

*Expect concept Q's also*

Sample

test (Phys 11H)  
(worksheet)

Feb 2024 Test: Physics 11 - Graph Interpretation

Name : \_\_\_\_\_

Block: \_\_\_\_\_

*With answers key*

**Equations:**

$$v_{\text{average}} = \Delta d / \Delta t$$

$$g = 9.80 \text{ m/s}^2$$

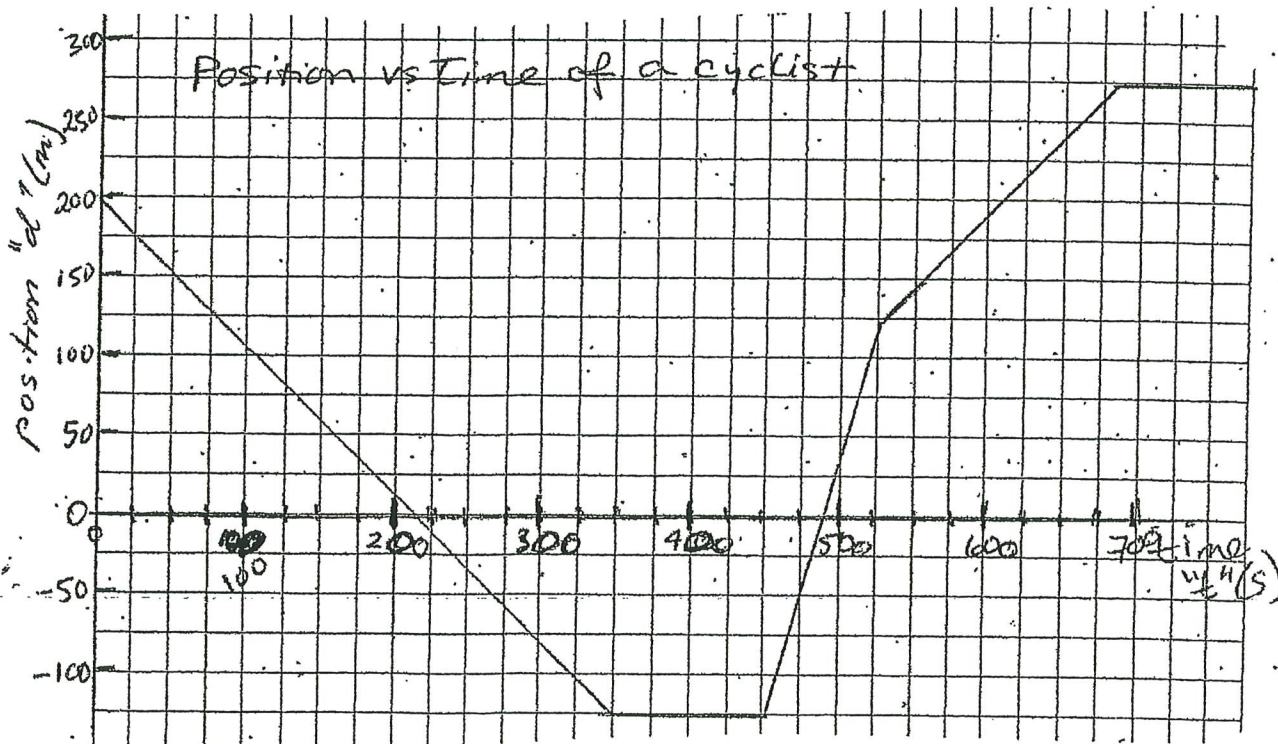
$$v_f = a\Delta t + v_i$$

$$\Delta d = 1/2(v_i + v_f)\Delta t$$

$$\Delta d = 1/2 a\Delta t^2 + v_i \Delta t$$

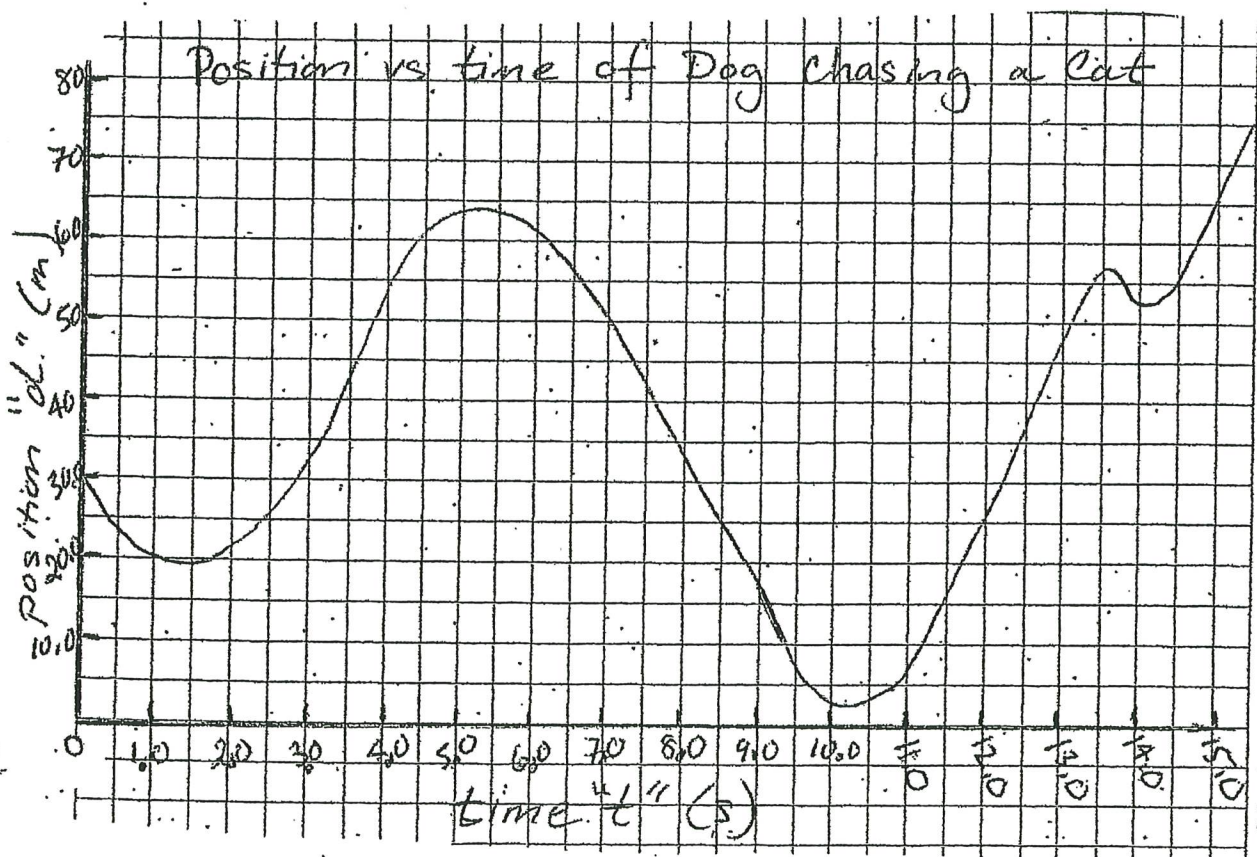
$$v_f^2 = 2a\Delta d + v_i^2$$

1. Use the position vs time graph of a cyclist to answer the following questions:
  - a. At which time(s) or time interval(s) is the cyclist at rest?
  - b. During which time interval(s) is the cyclist moving at their fastest speed?
  - c. Determine the velocity of the cyclist at  $t = 100$  seconds
  - d. Determine the velocity of the cyclist at  $t = 600$  seconds
  - e. Determine the equation of the straight line portion of the graph from  $t = 0$  seconds to  $t = 350$  seconds.

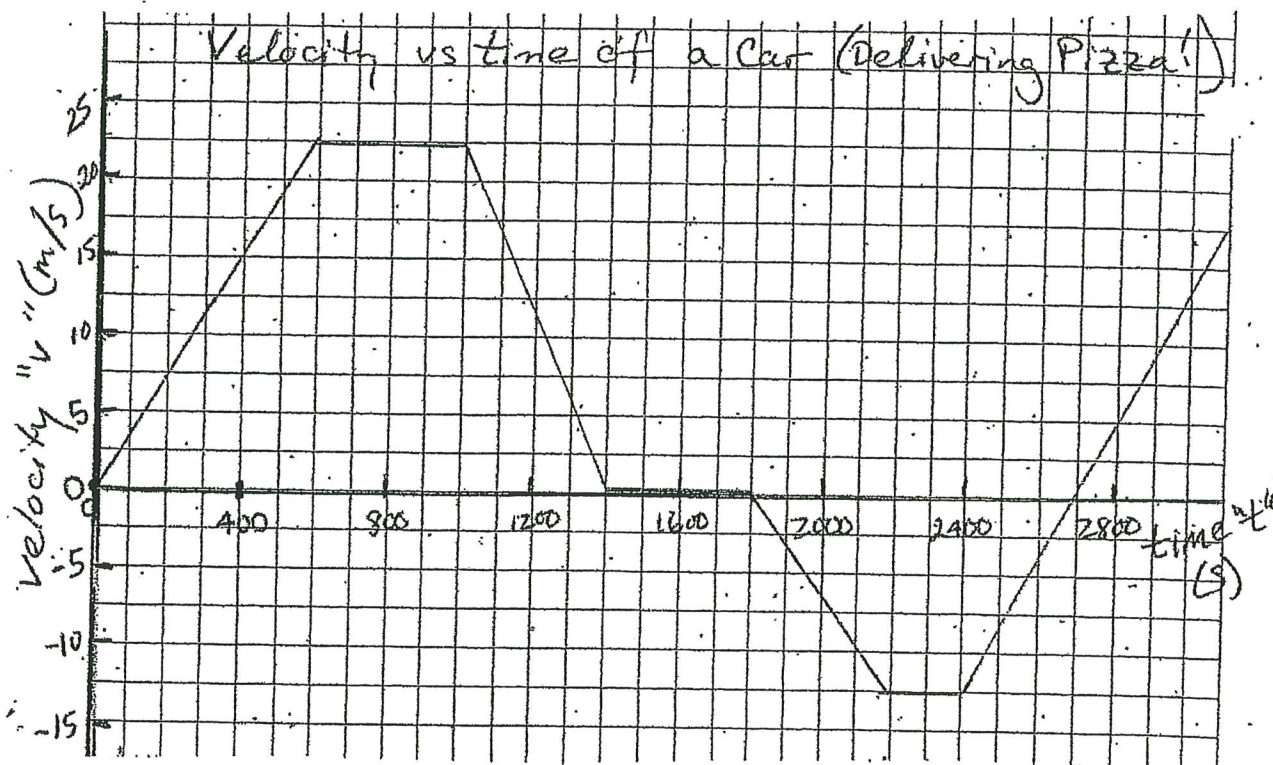


(100%) test 20/10/02 20/10/02

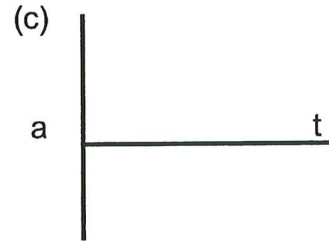
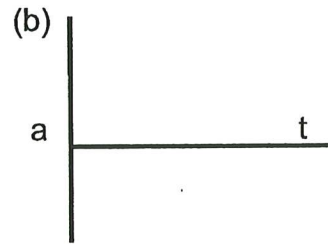
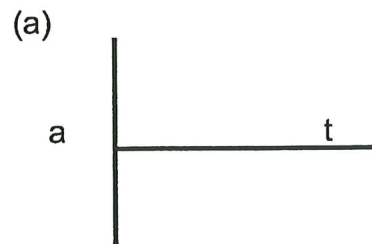
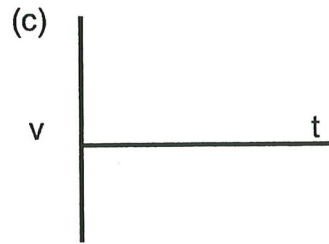
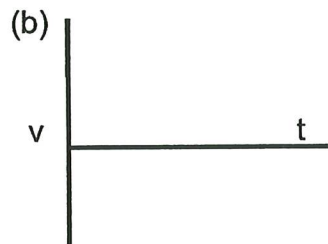
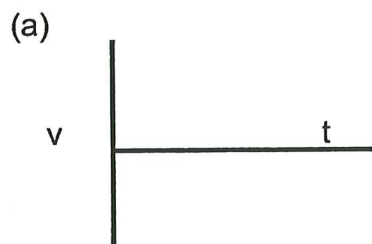
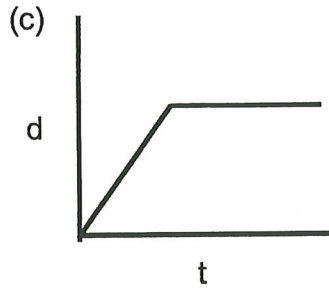
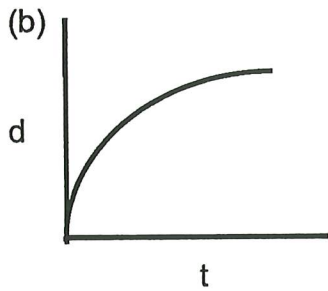
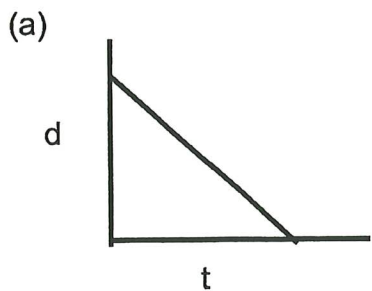
2. Use the position vs time graph of a dog chasing a cat to answer the following questions:
- a. Determine the average velocity of the dog between  $t = 0.0\text{s}$  and  $t = 13.0\text{s}$ .
  - b. Determine the instantaneous velocity of the dog at  $t = 3.5\text{ s}$ .
  - c. Determine the instantaneous velocity of the dog at  $t = 7.0\text{ s}$ .
  - d. At what time(s) is the dog at rest.



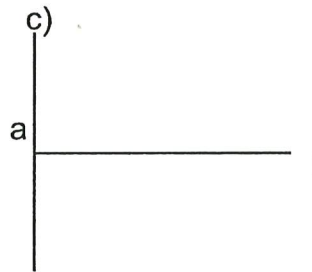
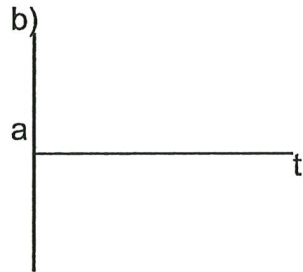
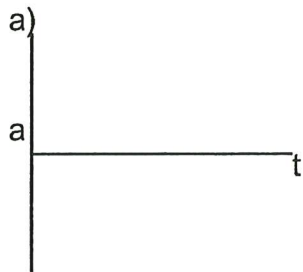
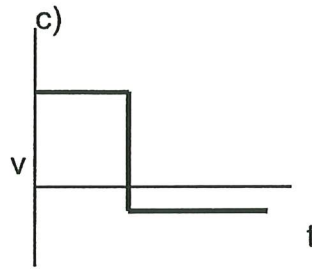
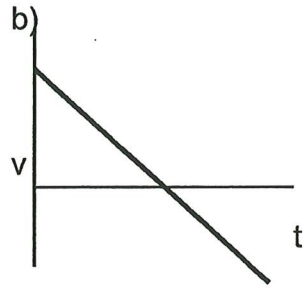
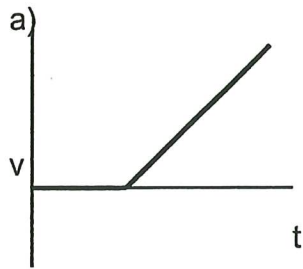
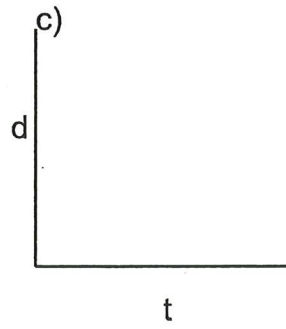
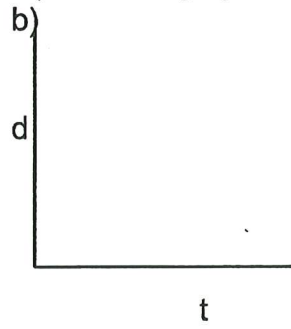
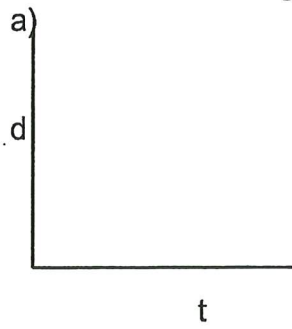
3. Use the velocity vs time graph of a car to answer the following questions:
- What is the velocity of the car at  $t = 400$  s?
  - At which time(s) or time interval(s) is the car at rest?
  - Determine the acceleration of the car at  $t = 2000$  s.
  - Determine the displacement of the car from  $t = 0.0$  s to  $t = 2800$  s?
  - Determine the equation of the straight line portion of the graph from  $t = 0$  seconds to  $t = 600$  seconds.



4. For each of the following **position vs time** graphs, sketch the corresponding **velocity vs time** and **acceleration vs time** graphs.



5. Sketch the **position vs time** and **acceleration vs time** graphs that corresponds to each of the following **position vs time** graphs.



# Feb 2024 Test: Physics 11 - Graph Interpretation

Name: KEY Block: \_\_\_\_\_

**Equations:**

$$v_{\text{average}} = \Delta d / \Delta t \qquad g = 9.80 \text{ m/s}^2$$

$$v_f = a\Delta t + v_i \qquad \Delta d = 1/2(v_i + v_f)\Delta t$$

$$\Delta d = 1/2 a\Delta t^2 + v_i \Delta t \qquad v_f^2 = 2a\Delta d + v_i^2$$

1. Use the position vs time graph of a cyclist to answer the following questions:

a. At which time(s) or time interval(s) is the cyclist at rest?

350s → 450s      680s → end

2

b. During which time interval(s) is the cyclist moving at their fastest speed?

450s → 525s

c. Determine the velocity of the cyclist at t = 100 seconds

$$v = \frac{d_f - d_i}{t_f - t_i} = \frac{-125 \text{ m} - 200 \text{ m}}{350 \text{ s} - 0 \text{ s}} = \boxed{-0.929 \text{ m/s}}$$

d. Determine the velocity of the cyclist at t = 600 seconds

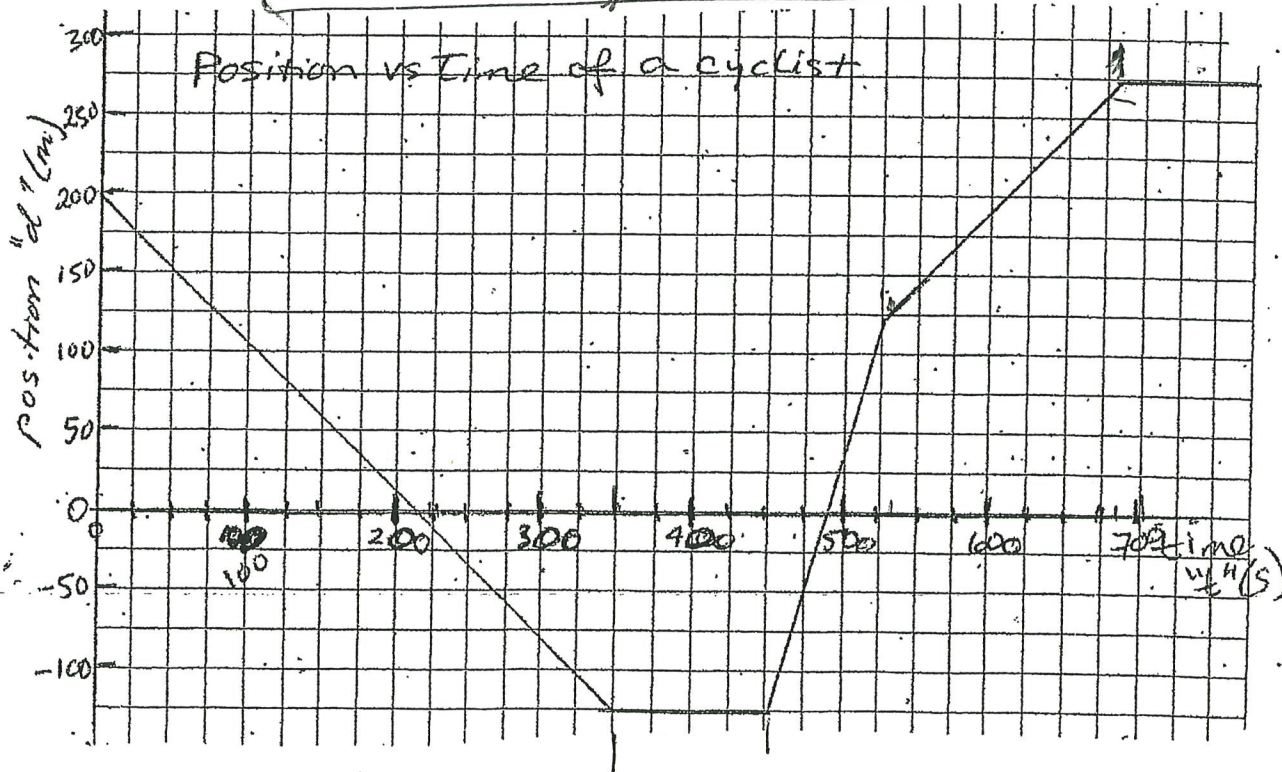
$$v = \frac{d_f - d_i}{t_f - t_i} = \frac{275 \text{ m} - 125 \text{ m}}{680 \text{ s} - 530 \text{ s}} = \boxed{1.00 \text{ m/s}}$$

3

e. Determine the equation of the straight line portion of the graph from t = 0 seconds to t = 350 seconds.

$$\boxed{d = (-0.929 \text{ m/s})t + 200 \text{ m}}$$

2



7

2. Use the position vs time graph of a dog chasing a cat to answer the following questions:

a. Determine the average velocity of the dog between  $t = 0.0\text{s}$  and  $t = 13.0\text{s}$ .

① 
$$v = \frac{475\text{m} - 30\text{m}}{13\text{s} - 0\text{s}} = \boxed{13.5\text{ m/s}}$$

b. Determine the instantaneous velocity of the dog at  $t = 3.5\text{s}$ .

