1-1A. Consider two quantities, A and B, which have <u>different</u> dimensions. We can form their sum: (A+B), their difference, (A-B), their product, AB, and their ratio, A/B. Which of these four arithmetic operations *could* be physically meaningful?
(a) Only the sum. (b) Only the difference. (c) Only the product. (d) Only the ratio. (e) The ratio or the product.

1-2A. Which one of the following corresponds to the prefixes: milli-, micro-, mega-, IN THE ORDER LISTED?
(a) 10^3, 10^{-6}, 10^9 (b) 10^{-3}, 10^{-6}, 10^9 (c) 10^{-3}, 10^6, 10^{-6} (d) 10^3, 10^{-6}, 10^6 (e) None of these.

1-3A. Which one answer properly uses the rules of significant figures for the following sum? $21.4 + 15 + 17.17 + 4.003$.
(a) 57.573   (b) 57.57   (c) 57.6   (d) 58   (e) None of these is correct.

1-4A. What is the product 3.2 x 3.563 to the correct number of significant figures?
(a) 11   (b) 11.4   (c) 11.40   (d) 11.402   (e) 11.4016.

1-5A. The length of the first joint of your index figure is closest to:
(a) 2 mm   (b) 2 cm   (c) 2 m   (d) 2 km   (e) 0.2 m

1-6A. A sphere has a surface area of 100 m^2. A second sphere has a radius twice that of the first. What is the surface area of the second sphere? (*Hint*: you don't need to find the radius of the first or second sphere).
(a) 50 m^2 (b) 200 m^2 (c) 157 m^2 (d) 400 m^2 (d) 800 m^2 (e) None of these is correct.

1-7A. Which of the following is closest to your age in seconds?
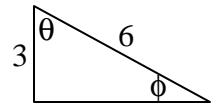(a) 6 x 10^8 sec   (b) 6 x 10^7 sec   (c) 6 x 10^6 sec   (d) 6 x 10^9 sec   (e) 6 x 10^5 sec

1-8A. A speed of 60 miles/hour is equivalent to about what speed in ft/sec?
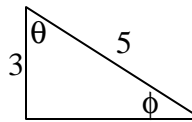(a) 176 ft/sec   (b) 88 ft/sec   (c) 44 ft/sec   (d) 880 ft/sec   (e) 8.8 ft/sec

1-9A. For the triangle at the right, what is the length of the unknown side and the cos θ, in that order?
(a) $\sqrt{3}$, 1/2   (b) $\sqrt{3}$, 2   (c) $3\sqrt{3}$, 1/2   (d) $3\sqrt{3}$, 2   (e) None of these is correct.

1-10A. For the triangle at the right, what are tan θ and cos φ, in that order?
(a) 4/5, 4/3   (b) 4/3, 4/5   (c) 3/4, 4/5   (d) 3/4, 5/4   (e) 4/3, 3/5

1-11A. A corner of a room is chosen as the origin of a rectangular coordinate system. If a fly is on an adjacent wall at coordinates (3 m, 4 m), how far is the fly from the corner at the origin?
(a) 5 m   (b) 12 m   (c) $\sqrt{5}$ m   (d) $\sqrt{7}$ m   (e) 25 m

1-12A. Two points in a rectangular coordinate system have coordinates (5, 3) and (−3,4) with units in meters. The distance between the two points is:
(a) $\sqrt{5}$ m   (b) $\sqrt{6}$ m   (c) 8 m   (d) $\sqrt{309}$ m   (e) $\sqrt{65}$ m

1-13A. A gallon of paint of volume 3.78 x 10^{-3} m^3 covers 25.0 m^2 of a wall. What is the thickness of the paint coat?
(a) 94.5 m^{-1} (b) 94.5 m   (c) 0.151 m   (d) 0.000151 m   (e) 0.00661 m

1-14A. Newton's law of gravitation is written as $F = G(M_1 M_2 / r^2)$, where F is the force of gravity, M_1 and M_2 are masses and r is a length. If the units of force are (kg•m)/s^2, what must be the units of G in kg,m,s units?
(a) Unitless   (b) m/(kg-s^2)   (c) m^3/(kg-s^2)   (d) (m^3-kg)/s^2 (e) None of these is correct.

