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Sept. 25, 12

Physics 20 Unit A [illegible]

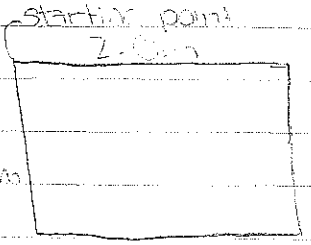
Due: Sept 25, 2012

1. a) displacement = side 1 + side 2 + side 3 + side 4

$\vec{d} = 2.0m + (-1.0m) + (-2.0m) + 1.0m$

$\vec{d} = 0.0m$

The displacement is 0.0m



2 b) distance = side 1 + side 2 + side 3 + side 4

$d: 2.0m + 1.0m + 2.0m + 1.0m$

$d: 6.0m$

The distance is 6.0m.

44/43

2. 1 minute = 60 seconds 5.5 min × 60 s = 498 s

$\vec{v} = \frac{\vec{d}}{t}$

$3.00 \times 10^8 m/s = \frac{\vec{d}}{498s}$

$(498s)(3.00 \times 10^8 m/s) = \frac{\vec{d}}{498s}(498s)$

2 $(3.00 \times 10^8 m/s)(498s) = \vec{d}$

$1.5 \times 10^{11} m = \vec{d}$

The Earth is 1.5×10^{11} m away from the sun.

3. a) 2.0cm/100 = 0.02m b) 3.5km × 1000 = 3500m

$v_f^2 = v_i^2 + 2\vec{a}\vec{d}$

$-v_i^2 \quad -v_i^2$

$\frac{v_f^2 - v_i^2}{2d} = \frac{2\vec{a}\vec{d}}{2d}$

$\frac{v_f^2 - v_i^2}{2d} = \vec{a}$

$\frac{3500m/s^2 - 0.0m/s^2}{2 \times 0.02m} = \vec{a}$

$3062500000 = \vec{a}$

$$\frac{(600\,m/s)^2 - (0.0\,m/s)^2}{2(0.9\,m)} = \vec{a}$$

$$\frac{(600\,m/s)^2}{2(0.9\,m)} = \vec{a}$$

$$\frac{360\,000\,m/s}{2(0.9\,m)} = \vec{a}$$

$$\frac{360\,000\,m/s}{1.8\,m} = \vec{a}$$

2) $200\,000\,m/s^2 = \vec{a}$

$2.0 \times 10^5\,m/s^2 = \vec{a}$

5. a) $\vec{a} = \frac{\Delta \vec{v}}{\Delta t}$

$\vec{a} = \frac{v_f - v_i}{t_f - t_i}$

$\vec{a} = \frac{(30\,m/s) - (0\,m/s)}{(5\,s) - (0\,s)}$

$\vec{a} = \frac{30\,m/s}{5\,s}$

$\vec{a} = 6\,m/s^2$

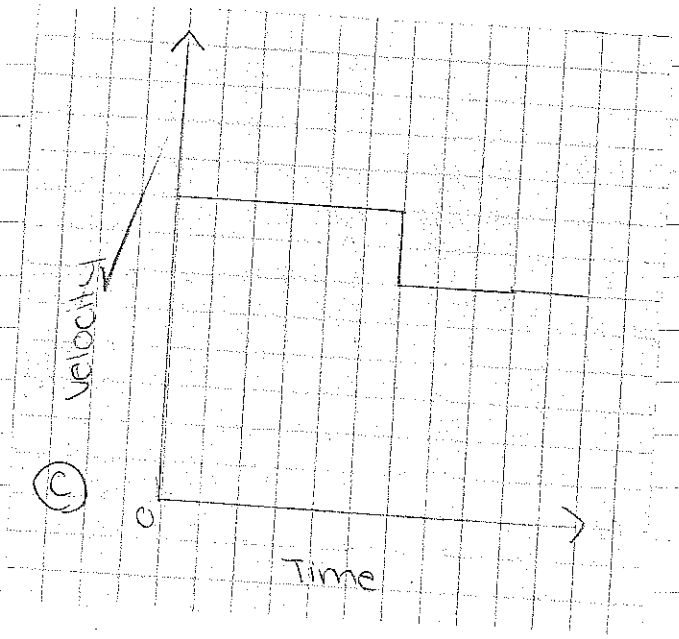
b) $\vec{a} = \frac{\Delta \vec{v}}{\Delta t}$

