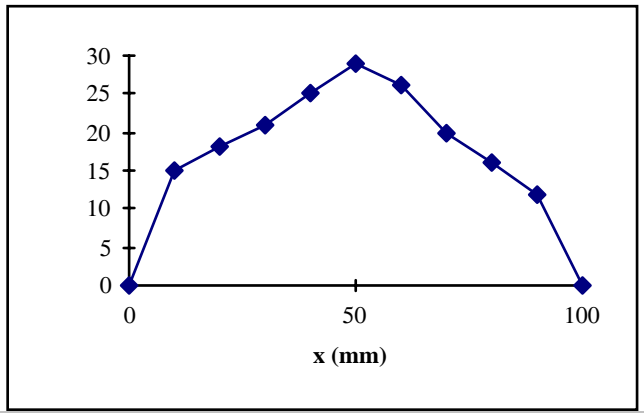
Complete solutions to Exercise 2(c)

1. We have

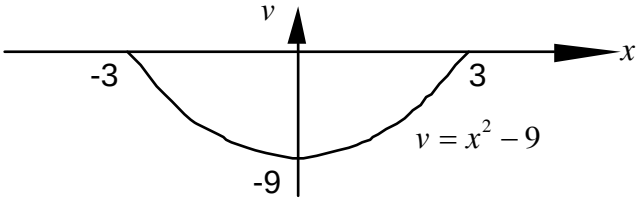


2. The graph cuts the x axis where $x^2 - 9 = 0$. Solving for x:

$$x^2 = 9$$

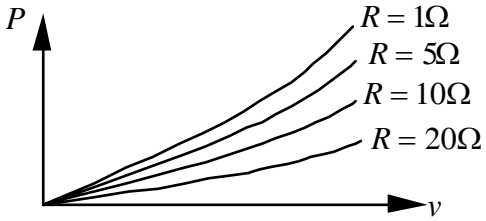
$$x = \pm 3$$

The graph v cuts the x axis at $+3$ and -3. We have:



3. The graphs of $P = \dfrac{v^2}{R}$ are quadratic curves going through the origin.

Substituting the given R values: $P = v^2, P = \dfrac{v^2}{5}, P = \dfrac{v^2}{10}$ and $P = \dfrac{v^2}{20}$.



4. The graph v cuts the x axis where $\dfrac{1}{40}(400 - x^2) = 0$. Solving:

$$400 - x^2 = 0$$

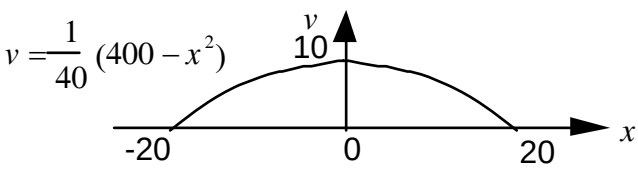
$$x^2 = 400$$

$$x = \pm 20$$

The graph v cuts the x axis at -20 and 20. Putting $x = 0$ gives

$$v = \frac{1}{40}(400) = 10$$

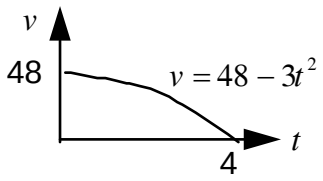
We have



5. When $t = 0$, $v = 48$ also the graph cuts the t axis where $v = 0$:

$$48 - 3t^2 = 0$$

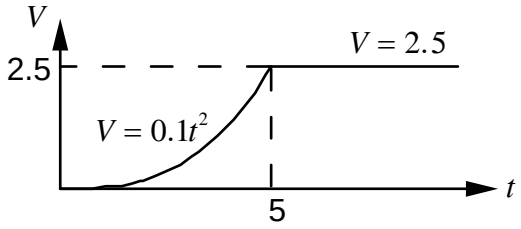
$$3t^2 = 48 \text{ gives } t^2 = 16 \text{ and so } t = 4$$



Since the velocity is decreasing with time t we have negative acceleration.

6. Between t=0 and t=5 we have the graph $V = 0.1t^2$ which is a quadratic going through the origin.

For $t > 5$ the graph follows a horizontal line $V = 2.5$ and at $t = 5$, $V = 0.1 \times 5^2 = 2.5$, hence:



7. For t between 0 and 2 we have the quadratic curve $s = t^2 + 1$ which cuts the s axis at 1. For $2 \le t < 10$ we have the straight line $s = 2t + 1$. Thus: