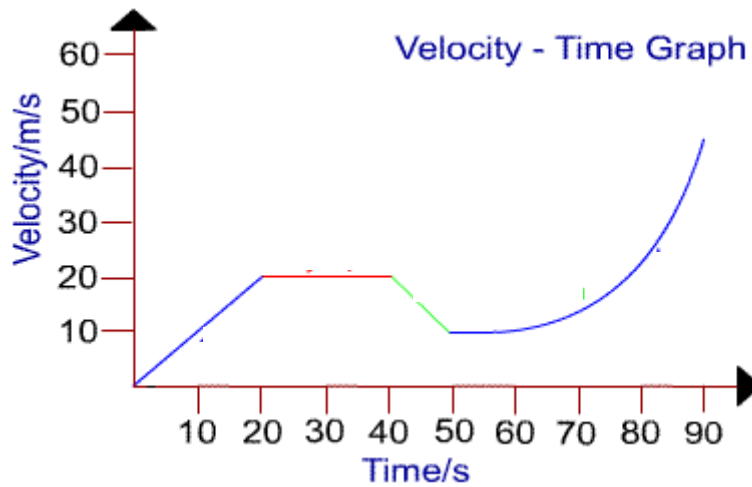
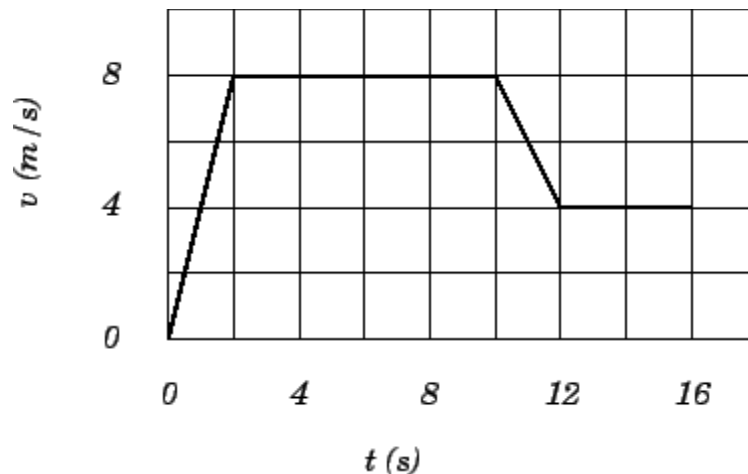


# Velocity-time graph problems

On the graph below, indicate when the object is accelerating, decelerating and maintaining a constant velocity



## *Velocity-time graph*

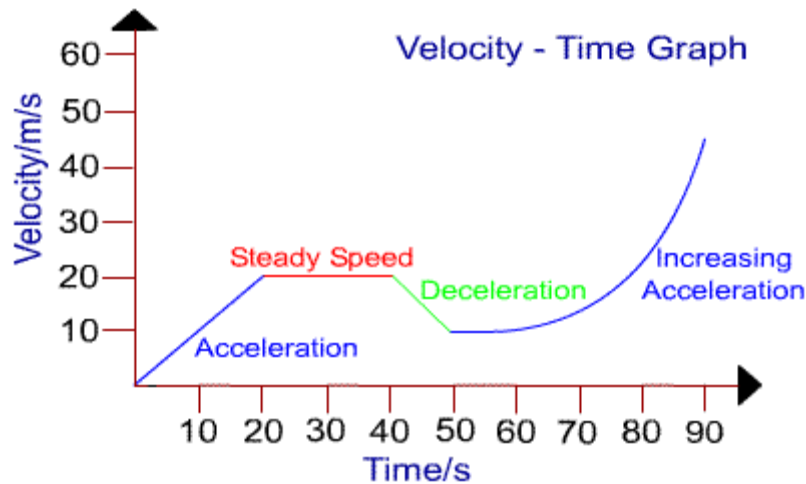


*Question:* Consider the motion of the object whose velocity-time graph is given in the diagram.

1. What is the acceleration of the object between times  $t = 0$  and  $t = 2$ ?
2. What is the acceleration of the object between times  $t = 10$  and  $t = 12$ ?
3. What is the net displacement of the object between times  $t = 0$  and  $t = 2$ ?
4. What is the net displacement of the object between times  $t = 0$  and  $t = 8$ ?
5. Describe the object's entire motion.

# Velocity-time graph problems

Answers



1.  $acceleration = gradient = \frac{rise}{run} = \frac{8}{2} = 4ms^{-2}$

2.  $acceleration = gradient = \frac{rise}{run} = \frac{-4}{2} = -2ms^{-2}$

3.  $displacement = area = \frac{1}{2} * base * height = \frac{1}{2} * 2 * 8 = 8m$

4. Add the area between  $t = 2$  and  $t = 8$  to the area from question 3.

$displacement = total\ area = 6 * 8 + 8 = 56m$

5. The object accelerated between  $t=0$  and  $t=2$  up to  $8m/s$ . It maintained a constant speed for 8 seconds before decelerating to  $4m/s$  over 2 seconds. It maintained a speed of  $4m/s$  for 4 seconds.