$\vec{a} = \frac{v_f - v_i}{t_f - t_i}$

$\vec{a} = \frac{(30\,m/s) - (30\,m/s)}{(10\,s) - (5\,s)}$

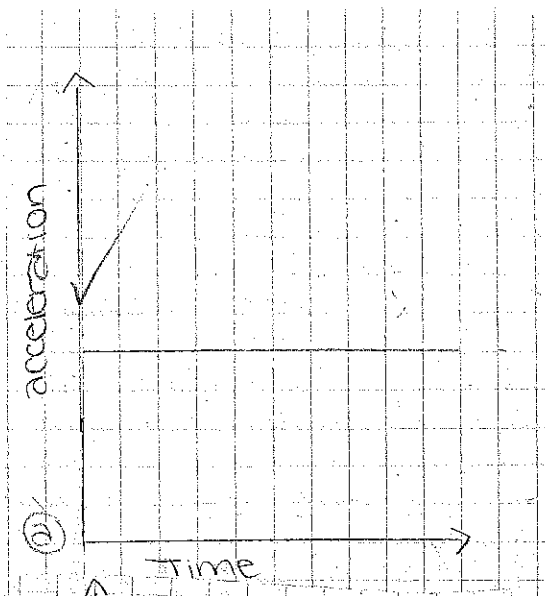
$\vec{a} = \frac{0\,m/s}{5\,s}$

$\vec{a} = 0\,m/s^2$

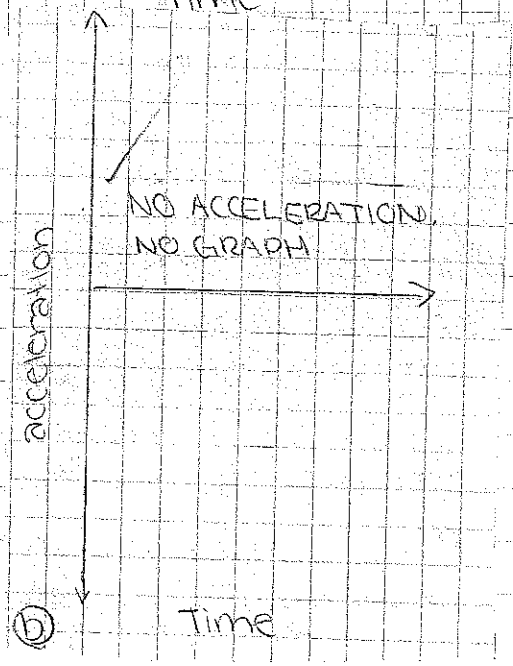

Velocity
0
Time

(c)

b)


acceleration
Time

(a)


NO ACCELERATION,
NO GRAPH
acceleration
Time

(b)

