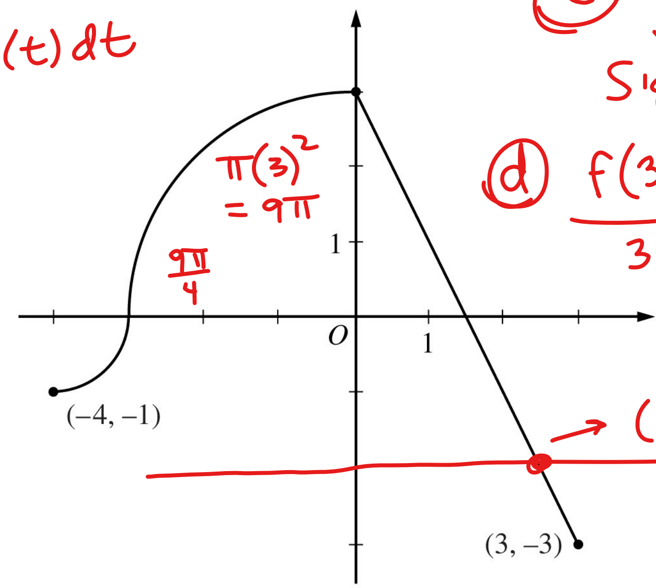
$g(-3) = 2(-3) + \int_0^{-3} f(t)\,dt$

$= -6 - \frac{9\pi}{4}$

$g'(-3) = 2 + f(-3)$

$= 2 + 0$

$= 2$



Graph of f

$\pi(3)^2 = 9\pi$

$\frac{9\pi}{4}$

$\to (2.5, -2)$

ⓒ g'' changes signs at $x = 0$

ⓓ $\frac{f(3) - f(-4)}{3 - -4} = \frac{-3 - -1}{7}$

$= -\frac{2}{7}$

$\downarrow$

f is not differentiable at $x = 0$

4. The continuous function f is defined on the interval $-4 \le x \le 3$. The graph of f consists of two quarter circles and one line segment, as shown in the figure above. Let $g(x) = 2x + \int_0^x f(t)\,dt$.

$g'(x) = 2 + f(x)$

$g''(x) = f'(x)$

(a) Find $g(-3)$. Find $g'(x)$ and evaluate $g'(-3)$.

(b) Determine the x-coordinate of the point at which g has an absolute maximum on the interval $-4 \le x \le 3$. Justify your answer.

(c) Find all values of x on the interval $-4 < x < 3$ for which the graph of g has a point of inflection. Give a reason for your answer.

(d) Find the average rate of change of f on the interval $-4 \le x \le 3$. There is no point c, $-4 < c < 3$, for which $f'(c)$ is equal to that average rate of change. Explain why this statement does not contradict the Mean Value Theorem.

ⓑ $g'(x) = 0$ $\quad 0 = 2 + f(x) \to f(x) = -2$

x	$g(x)$
-4	
2.5	
3	

not necessary this time

$g'(x) > 0 \quad (-4, 2.5)$

$g'(x) < 0 \quad (2.5, 3)$

so the abs max of g is at $x = 2.5$