.  
(a) complementary                      (b) supplementary                      (c) obtuse

4.3.  $4x + 20 = 2x + 30$      $x =$  \_\_\_\_\_

4.4. **Find the surface area of the following solid.**

A rectangular prism: 2 cm wide, 4 cm high, 6 cm deep \_\_\_\_\_

4.5. Vertical angles are located on \_\_\_\_\_ sides of intersecting lines.  
(a) the same                      (b) opposite                      (c) parallel

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5.1. 25 kilometers is how many miles? \_\_\_\_\_  
(a) 12.42 miles                      (b) 28.3 miles                      (c) 10.08 miles                      (d) 15.525 miles

5.2.  $(8.48 \times 10^{-8}) \div (8 \times 10^{-11})$  \_\_\_\_\_  
(a)  $1060 \times 10^3$                       (b)  $1.06 \times 10^3$                       (c)  $1.1 \times 10^{-18}$                       (d)  $.11 \times 10^{-2}$

5.3.  $(45.4 \times 10^5) + (4.4 \times 10^3) =$  \_\_\_\_\_

5.4. **Calculate the interest in the following problem.**

$I =$  \_\_\_\_\_:  $P = \$18,000.00$ ;  $r = 3\%$ ;  $t = 6$  months.

5.5. **Convert the following number to scientific notation.**  $98765.43 =$  \_\_\_\_\_

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Use your calculator to work the problems below.

6.1.  $800 - 500 + 4 \cdot 35 =$  \_\_\_\_\_

6.2.  $57^3 =$  \_\_\_\_\_

6.3.  $(2.2 \times 10^{11}) + (2.111 \times 10^{13}) =$  \_\_\_\_\_

6.4.  $50^{\circ}C =$  \_\_\_\_\_  $^{\circ}F$

6.5.  $40.5x - 9 = 13.5x + 18; x =$  \_\_\_\_\_

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7.1. A bag contains 6 blue, 5 red, and 4 white marbles. Calculate the probability of pulling a red marble from the bag. \_\_\_\_\_

7.2. If an event will occur 100% of the time, the probability is \_\_\_\_\_.  
(a) 100                      (b) 1                      (c) zero                      (d) none of these

7.3. The volume of cube A is one cubic unit. Calculate the dimensions of cube B, if the volume of cube B is 27, cubic units. \_\_\_\_\_





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7.4. Write the value of the Roman numeral: DCCLXXVII = \_\_\_\_\_

7.5. A number cube of eight sides is specially labeled with the numbers 2, 3, 3, 3, 3, 4, 4. Calculate the odds of rolling a 3. \_\_\_\_\_

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8.1. Calculate the area of a rectangle with a length of 7 meters and a width of 5 meters.

- \_\_\_\_\_ (a) 35 meters (b) 35 sq meters (c) 12 meters (d) 29 sq meters

8.2. Simplify the following mathematical expression.

$5x + 2x^2 + 4x^3 + 2x^2 + 9x + 5x^3$  \_\_\_\_\_

8.3.  $3x^2 + 2\{2[3(x + 2)] + 2x^2\} + 3 =$  \_\_\_\_\_

8.4.  $\frac{a}{b} \div \frac{d}{c} =$  \_\_\_\_\_

8.5.  $\frac{2x+3y}{5} + \frac{2x+3y}{5} =$  \_\_\_\_\_

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- 9.1. Calculate the circumference of a circle with a radius of 6. (Use a calculator to determine the answer.) \_\_\_\_\_
- 9.2. A square prism is 4 inches wide, 3 inches high, and 7 inches long. Calculate the volume of the prism. \_\_\_\_\_
- 9.3. A \$20,000.00 loan at a bank is paid off in 6 months. The simple interest rate is 10%. Calculate the interest owed at the end of six months. \_\_\_\_\_
- 9.4. Calculate the area of a triangle with a base of length 20 cm and a height of 15 cm.  
\_\_\_\_\_
- 9.5. In the 1936 Olympics, Jesse Owens also won a gold medal in the 100m run. Calculate how many kilometers Jesse ran. \_\_\_\_\_

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10.1  $\frac{8(19-16)+15}{13\sqrt{11}} =$  \_\_\_\_\_

10.2  $\frac{-4x}{4[2(9-8)]} \geq \frac{5(6-2)}{2(14-4)}$        $x =$  \_\_\_\_\_

- 10.3. Solve the following combined inequality. Express the solution in set-builder and interval notation on the blank.

$55 \leq 5x + 20 \leq 95$  \_\_\_\_\_

10.4.  $4 |17 - 13| - 5 =$  \_\_\_\_\_



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**10.5. Determine the coordinates of the midpoint of the line segment between the points in each problem below.**

(20, 42), (40, 6) \_\_\_\_\_

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**Simplify the following algebraic expressions.**

**11.1.**  $(7a + 6b - 5c) + (2a - 3b + 9c) =$  \_\_\_\_\_

**11.2.**  $\frac{2[2(x-1)+3]}{3[3(x-2)+4]} =$  \_\_\_\_\_

**11.3.**  $(25x - 10y - 17) - (15x - 5y - 18) =$  \_\_\_\_\_

**11.4.**  $5(3x + 4)$  \_\_\_\_\_

**11.5.**  $(8x^3 + 4x^2 + 3x - 1) - (6x^3 + 2x^2 - 2x + 1) =$  \_\_\_\_\_

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**Multiply the following polynomials.**

**12.1.**  $(3x + 2)(2x + 1) =$  \_\_\_\_\_

**12.2.**  $(3x + 1)(2a + 3b + 1) =$  \_\_\_\_\_



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12.3.  $(25x^3 + 15x^2 + 5x) \div (5x) =$  \_\_\_\_\_

**Simplify the following algebraic expressions containing a complex fraction.**

12.4. 
$$\frac{\frac{3(x-1)}{2(x+2)}}{\frac{2(x+1)}{7(x+2)}} =$$
 \_\_\_\_\_

**Factor completely the following expression.**

12.5.  $15x^2y + 30xy + 30y$  \_\_\_\_\_

**Number correct for this Section** \_\_\_\_\_