$240_{tf} = 14.0\,m/s + v_f\,(6.00s)$

$40m = 14.0\,m/s + v_f$

$26\,m/s = v_f$

$v_{f(A)} = v_{i(B)}$

$\vec{v} = \frac{\vec{a}}{t}$

$26\,m/s = \frac{\vec{a}}{35.0s}$

$(26\,m/s)(35.0s) = \vec{a}$

$910m = \vec{a}$

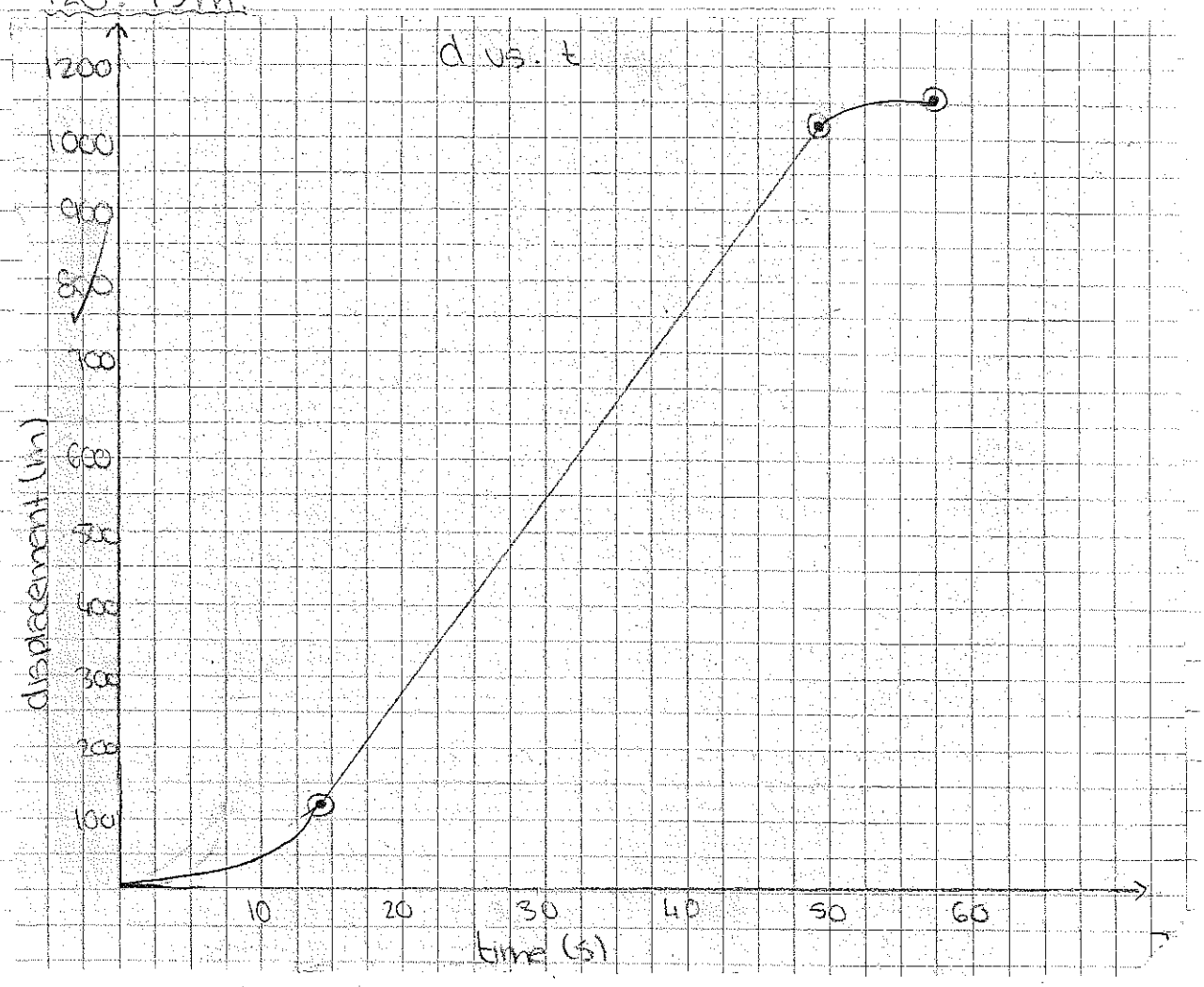
Section C

$\vec{d} = \vec{v}_i t + \frac{1}{2}\vec{a}t^2$

$\vec{d} = (26\,m/s)(7.0s) + \frac{1}{2}(-2.50\,m/s^2)(7.0s)^2$

$\vec{d} = 120.75\,m$

2



9 a) $\vec{a} = \frac{\Delta \vec{v}}{\Delta t}$

$\vec{a} = \frac{v_f - v_i}{t_f - t_i}$

$\vec{a} = \frac{45\,m/s - 20\,m/s}{42.5\,s - 10\,s}$

2 $\vec{a} = \frac{25\,m/s}{32.5\,s}$

$\vec{a} = 0.77\,m/s^2$

b) displacement = area under graph.

Area A: $1/2\,(b \times h)$

$= 1/2\,(20\,s)(15\,m/s)$

$= 150\,m$

Area B: $(b \times h)$

$= (20\,s \times 20\,m/s)$

$= 400\,m$

Area A + Area B = total area

2 $150 + 400\,m = 550\,m$

$= 6.0 \times 10^2\,m$

c) $v_{ave} = \frac{6.0 \times 10^2\,m}{20\,s}$

2 $v_{ave} = 30\,m/s$

d) $\vec{a} = \frac{\Delta \vec{v}}{\Delta t}$

$0.8\,m/s^2 = \frac{\Delta \vec{v}}{75\,s}$

2 $0.8\,m/s^2\,(75\,s) = \Delta \vec{v}$

$60\,m/s = \vec{v}$

2 $60\,m/s + 13\,m/s = 73\,m/s$

e) $\vec{t} = 18\,s$

(read from the graph)