We are lean, mean, integration machines! Do the following problems in your notebook and then transfer your solutions to the table.

Integral	*Solution*
$\int f'(x)\ dx$	$f(x)+C$
$\int_3^7 g'(x)\ dx$	$g(7)-g(3)$
$\int [h'(x)+13]\ dx$	$h(x)+13x+C$
$\int \sin x\, dx$	$-\cos x + C$
$\int_0^{\frac{\pi}{4}} \sec^2(x)\ dx$	1
$\int_{-2}^{10} \left[3x^2+2x+1\right]dx$	1116
$\int_{10}^{-2} \left[3x^2+2x+1\right]dx$	-1116
$\int_0^{2\pi} \cos\theta\ d\theta$	0
$\int \left(\sin^2\theta+\cos^2\theta\right) d\theta$	$\theta + C$
$\int \sqrt{x}\left(\sqrt{x}+1\right)\ dx$ SIMPLIFY	$\frac{1}{2}x^2+\frac{2}{3}x^{\frac{3}{2}}+C$
$\int \frac{x^2-2x}{x}\ dx$ SIMPLIFY	$\frac{1}{2}x^2-2x+C$
$\int_2^4 \frac{1}{x^2}\ dx$ $= -\frac{1}{x}\Big\vert_2^4$	$\frac{1}{4}$
$\int_1^5 f''(x)\ dx$	$f'(5)-f'(1)$

$$\frac{d}{dx}\int_1^x f(t)\ dt$$

$= f(x)$

$$\int_\pi^x \cos t\ dt$$

$= \sin x - \sin\pi$

$= \sin x$

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$$\frac{d}{dx}\int_\pi^x \cos t\ dt$$

$= \cos x$

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Let $g(x)=\int_3^x f(t)\ dt$. Find $g(3)$

$g(3) = \int_3^3 f(t)\,dt$

so, $g(3)=0$

$$f(3)+\int_3^7 f'(x)\ dx = \ ?$$

$f(3)+[f(7)-f(3)]$

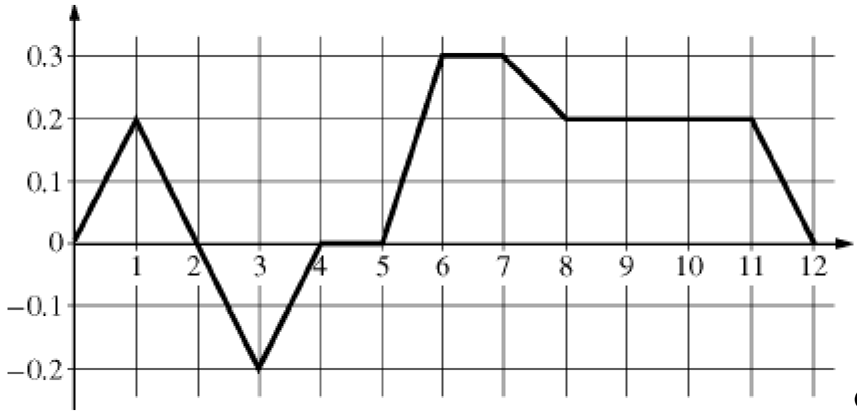
$= f(7)$

t [seconds]	0	8	20	25	32	40
$v(t)$ [m per sec]	3	8	-10	-8	-4	7

Estimate $\int_0^{40} v(t)\ dt$ using a Right Riemann Sum

RRAM $= 8v(8) + 12v(20) + 5v(25) + 7v(32) + 8v(40)$

$= -68$ m



f

Graph of f

Let f be the function shown above. The function g is defined by $\int_0^x f(t)\ dt$

Find: $g(0)$, $g(4)$, $g(12)$

$g(0) = \int_0^0 f(t)\,dt$

$g(0) = 0$

$g(4) = \int_0^4 f(t)\,dt$

$= \int_0^2 f(t)\,dt + \int_2^4 f(t)\,dt$

$= 0$

$g(12) = \int_0^{12} f(t)\,dt$

$= \int_0^5 f(t)\,dt + \int_5^{12} f(t)\,dt$

$= 1.4$

Find $g'(x)$

$g'(x) = \frac{d}{dx} \int_0^x f(t)\,dt$

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

Write the equation of the line tangent to the graph of g at $x = 1$

Point: $g(1) = \int_0^1 f(t)\,dt$

$g(1) = .1$

Slope: $g'(1) = f(1)$

$= g'(1) = .2$

$y - .1 = .2(x-1)$