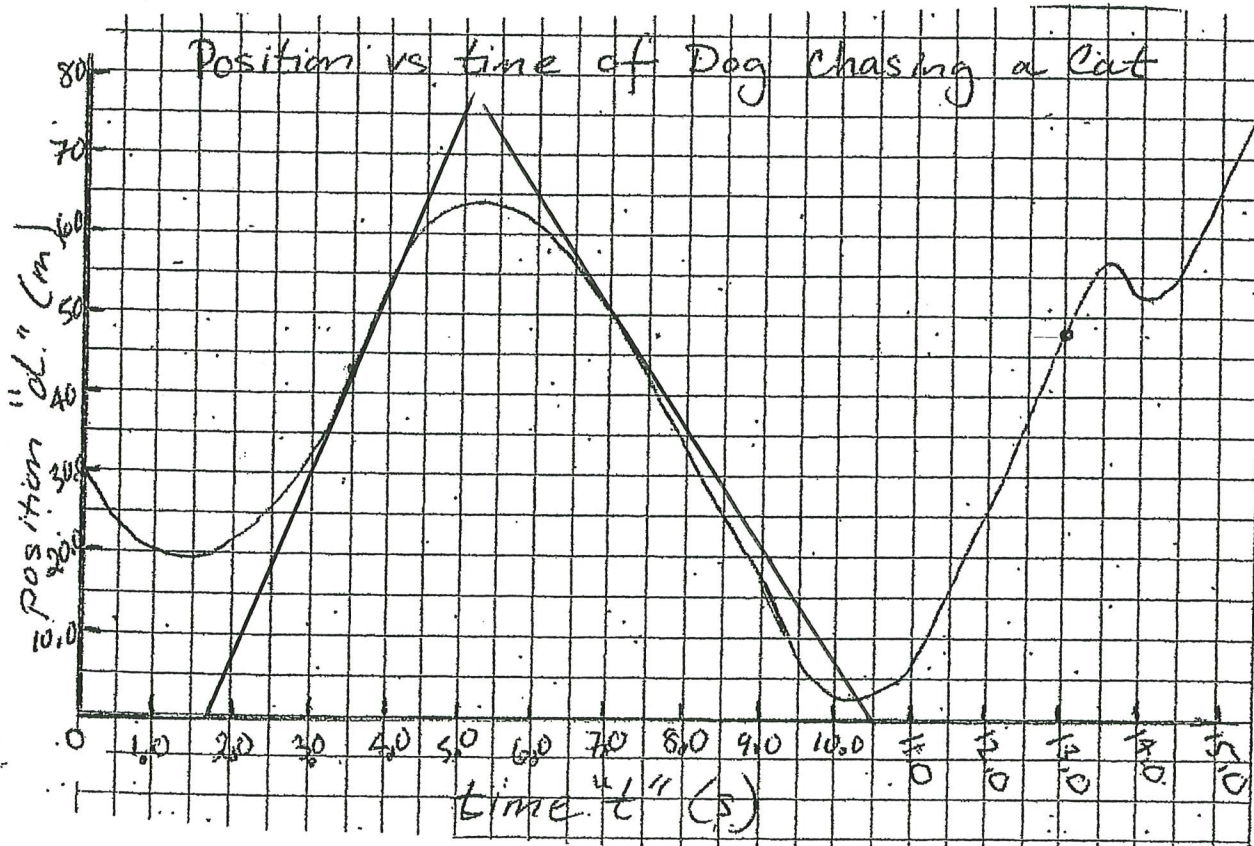
③ 
$$v = \frac{75\text{m} - 0\text{m}}{5.0\text{s} - 1.7\text{s}} = \boxed{22.7\text{ m/s}}$$

c. Determine the instantaneous velocity of the dog at  $t = 7.0\text{s}$ .

③ 
$$v = \frac{0 - 65}{10.5\text{s} - 6\text{s}} = \boxed{-14.4\text{ m/s}}$$

d. At what time(s) is the dog at rest.

②  $1.5\text{s}, 5.25\text{s}, 10.2\text{s}, 13.6\text{s}, 14.2\text{s}$



3. Use the velocity vs time graph of a car to answer the following questions:

a. What is the velocity of the car at  $t = 400$  s?

$15.0 \text{ m/s}$

2

b. At which time(s) or time interval(s) is the car at rest?

$0 \text{ s} , 1400 \text{ s} \rightarrow 1800 \text{ s} , 2700 \text{ s}$

c. Determine the acceleration of the car at  $t = 2000$  s.

$a = \frac{v_f - v_i}{\Delta t} = \frac{-12.5 \text{ m/s} - 0}{2180 \text{ s} - 1800 \text{ s}} = -0.0329 \text{ m/s}^2$

2

d. Determine the displacement of the car from  $t = 0.0$  s to  $t = 2800$  s?

area =  $\frac{1}{2}(600)(22.5) + (22.5)(1000 - 600) + \frac{1}{2}(-12.5)(2200 - 1800)$   
 $+ (-12.5)(200) + \frac{1}{2}(-12.5)(300) + (\frac{1}{2})(5)(100)$   
 $= 6750 + 9000 + (-2500) - 2500 - 1875 + 250$   
 $\Delta d = 13625 \text{ m}$

