# MATH REVIEW & NEW CONCEPTS

NAME: _____

## Algebra (Review)

1. Given the equation $x = vt + \frac{1}{2}at^2$, solve for the indicated variable. Show your work. (1 point each)

(a) Solve for $v$.

(b) Solve for $a$.

(c) Solve for $t$.

2. Given the equation $F = mv^2/r$, solve for $r$ if $F = 455$, $m = 94$, and $v = 22$. (1 point)

3. Given the equation $K = \frac{1}{2}mv^2$, solve for $v$ if $K = 42$ and $m = 9.1$. (1 point)

4. Solve the following system of equations for $v_1$ and $v_2$, given $m = 5$ and $v_f = 2.1$ (2 points):

$$\frac{1}{2}mv_1{}^2 + \frac{1}{2}mv_2{}^2 = mv_f{}^2$$

$$mv_1 + mv_2 = 2mv_f$$

**SI Units & Prefixes (New)** (1 point each)

4. Express 3.58 milligrams (mg) numerically in grams (g).

5. Express 7840 centimeters (cm) numerically in kilometers (km).

6. Express 0.26 kilojoules (kJ) numerically in joules (J).

**Exponents, Scientific Notation, and Significant Figures (New)** (½ point each)

7. Simplify each of the following:

(a) $x^3 \cdot x^5$                                   (b) $10^7 \cdot 10^{-3}$

(c) $(2.5 \times 10^{-6})(4 \times 10^6)$

(d) $\dfrac{(6\times10^6)(4\times10^{-5})^4}{(8\times10^2)^2(2\times10^{-4})^3}$

8. Express each of the following using scientific notation:

(a) 32,600

(d) 1006

(b) 0.831

(e) 0.00000000019

(c) 0.0002

(f) 299,000,000

9. How many significant figures are in each of the following?

(a) 130.0

(c) 0.04569

(b) 2500

(d) $6.50 \times 10^{-7}$

## Trigonometry (Review)

10. You are given a right triangle with one acute angle of 25° and a hypotenuse of length 10 cm. Find the other acute angle and the lengths of the other two sides. (3 points)

### Vectors (New)

11. An object is located at a position of (-4, 7) on a Cartesian coordinate system. Find the magnitude and direction (given as an angle between 0° and 360°) of its position vector. (2 points)

12. An object moves from its original position of (5, 2) to its new position of (8, -3). (1 point each)

(a) Find the *change* in position and write this as a vector.

(b) What is the magnitude of the vector found in part (a)?

(c) What is the direction (given as an angle between 0° and 360°) of the vector found in part (a)?