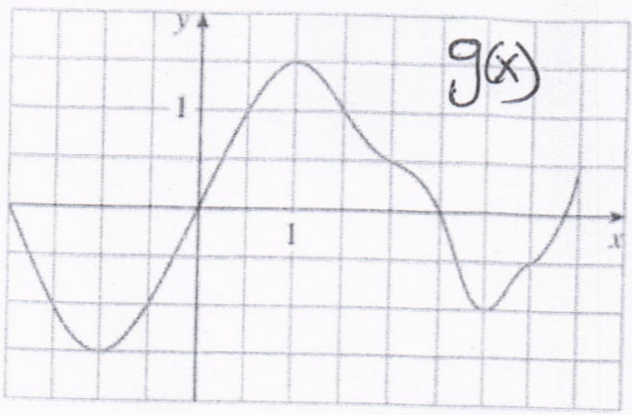

Figure 1

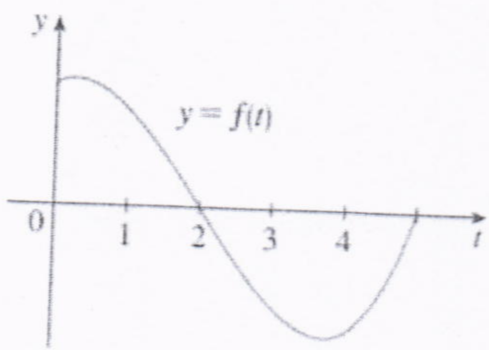

Figure 2

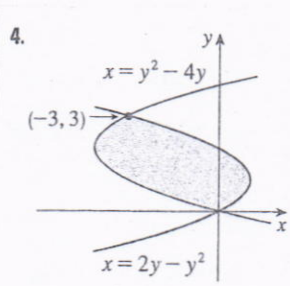

Figure 3

1. The lower sum for $f(x) = 1 - x^2$, $-1 \le x \le 1$, with $n = 4$ is

(a) $\frac{3}{4}$ (correct)

(b) $\frac{1}{4}$

(c) $\frac{1}{2}$

(d) 1

(e) $\frac{9}{8}$

$$L_4 = \left(\frac{1}{2}\right)(0) + \frac{1}{2}\left(1 - \frac{1}{4}\right) + \frac{1}{2}\left(1 - \frac{1}{4}\right) + \frac{1}{2}(0) = 3/4$$

Similar to #8/5.1

2. Using right endpoints, the area of the region that lies under the graph $f(x) = \sqrt{\cos x}$, $0 \le x \le \frac{\pi}{2}$ is

(a) $\lim_{n\to\infty} \frac{\pi}{2n} \sum_{i=1}^{n} \sqrt{\cos\left(i\frac{\pi}{2n}\right)}$ (correct)

(b) $\lim_{n\to\infty} \frac{\pi}{n} \sum_{i=1}^{n} \sqrt{\cos\left(i\frac{\pi}{n}\right)}$

(c) $\lim_{n\to\infty} \pi \sum_{i=1}^{n} \sqrt{\cos\left(i\frac{\pi}{n}\right)}$

(d) $\lim_{n\to\infty} \frac{\pi}{2n} \sum_{i=1}^{n} \sqrt{\cos\left(i\frac{\pi}{n}\right)}$

(e) $\lim_{n\to\infty} \frac{\pi}{2n} \sum_{i=1}^{n} \sqrt{\cos\left(\frac{i}{2n}\right)}$

$$DX = \frac{\frac{\pi}{2} - 0}{n} = \frac{\pi}{2n}$$

$$X_1 = \frac{\pi}{2n}, \quad X_2 = 2\frac{\pi}{2n} \; \ldots$$

$$X_i = i\frac{\pi}{2n}, \; \ldots \; X_n = \pi/2$$

$$A = \frac{\pi}{2n}\left[\sqrt{\cos\frac{\pi}{2n}} + \sqrt{\cos\frac{2\pi}{2}} + \cdots + \sqrt{\cos\frac{\pi}{2}}\right]$$

$$= \lim_{n\to\infty} \frac{\pi}{2n} \sum_{i=1}^{n} \sqrt{\cos\left(\frac{i\pi}{2n}\right)}$$