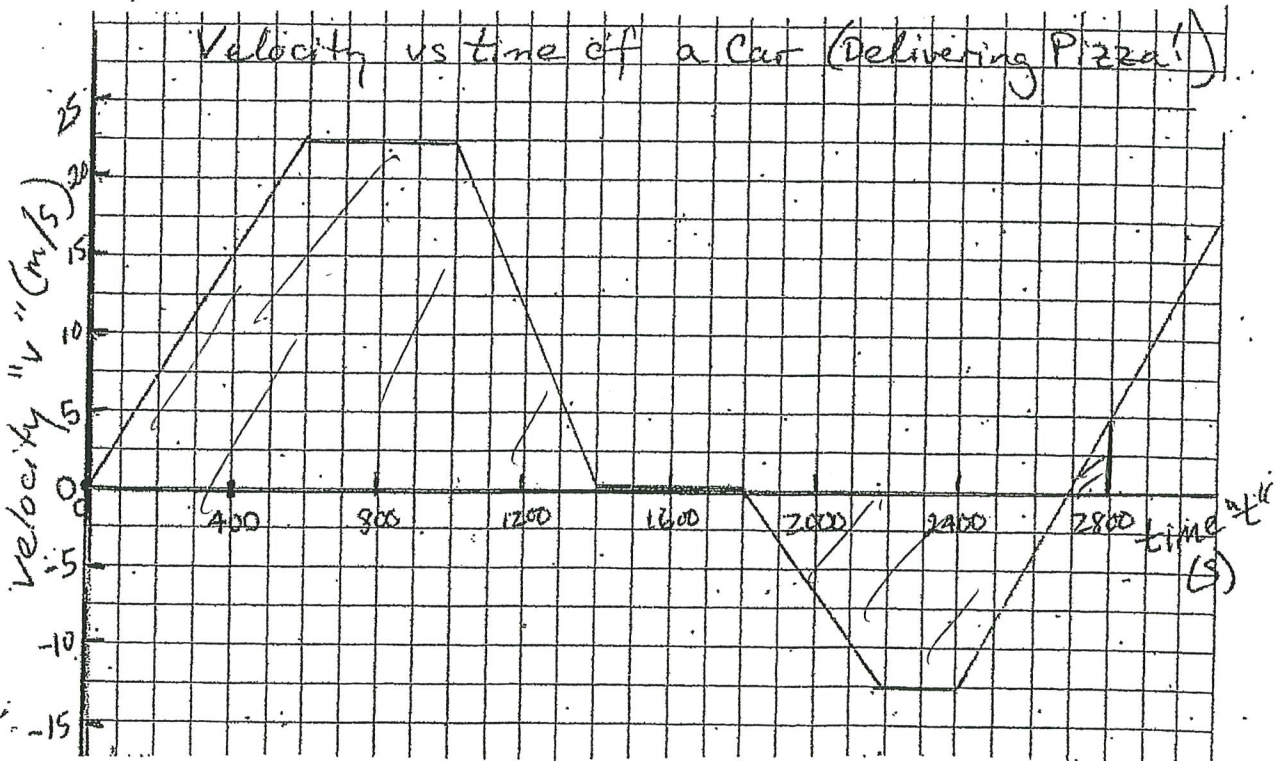
2

e. Determine the equation of the straight line portion of the graph from  $t = 0$  seconds to  $t = 600$  seconds.

