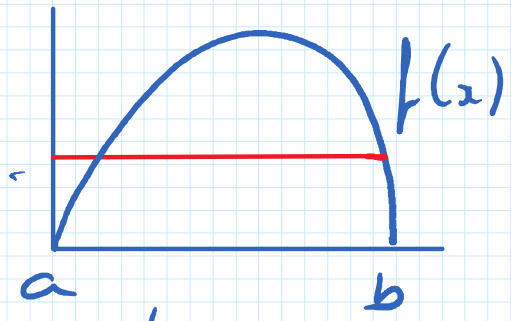
Average Value



$$\frac{1}{b-a}\int_a^b f(x)\,dx$$

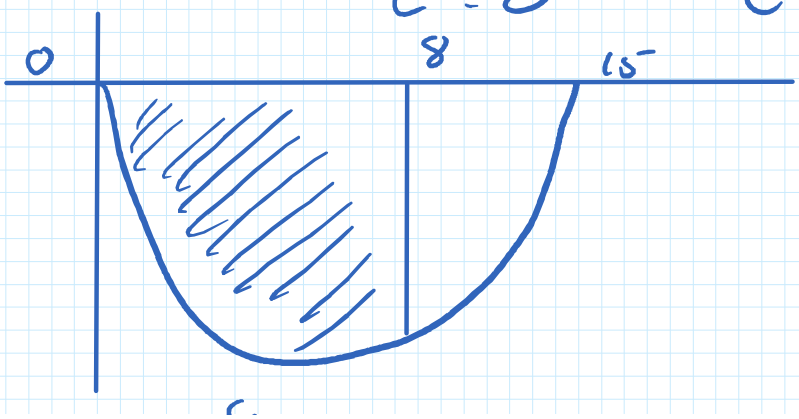
The temperature T°C from midnight is given by $T = t^2 - 15t$. Find the average temperature until 8am where t is time.

$$T = t^2 - 15t$$

$$t^2 - 15t = 0$$

$$t(t-15) = 0$$

$t = 0$ $t = 15$



$$\frac{1}{8}\int_0^8 (t^2 - 15t)\,dt$$

$x^2 \cup$

$-x^2 \cap$

$$= \frac{1}{8}\left[\frac{t^3}{3} - 15t^2\right]_0^8$$

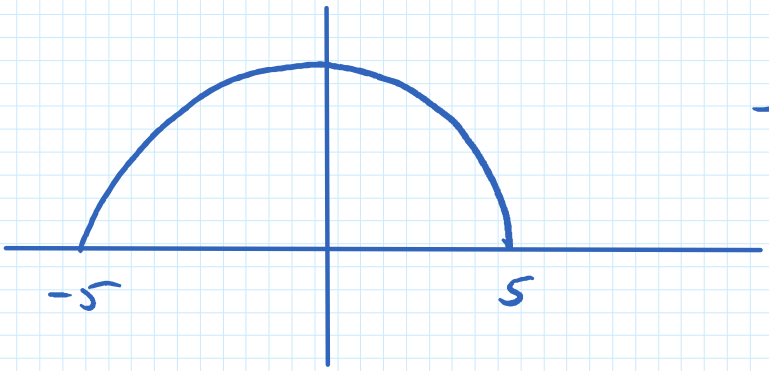
$$= \frac{1}{8}\left[\frac{8^3}{3} - 15(8^2)\right] = -38.6^{\circ}C$$

$y = 25 - x^2$ find average value of y between x intercepts.

$$y = 25 - x^2$$

$$25 - x^2 = 0$$

$$x = \pm 5$$



$$\frac{1}{10}\int_{-5}^{5} (25 - x^2)\,dx$$

$$\frac{1}{10}\left[25x - \frac{x^3}{3}\right]_{-5}^{5}$$

$$= 16.\dot{6}$$

Velocity v, in m/s of a particle is given by $v = t^2 - 6t + 5$.

(i) At times is it at rest?

(ii) Find average velocity during times when it stops.

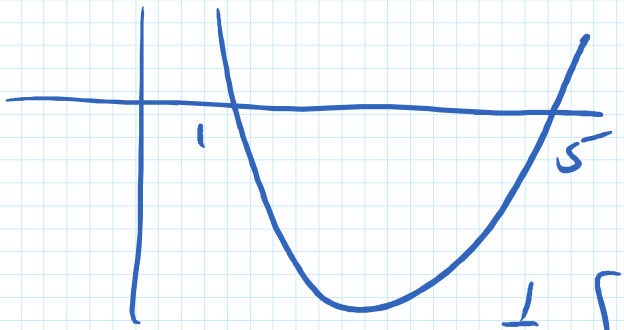
$$v = t^2 - 6t + 5$$

At rest $\Rightarrow$ speed $= 0$

$$t^2 - 6t + 5 = 0$$

$$(t-1)(t-5) = 0$$

$$t = 1 \quad t = 5$$



$$\frac{1}{4}\int_1^5 (t^2 - 6t + 5)\,dx$$

$$\frac{1}{4}\left[\frac{t^3}{3} - 3t^2 + 5t\right]_1^5$$

$$= -\frac{8}{3}\ \text{m/s}.$$