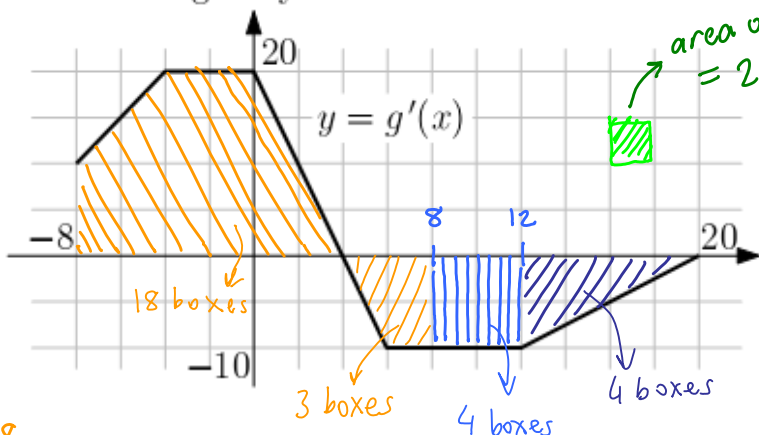


Show your work in all problems.

FTC tells integral of r.o.c. is total change

1. The graph of  $g'(x)$  is given below. Using the graph fill in the table. Write down which definite integrals you have used. (similar to #12 p246)



$x$	-8	8	12	20
$g(x)$	-73	77	37	-3

$\Delta g = 150$     $\Delta g = -40$     $\Delta g = -40$

$$\int_{-8}^8 g'(x) dx = g(8) - g(-8)$$

$$180 - 30 = 77 - g(-8)$$

$$g(-8) = 77 - 180 + 30 = -73$$

$$\int_8^{12} g'(x) dx = g(12) - g(8)$$

$$-40 = 37 - g(8)$$

$$g(8) = 77$$

$$\int_{12}^{20} g'(x) dx = g(20) - g(12)$$

$$-40 = g(20) - 37$$

$$-3 = g(20)$$

2. For a function  $r(t)$  we know that  $\int_3^7 r(t) dt = 8$ ,  $\int_1^7 r(t) dt = 5$ . Compute  $\int_1^3 r(t) dt$



$$\int_1^3 r(t) dt + \int_3^7 r(t) dt = \int_1^7 r(t) dt$$

$$? + 8 = 5$$

Property 1 in page 253

answer:  $5 - 8 = -3$

3. Given  $F(x) = \int_1^x 2 + \ln(w) dw$ , find the derivative function  $F'(x)$

use 2<sup>nd</sup> FTC, page 253

$$F'(x) = 2 + \ln(x) \quad \text{by 2<sup>nd</sup> FTC}$$

4. Find the equation of the tangent line to the curve  $y = r(x) = 4x^2 - x^5$  at  $x = 1$ .

Point of tangency:  $(1, f(1)) = (1, 3)$

$$r'(x) = 8x - 5x^4$$

slope of tangent line =  $m = r'(1) = 8 - 5 = 3$

Tangent line:  $y - 3 = 3(x - 1)$