slope =  $\frac{22.5 \text{ m/s} - 0}{600 \text{ s}}$

$v = (0.0375 \text{ m/s}^2)t$

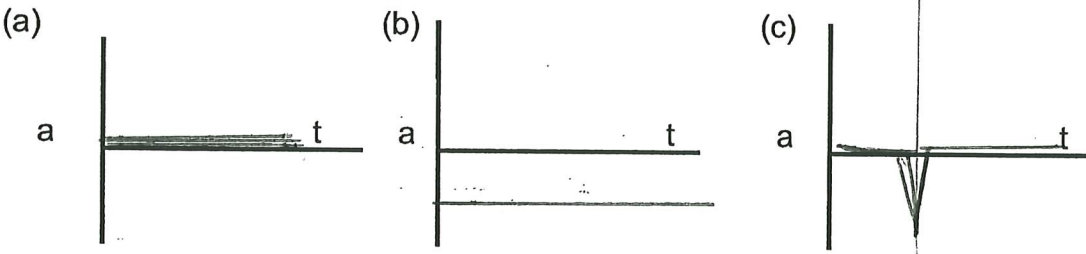
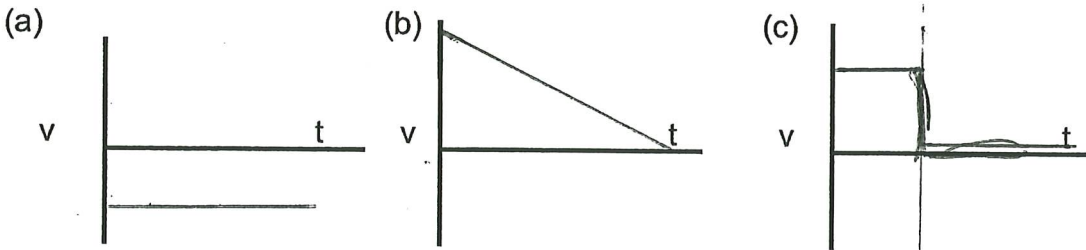
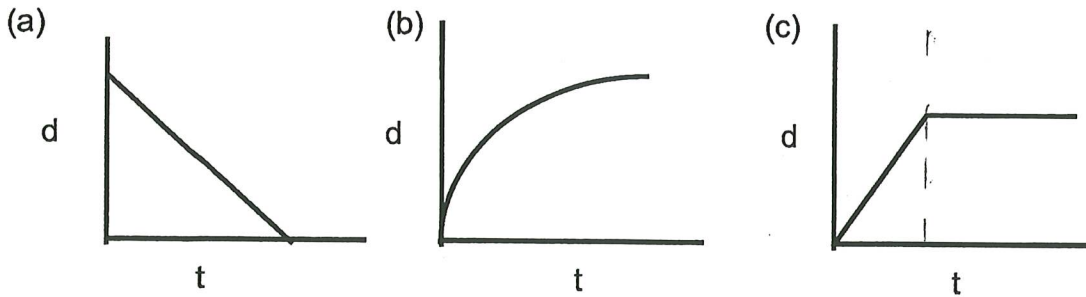
2



8

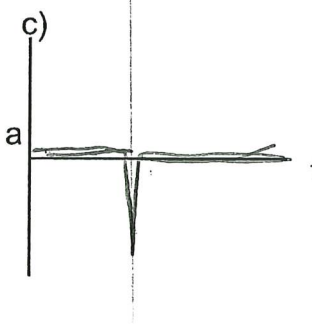
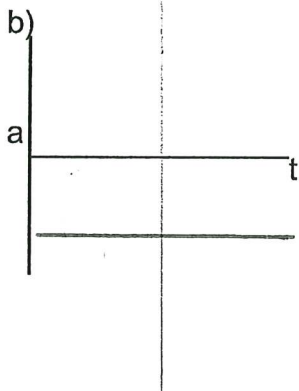
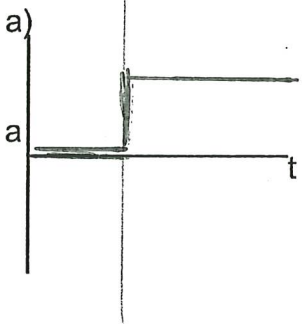
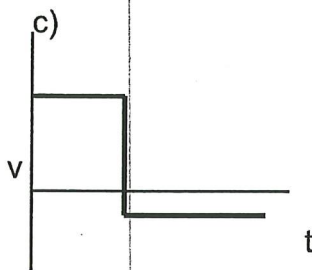
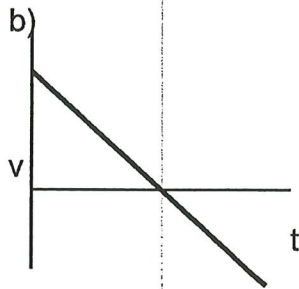
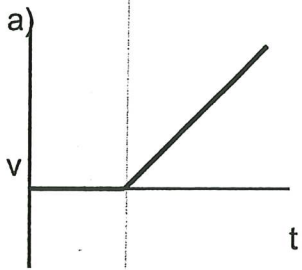
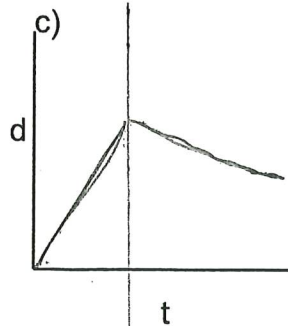
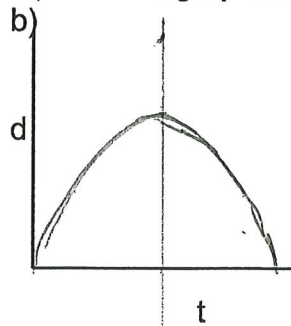
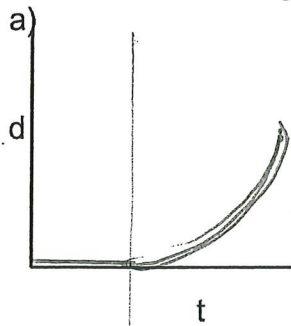


4. For each of the following **position vs time** graphs, sketch the corresponding **velocity vs time** and **acceleration vs time** graphs.



6

5. Sketch the **position vs time** and **acceleration vs time** graphs that corresponds to each of the following **position vs time** graphs.



6