More Review Problems - Chapter 5

1) $\frac{d}{dx}\int_2^{4x} \frac{1}{t}\,dt$ 2) $\frac{d}{dx}\int_3^{x} \sin t\,dt$ 3) $\frac{d}{dx}\int_{-x}^{3x} \frac{1}{1+t}\,dt$

Answers: $\frac{1}{x}$	$\sin x$	$\frac{3}{1+3x} + \frac{1}{1-x}$

4) $\int_1^2 (5-3x)^5\,dx$

Answer: $\frac{7}{2}$

5) $\int_0^{\pi} 2\cos 3x\,dx$

Answer: $\frac{2}{3}$

(6) $\int_1^5 |x-2|\,dx$

Answer: 5

(7) $\int_1^2 x^5 - x^2 + 2x\,dx$

Answer:

$$\frac{67}{6}$$

(8) Velocity, $v(t) = 2t - 3$
$s(1) = 5$
Find position $s(t)$

Answer: $s(t) = t^2 - 3t + 7$

(9) Acceleration
$a(t) = x^2 - 3x + 1$
$v(0) = 0$, $s(0) = 0$
Find position $s(t)$

Answer:

$s(t) = \frac{1}{12}x^4 - \frac{1}{2}x^3 + \frac{1}{2}x^2 + 0$

If $\int_0^1 f(x)dx = 2$ and $\int_1^2 f(x)dx = 1$

Find the value of $\int_0^2 f(x)dx$

Answer: 3

(11) If $\int_0^1 f(x)dx = 7$ and $\int_0^3 f(x)dx = 6$

Find the value of $\int_1^3 f(x)dx$

Answer: -1

(12) Let $f(x) = \int_0^x t^3 dt$

Find the value of $f'(2)$

Answer: 8

(13) Let $f(x) = \int_0^{x^2} t^2 dt$

Find the value of $f'(1)$

Answer: 2

Let $f(x) = \int_{x}^{x^2} t^2 dt$

Find the value of $f'(1)$

Answer: 1

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(15) The length of a rectangle is increasing at a rate of 2 ft/sec, while the width is increasing at 1 ft/sec. When the length is 5 ft. and width is 3 feet, how fast is area increasing?

Answer: 11 ft^2/sec

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(16) A cube is 4 feet on each edge. Each edge is increasing at 1 ft/sec. What is the rate of increase in volume?

Answer: 48 ft^3/sec
