Physics 101 Math Review

1. Exponents and Scientific Notation:
   (a) Find the following without the use of a calculator:
   1. \(x^3 \cdot x^5\)
   2. \(10^7 \cdot 10^{-3}\)
   3. \(0.004 \cdot 32,000 \cdot 0.6 / 6400 \cdot 3000 \cdot 0.08\)
   4. \((2.5 \times 10^{-6}) \cdot (4 \times 10^6)\)
   5. \((6 \times 10^6) \cdot (4 \times 10^{-5})^4\)

   (b) Express the following as powers of 10 (i.e., scientific notation)
   1. 32,600
   2. 0.831
   3. 0.002
   4. 1006
   5. 0.00000000019

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

   (b) Figure ABCD below is a rectangle with the side AB 20.0 m long and angle DAC= 39°. Find the lengths of diagonal AC and side AD.

![Diagram](image)

3. Algebra: Given the following equations, solve for the indicated unknown.
   (a) 5280 = 44t : find t
   (b) 3 = a/2 + a^2 : find a
   (c) \(v_f^2 = v_o^2 + (1/2)at^2\) : find a if \(v_f = 0, v_o = 20, \text{ and } t = 4\)
   (d) \(F = mv^2/r\) : find r if \(F = 455, m = 94, \text{ and } v = 22\)
   (e) \(KE = (1/2)mv^2\) : find KE if \(m = 9.1 \times 10^{-31} \text{ and } v = 3 \times 10^6\)
   (f) \(T=(1/(2\pi)) (1.5/9.8)^{1/2}\) : find T

4. Prefixes and numbers
   (Be comfortable with everything from nano- up to giga: n, \(\mu\), m, k, M, G)
   (a) Express 3.58 milligrams (mg) numerically in grams (g)
   (b) Express 2.3 micrograms (\(\mu\)g) numerically in grams
   (c) Express 15,700,000 newtons (N) numerically in meganewtons (MN)