Lesson 1

Read Chapter 1

Units, Formulas,Coordinate Systems, Linear motion

Please familiarize yourself with the canvas page

Please login into WebAssign before your first quiz section

Word Problems

- ▶ Draw a picture (Ch 2)
- ▶ Identify useful formulas
- ▶ Pay attention to units

Convert 2 hrs 10 minutes and 57 seconds to hours.

$$2 + 10 \cdot \frac{1}{60} + 57 \cdot \frac{1}{3600} = \frac{2 \times 3600 + 10 \times 60 + 57}{3600} = \frac{5857}{3600} \text{ hrs}$$

$$60 \times 60$$

$$\underbrace{\frac{5857}{3600}}_{\text{exact}}$$

$$\approx \underbrace{2.18}_{\text{approximation}} \text{ hrs}$$

Real numbers $2, \frac{1}{2}$ $\frac{1}{3}, \pi$ $\sqrt{2}, e$ in general have **infinite** decimal expansion

$$2.0 \quad 0.5 \quad 0.3333 \qquad 3.1415\ldots\ldots$$

$$2 + 0.17 + 0.02 = 2.19$$

Error tolerance in WebAssign

Convert 7857.31 seconds into hours , minutes and seconds.

$1 \ hr = \dfrac{1}{3600} \ sec$

$\dfrac{7857.31}{3600} = \boxed{2.}\underline{1826}$ <u>hrs</u> .   2 hrs and 0.1826 hrs

$\underline{1} \ hr = 60 \ min$

$\underline{0.1826} \times 60 = \boxed{10.}\underline{956}$ min .   10 min and 0.956 min

$1 \ min = 60 \ sec$

$\underline{0.956} \times 60 = \boxed{57}.36$ <u>sec</u> .   57 sec and 0.36 sec

we will disregard this

Approx :   2 hrs   10 min   57 sec

Check handouts with Area and Volume formulas

Other formulas :

$\boxed{d = vt}$, for constant speed/velocity v

$\boxed{\text{mass= density x volume}}$

$\boxed{\text{total change } = \text{ rate of change x t}}$, for constant rate of change

d=vt
distance=(speed) x time
displacement=(velocity) x time

speed   is ≥ 0

velocity   is   vector: it has direction   and   magnitude

in 1D   velocity is a number, positive or negative

rectilinear
motion

$\leftarrow$ − $\rightarrow$ +

velocity   60 km/hr $\longrightarrow$
velocity   − 60 km/hr $\leftarrow$

velocity could be positive or negative.

$s(t_2) = -1$ $s(t_1) = 2$

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   -2   -1   0   1   2
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$t_1 \leq t \leq t_2$ $\longleftarrow$

$+$ $\uparrow$

$-$ $\downarrow$
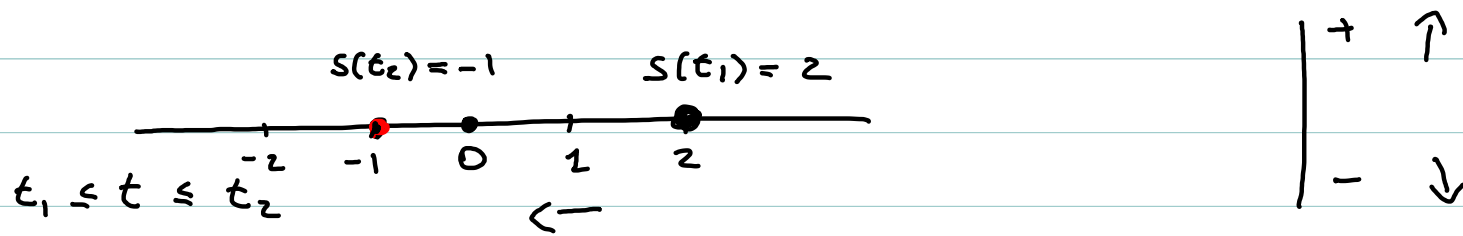
displacement $s(t_2) - s(t_1)$ $s(t) = $ postion $=$
over time interval   coordinate
$t_1 \leq t \leq t_2$

displacement $s(t_2) - s(t_1) = -1 - 2 = -3$

$d = \quad v \quad \underline{\underline{t}}$

Sarah can bicycle around a path, with constant speed, in two hours and 40 min. If she decreases her speed by 1 km/hr her time increases by 4 min. How long is the path ?

straight

d

$$d = v \, t$$

Next time.