Section 5.2.

#34

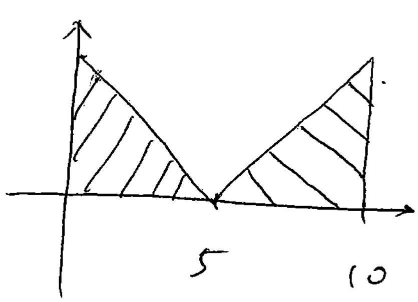
(a). $\int_0^2 g(x) = \frac{1}{2}\cdot 4\cdot 2 = \boxed{4}$ (area of a triangle)

(b). $\int_2^6 g(x) = -\frac{1}{2}\pi(2)^2 = \boxed{-2\pi}$ (negative of the area of a semicircle)

(c). $\int_6^7 g(x) = \frac{1}{2}\cdot 1\cdot 1 = \frac{1}{2}$ (area of a triangle)

$$\int_0^7 g(x)\,dx = \int_0^2 g(x)dx + \int_2^6 g(x)dx + \int_6^7 g(x)dx$$
$$= 4 + (-2\pi) + \frac{1}{2}$$
$$= \boxed{4.5 - 2\pi}$$

#40



$\int_0^{10} |x-5|dx$ can be interpreted as the sum of the area of the two shaded triangles.

So $\int_0^{10} |x-5|dx = 2\cdot(\frac{1}{2})\cdot 5.5 = \boxed{25}$

Section 5.3

P2

#2

(a). $g(x) = \int_0^x f(t)\,dt$.

So $g(0) = \int_0^0 f(t)\,dt = \boxed{0}$

$g(1) = \int_0^1 f(t)\,dt = \frac{1}{2}\cdot 1\cdot 1 = \boxed{\frac{1}{2}}$ (area of triangle)

$g(2) = \int_0^2 f(t)\,dt = \int_0^1 f(t)\,dt + \int_1^2 f(t)\,dt$

$= \frac{1}{2} + \left(-\frac{1}{2}\cdot 1\cdot 1\right) = 0$

$g(3) = g(2) + \int_2^3 f(t)\,dt$

$= 0 - \frac{1}{2}\cdot 1\cdot 1 = \boxed{-\frac{1}{2}}$

$g(4) = g(3) + \int_3^4 f(t)\,dt$

$= -\frac{1}{2} + \frac{1}{2}\cdot 1\cdot 1 = \boxed{0}$

$g(5) = g(4) + \int_4^5 f(t)\,dt$

$= 0 + 1.5 = \boxed{1.5}$

$g(6) = g(5) + \int_5^6 f(t)\,dt$

$= 1.5 + 2.5 = \boxed{4}$

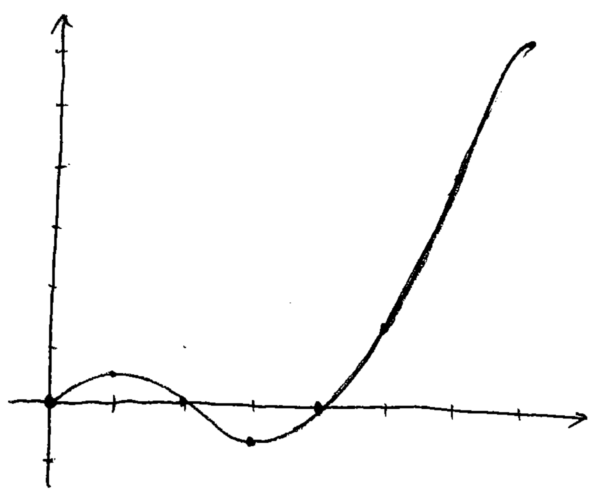
(b) $g(7) = g(6) + \int_6^7 f(t)\,dt \approx 4 + 2.2 = \boxed{6.2}$

(c) The answers from part (a) and part (b) show that

$g_{max} = g(7) = 6.2$

$g_{min} = g(3) = -\frac{1}{2}$

(d)



#12

$G(x) = \int_x^1 \cos\sqrt{t}\,dt = -\int_1^x \cos\sqrt{t}\,dt.$

$\Rightarrow G'(x) = -\frac{d}{dx}\int_1^x \cos\sqrt{t}\,dt = \boxed{-\cos\sqrt{x}}$

#24

$\int_1^8 \sqrt[3]{x}\,dx = \int_1^8 x^{1/3}\,dx = \left[\frac{3}{4}x^{4/3}\right]_1^8$

$= \frac{3}{4}(8^{4/3} - 1^{4/3}) = \frac{3}{4}(2^4 - 1) = \frac{3}{4}\cdot 15 = \boxed{\frac{45}{4}}$