

Test # 1 Review Questions

1. Define Physics.

Physics is the study of matter and energy.

2. Name the 5 periods of physics history and define two in depth.

Modern Einstein Renaissance Galileo
Classical Newton Middle Ages —
Ancient Greece Aristotle

3. Name the 7 fundamental units of physics.

Candela mole Ampere
Kelvin meter kilogram
Second

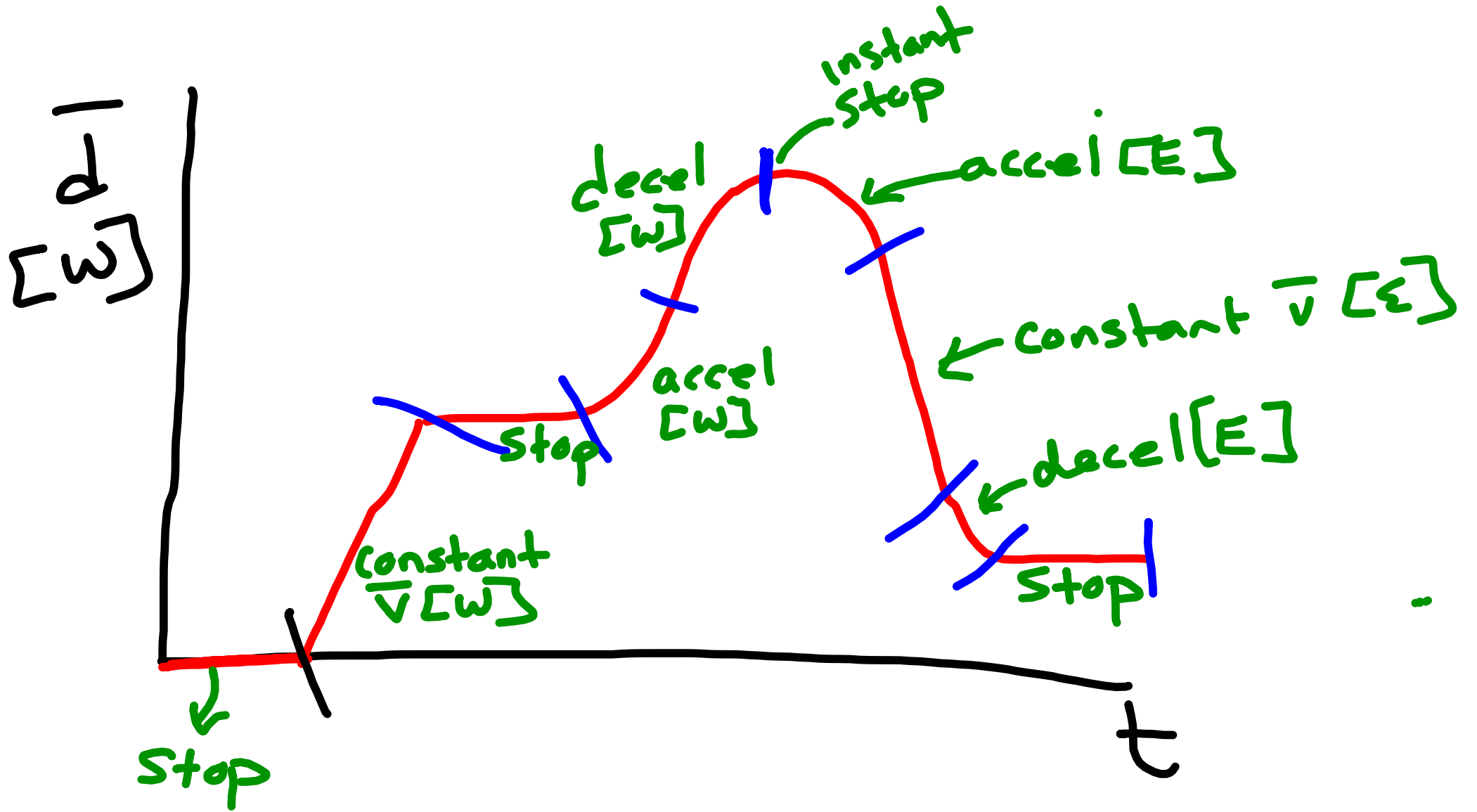
4. State three rules of significant figures.

5. State the 5 equations of uniform acceleration.

$$\begin{array}{lll} d = v_1 t + \frac{1}{2} a t^2 & a = \frac{v_2 - v_1}{t} & 2ad = v_2^2 - v_1^2 \\ d = v_2 t - \frac{1}{2} a t^2 & d = \frac{(v_1 + v_2)t}{2} & \times \end{array}$$

6. What does ...

- a. the slope of a d-t graph represent? **velocity**
- b. the slope of a v-t graph represent? **accel.**
- c. the area under a v-t graph represent? **displacement**
- d. **the slope of an a-t graph represents? jerk**



7. Natasha is driving a cool car at a constant velocity of 12 m/s. Cai is travelling at his truck at a velocity of 0 m/s. At the instant that Natasha passes him Cai starts to accelerate at 3 m/s². How long before Cai catches up with Natasha? What will Cai's final velocity be?

N	C
$v = 12 \text{ m/s}$	$v_i = 0$
$v = \frac{d}{t}$	$a = 3 \text{ m/s}^2$
$12 = \frac{d}{t}$	$d = v_i t + \frac{1}{2} a t^2$
$d = 12t$	$d = 1.5t^2$

$$d = d$$

$$\frac{1.5t^2}{1.5} = \frac{12t}{1.5}$$

$$t^2 = 8t$$

$$t^2 - 8t = 0$$

$$t(t - 8) = 0$$

\downarrow $t = 0$ \downarrow $t = 8 \text{ s}$

$$d = 12t$$

$$= 12(8)$$

$$= \underline{\underline{96 \text{ m}}}$$



$$a = \frac{v_2 - v_1}{t}$$

$$3 = \frac{v_2 - 0}{8} \Rightarrow v_2 = 24 \text{ m/s}$$

8. Maggie is driving a really cool double decker bus. She starts off from rest and accelerates at 2 m/s^2 till she reaches a speed of 9 m/s . She stays at this speed for awhile and then accelerates at 3 m/s^2 till she reaches a speed of 18 m/s . She then decelerates at a rate of 5.5 m/s^2 and comes back to a stop. What a wild ride! The whole trip cover exactly 1 km . How long did her trip take?



9. A diver jumps into the water 10 m below from rest. At the same time another diver jumps into the water from a position 4 m above the first diver, with an initial velocity of 2 m/s. Who reaches the water first?

falls

Diver 1

$$v_1 = 0$$

$$d = 10 \text{ m}$$

$$t = ?$$

$$a = 9.8 \text{ m/s}^2$$

$$d = v_1 t + \frac{1}{2} a t^2$$

$$10 = \frac{1}{2} (9.8) t^2$$

$$10 = 4.9 t^2$$

$$t = \sqrt{10/4.9} = 1.43 \text{ s}$$

Diver 2

$$v_1 = 2 \text{ m/s}$$

$$d = 10 + 4 = 14 \text{ m}$$

$$a = 9.8 \text{ m/s}^2$$

$$t = ?$$

$$v_2 = ?$$

$$2ad = v_2^2 - v_1^2$$

$$2(9.8)(14) = v_2^2 - 2^2$$

$$v_2^2 = 274 + 4$$

$$= 278$$

$$v_2 = 16.7 \text{ m/s}$$

$$a = \frac{v_2 - v_1}{t}$$

$$t = \frac{16.7 - 2}{9.8}$$

$$= 1.5 \text{ s}$$

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