COLLEGE ALGEBRA QUIZ

(1) Which equation of variation describes the following situation: y varies directly as the square of x, and $y = 75$ when $x = 5$.

(a) $y = 3x^2$
(b) $y = 9x^2$
(c) $y = 15x$
(d) $y = 15x^2$
(e) $y = \frac{3}{5}x^3$

(2) Which equation of variation describes the following situation: y varies directly as x, and $y = 16$ when $x = 4$.

(a) $y = 4x$
(b) $y = \frac{1}{4}x$
(c) $y = x^2$
(d) $y = 4x^2$
(e) $y = 16x$

(3) Which equation of variation describes the following situation: y varies inversely as x cubed, and $y = 120$ when $x = 2$.

(a) $y = \frac{15}{x^3}$
(b) $y = \frac{40}{3x^3}$
(c) $y = \frac{15}{x^2}$
(d) $y = \frac{60}{x^3}$
(e) $y = \frac{x^3}{8}$

(4) Which equation of variation describes the following situation: y varies inversely as x, and $y = 8$ when $x = 3$.

(a) $y = \frac{8}{3x}$
(b) $y = \frac{24}{x}$
(c) $y = \frac{3}{8x}$
(d) $y = \frac{8x}{3}$
(e) $y = \frac{2}{x}$

(5) Which equation of variation describes the following situation: y varies jointly as x and z, and $y = 24$ when $x = 2$ and $z = 4$.

(a) $y = 3xz$
(b) $y = xz$
(c) $y = \frac{x}{z}$
(d) $y = \frac{x}{2z}$
(e) $y = 8xz$

(6) A large cylindrical tank, filled with water, has a spout which is a distance, y, from its surface. If the spout is opened, the volumetric flow rate, Q, will vary directly with the $\frac{1}{2}$ power of y. A certain cylindrical tank, which has a spout depth of 30 m, has a volumetric flow rate of 193 L/s. If the same tank were to have a spout depth of 10 m, what would the new flow rate be?

(a) 111 L/s

(b) 21 L/s

(c) 25 L/s

(d) 334 L/s

(7) Average velocity, V, is inversely related to the difference in time, t. If it takes a man half an hour to drive to the hospital from his home when he is traveling about 35 miles per hour, about how fast must he drive to get to the hospital from his home in only a quarter of an hour?

(a) 70 mi/hr

(b) 60 mi/hr

(c) 50 mi/hr

(d) 40 mi/hr

(8) The kinetic energy, E, that an object possesses varies directly with the square of its velocity, v. A train that is traveling 13 m/s possesses 44,531.5 joules of kinetic energy. How much kinetic energy does the same train traveling 25 m/s have?

(a) 164,687.5 joules

(b) 237,150 joules

(c) 105,400 joules

(d) 59,287.5 joules

(9) The electric force of repulsion, F, between two protons is inversely related to the square of their distance, d, from each other. If two protons are placed 0.001 m from each other, they experience an electric force of 2.27×10^{-22} N in the opposite direction. How far apart are the two protons if they experience an electric force of 5.69×10^{-23} N?

(a) 0.002 m

(b) 63 m

(c) 0.004 m

(d) 0.063 m