Year 13 Science: Testing a physics theory by experiment

Name: _____ Date: _____

Try these without your notes first, then check the answer key.

Practice

1. Three timings of 10 oscillations are 8.42 s, 8.50 s and 8.46 s. Find T with its uncertainty.

2. Using $T = 0.846 \pm 0.004$ s, find T^2 with its absolute uncertainty.

3. Theory says $f = (1/2L)\sqrt{(F/\mu)}$, with tension F varied. What should you plot to get a straight line?

4. A graph of T^2 against m has gradient 2.47 $s^2\,kg^{-1}$. Find the spring constant k.

5. The steepest and shallowest lines on a graph have gradients 2.55 and 2.40 $s^2\,kg^{-1}$. What is the uncertainty in the gradient?

Fix the mistake

6. Correct this statement: "I timed one oscillation five times and averaged it, so my reaction time does not matter."

7. Correct this statement: "T has a 1.3% uncertainty, so T^2 has a 1.3% uncertainty too."

8. Correct this statement: "The theory has no constant term, so I forced my best-fit line through the origin."

9. Correct this statement: "My value of k is 20.0 and the other method gave 20.2, so they are different."