Similar to P/5.2

3. The graph of g is shown (figure 1). The estimate of $\int_{-2}^{4} g(x)\,dx$ with six subintervals using left endpoint is

(a) $-\frac{1}{2}$ (correct)

(b) $\frac{1}{2}$

(c) -2

(d) 0

(e) 2

$L_6 = 1[0 + (-1.5) + 0 + (1.5) + (-1) + (0.5)] = -1/2$

Similar to #6/5.2

4. $\sum_{i=1}^{50} i^2 =$

(a) 42925 (correct)

(b) 25755

(c) 38965

(d) 44255

(e) 32425

$$\sum_{i=1}^{n} i^2 = \frac{n(n+1)(2n+1)}{6}$$

$n = 50$

$$\frac{50(50+1)(100+1)}{6}$$

$= 42925$

Formula in 5.2

5. If $F(x) = \int_2^x f(t)\,dt$, where f is the function whose graph is given (figure 2).
Which of the following values is largest?
$F(0)$, $F(1)$, $F(2)$, $F(3)$ and $F(4)$

(a) $F(2)$ (correct)

(b) $F(0)$

(c) $F(1)$

(d) $F(3)$

(e) $F(4)$

$F(0) < 0$

$F(1) < 0$

$F(3) < 0$

$F(4) < 0$

$F(2) = \int_2^2 f(t)\,dt = 0$

$\boxed{\#52/5.2}$

6. For $x \in \left(\frac{-\pi}{2}, \frac{\pi}{2}\right)$, $\frac{d}{dx}\left[\int_{\tan x}^{5} (t - \tan^{-1} t)dt\right] =$

(a) $x \sec^2 x - \tan x \sec^2 x$ (correct)

(b) $(5 - \tan^{-1} 5) - \tan x \sec^2 x$

(c) $\tan x \sec^2 x - x \sec^2 x$

(d) $(\tan x - \tan^{-1} x) \sec^2 x$

(e) $\tan x - x$

$= (5)'[\ ] - (\tan x - \tan^{-1}(\tan x))\sec^2 x$

$= -\tan x \sec^2 x + x \sec^2 x$

$\boxed{\approx 13-18/5.3}$

7. If $6 + \int_a^x \frac{f(t)}{t^2}\,dt = 2\sqrt{x}$, $x \geq 0$, then $f(x) + a =$

(a) $9 + \sqrt{x^3}$ (correct)
(b) $9 + \sqrt[3]{x^2}$
(c) $6 + \sqrt{x^2}$
(d) $6 + \sqrt{x^3}$
(e) $9 + \sqrt{x}$

If $x = a \Rightarrow$
$6 = 2\sqrt{a} \Rightarrow a = 9$
Diff Both sides
$0 + \frac{f(x)}{x^2} = \frac{1}{2\sqrt{x}}$
$\Rightarrow f(x) = x^{3/2}$

8. $\int_1^{64} \frac{1+\sqrt[3]{x}}{\sqrt{x}}\,dx =$

(a) $\frac{256}{5}$ (correct)
(b) $\frac{216}{5}$
(c) $\frac{212}{5}$
(d) $\frac{144}{5}$
(e) $\frac{252}{5}$

$\int_1^{64} \left(\frac{1}{\sqrt{x}} + \frac{\sqrt[3]{x}}{\sqrt{x}}\right) dx$
$= \int (x^{-1/2} + x^{-1/6})\,dx$
$= \left[2\sqrt{x} + \frac{6}{5}x^{5/6}\right]_1^{64}$

#39/5.4

$= (2)(8) + \frac{6}{5}((2^6)^{5/6}) - \left(2 + \frac{6}{5}\right)$
$= 16 + \frac{186}{5} = \boxed{\frac{256}{5}}$