Physics. Qz. 8.28.2009

Name____Key____

4,

1. Describe in a few clearly written sentences the real point of the "hooey stick" demo that your instructor performed on day 1 of class.

Students are encouraged or invited to question, with some skepticism, the explanations provided by their instructors, their texts, + conventional wisdom.

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2. Solve $m = \dfrac{y_2 - y_1}{x_2 - x_1}$ for x_1

$$m(x_2 - x_1) = y_2 - y_1$$

$$x_2 - x_1 = \frac{y_2 - y_1}{m}$$

$$\boxed{x_2 - \frac{y_2 - y_1}{m} = x_1}$$

4.

3. Solve $\dfrac{a}{b-c} = d$ for c

$$a = d(b-c)$$

$$\frac{a}{d} = b - c$$

$$c = b - \frac{a}{d}$$

+3

Bonus: Solve $\dfrac{1}{a} + \dfrac{1}{b} + \dfrac{1}{c} = \dfrac{1}{d}$ for b

$$bcd + acd + abd = abc$$

$$acd = abc - bcd - abd$$

$$acd = b(ac - cd - ad)$$

$$\boxed{b = \frac{acd}{ac - cd - ad}}$$

Bonus (2). The diameter of Earth is 8000 miles. The diameter of the Earth's moon is 2160 miles. How many moons would fit inside the Earth? (Imagine they are made of modeling clay, or something whose shape can be changed, so it's not an exercise in sphere packing, you can squeeze out all the "empty space")

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$$V_E = \frac{4}{3}\pi r_E^3$$

$$V_M = \frac{4}{3}\pi r_m^3$$

$$\frac{V_E}{V_m} = \left(\frac{r_E}{r_m}\right)^m = \left(\frac{4000}{1080}\right)^3$$

$$\frac{V_E}{V_m} = \boxed{\approx 50.8}$$