1-1B. Acceleration has units of distance (x) divided by time squared (t^2). Speed (v) has units of distance divided by time.
Distance (x) has units of distance. Which one of the following relationships has the dimensions of acceleration?
(a) v/t^2　　(b) v/x^2　　(c) v^2/t　　(d) v^2/x　　(e) v/x

1-2B. Which one of the following corresponds to the prefixes: kilo-, centi-, micro-, IN THE ORDER LISTED?
(a) 10^3, 10^{-2}, 10^{-6}　　(b) 10^{-3}, 10^2, 10^6　　(c) 10^{-3}, 10^2, 10^{-6}　　(d) 10^3, 10^{-2}, 10^6　　(e) None of these.

1-3B. Which one answer properly uses the rules of significant figures for this sum? $21.4276 + 15.3 + 17.17 + 4.003$.
(a) 57.9006　　(b) 57.901　　(c) 57.90　　(d) 57.9　　(e) 58

1-4B. What is the ratio (5.351)/(0.0300) to the correct number of significant figures?
(a) 180　　(b) 178　　(c) 178.3　　(d) 178.36　　(e) 178.367.

1-5B. The height of the Biomedical-Physical Sciences building is closest to:
(a) 0.2 m　　(b) 2 m　　(c) 2 cm　　(d) 2 km　　(e) 20 m

1-6B. A sphere has a volume of 100 m^3. A second sphere has a radius twice that of the first. What is the volume of the
second sphere? (*Hint*: you don't need to find the radius of the first or second sphere).
(a) 200 m^3　　(b) 800 m^3　　(c) 12.5 m^3　　(d) 400 m^3　　(d) 1600 m^3　　(e) None of these is correct.

1-7B. Which of the following is closest to a year in seconds?
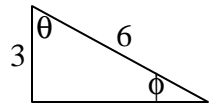(a) 3×10^6 sec　　(b) 3×10^7 sec　　(c) 3×10^8 sec　　(d) 3×10^9 sec　　(e) 3×10^5 sec

1-8B. A speed of 60 km/hour is equivalent to about what speed in m/sec?
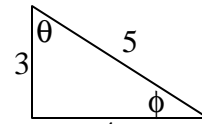(a) 68 m/sec　　(b) 34 m/sec　　(c) 17 m/sec　　(d) 216 m/sec　　(e) 8.5 m/sec

1-9B. For the triangle at the right, what is the length of the unknown side and the $\cos \phi$, in that order?
(a) $27, \sqrt{3}/2$　　(b) $3\sqrt{3}, \sqrt{3}/2$　　(c) $27, 2\sqrt{3}$　　(d) $3\sqrt{3}, 2/\sqrt{3}$　　(e) None of these is correct.

1-10B. . Given the triangle at the right, what are $\tan \phi$ and $\sin \theta$, in that order?
(a) 3/4, 3/5　　(b) 4/3, 4/5　　(c) 3/4, 4/5　　(d) 3/4, 5/4　　(e) 4/3, 3/5.

1-11B. A corner of a room is chosen as the origin of a rectangular coordinate system. If a fly is on an adjacent wall
at coordinates (8 m, 6 m), how far is the fly from the corner at the origin?
(a) 14 m　　(b) 196 m　　(c) 2 m　　(d) $\sqrt{14}$ m　　(e) 10 m

1-12B. Two points in a rectangular coordinate system have coordinates (5, -3) and (3, -4) with units in meters. The distance
between the two points is:
(a) $\sqrt{6}$ m　　(b) $\sqrt{5}$ m　　(c) 15 m　　(d) $\sqrt{53}$ m　　(e) $\sqrt{65}$ m

1-13B. A droplet of oil on water will spread out until it is only about molecule of oil thick. If an oil droplet of volume
1×10^{-9} m^3 spreads out to cover an area 5000 cm^2, about what is the diameter of an oil molecule?
(a) 5×10^{13} m　　(b) 2×10^{13} m　　(c) 5×10^{-6} m　　(d) 2×10^{-9} m　　(e) None of these is correct.

1-14B. Energy has units of $(kg \bullet m^2)/s^2$. Which one of the following relations involving acceleration, a, velocity, v, mass, M,
and time, t has the units of energy?
(a) Mv^2　　(b) Mav　　(c) Ma/vt　　(d) $(vt)^2/M$　　(e) None of these has units of energy.

1-1A) e 2A) e 3A) d 4A) a 5A) b 6A) d 7A) a 8A) b 9A) c 10A) b 11A) a 12A) e 13A) d 14A) c

1-1B) d 2B) a 3B) d 4B) b 5B) e 6B) b 7B) b 8B) c 9B) b 10B) c 11B) e 12B) b 13B) d 14B) a