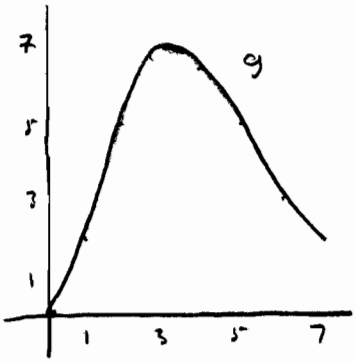
3-0235 — 50 SHEETS — 5 SQUARES
3-0236 — 100 SHEETS — 5 SQUARES
3-0237 — 200 SHEETS — 5 SQUARES
3-0137 — 200 SHEETS — FILLER
COMET

3) a. $g(0) = 0$
$g(1) = 2$
$g(2) = 5$
$g(3) = 7$
$g(6) = 7 - 4 = 3$

b. g increases on $(0,3)$ because we add more area.

c. g has a max at $x = 3$

d.



7) $g(x) = \int_1^x \frac{1}{t^3+1}\,dt$

$$\boxed{g'(x) = \frac{1}{x^3+1}}$$

11) $F(x) = \int_x^{\pi} \sqrt{1 + \sec t}\,dt$

$= -\int_{\pi}^{x} \sqrt{1+\sec t}\,dt$

$$\boxed{F'(x) = -\sqrt{1+\sec x}}$$

14) $h(x) = \int_0^{x^2} \sqrt{1+r^3}\,dr$

let $u = x^2$

$h(u) = \int_0^{u} \sqrt{1+r^3}\,dr$

$\frac{dh}{dx} = \frac{dh}{du} \cdot \frac{du}{dx} = \sqrt{1+u^3} \cdot \frac{d(x^2)}{dx}$

$= \sqrt{1+(x^2)^3} \cdot 2x$

$$\boxed{h'(x) = 2x\sqrt{1+x^6}}$$

19) $\int_{-1}^{2} (x^3 - 2x)\, dx = \frac{x^4}{4} - x^2 \Big|_{-1}^{2}$

$= \left(\frac{2^4}{4} - 2^2\right) - \left(\frac{(-1)^4}{4} - (-1)^2\right)$

$= (4-4) - \left(\frac{1}{4} - 1\right)$

$\boxed{= \frac{3}{4}}$

24) $\int_{1}^{8} \sqrt[3]{x} = \frac{3}{4} x^{4/3} \Big|_{1}^{8}$

$= \frac{3}{4}\left[(8)^{4/3} - 1^{4/3}\right]$

$= \frac{3}{4}(16 - 1)$

$\boxed{= \frac{45}{4}}$

3-0235 — 50 SHEETS — 5 SQUARES
3-0236 — 100 SHEETS — 5 SQUARES
3-0237 — 200 SHEETS — 5 SQUARES
3-0137 — 200 SHEETS — FILLER
COMET

3-0235 — 50 SHEETS — 5 SQUARES
3-0236 — 100 SHEETS — 5 SQUARES
3-0237 — 200 SHEETS — 5 SQUARES
3-0137 — 200 SHEETS — FILLER
COMET

26) $\int_{\pi}^{2\pi} \cos\theta \, d\theta = \sin\theta \Big|_{\pi}^{2\pi}$

$= (\sin 2\pi - \sin \pi)$

$= 0 - 0$

$\boxed{= 0}$

29) $\int_1^9 \frac{x-1}{\sqrt{x}} \, dx = \int_1^9 (x-1)\, x^{-1/2} \, dx$

$= \int_1^9 x^{1/2} - x^{-1/2} \, dx$

$= \frac{2}{3} x^{3/2} - 2x^{1/2} \Big|_1^9$

$= \left(\frac{2}{3} 9^{3/2} - 2 \cdot 9^{1/2}\right) - \left(\frac{2}{3} \cdot 1^{3/2} - 2 \cdot 1^{1/2}\right)$ 4.9.9

$= \left(\frac{2}{3} \cdot 27 - 2 \cdot 3\right) - \left(\frac{2}{3} - 2\right)$

$= 12 - (-4/3)$

$\boxed{= \frac{40}{3}}$

31) $\int_0^{\pi/4} \sec^2 t \, dt = \tan t \Big|_0^{\pi/4}$

$= \tan\left(\frac{\pi}{4}\right) - \tan 0$

$= 1 - 0$

$\boxed{= 1}$

32) $\int_0^{\pi/4} \sec\theta \tan\theta \, d\theta = \sec\theta \Big|_0^{\pi/4}$

$= \sec\frac{\pi}{4} - \sec 0$

$= \frac{2}{\sqrt{2}} - 1$

$\boxed{= \sqrt{2} - 1}$

3-0235 — 50 SHEETS — 5 SQUARES
3-0236 — 100 SHEETS — 5 SQUARES
3-0237 — 200 SHEETS — 5 SQUARES
3-0137 — 200 SHEETS — FILLER
COMET

38) $\int_0^1 \frac{4}{t^2+1}\,dt = 4\int_0^1 \frac{1}{t^2+1}\,dt = 4\cdot \tan^{-1} t \Big|_0^1$

$= 4\left(\tan^{-1}1 - \tan^{-1}0\right)$

$= 4\left(\frac{\pi}{4} - 0\right)$

$\boxed{= \pi}$

41) $\int_0^{\pi} f(x)\,dx \qquad f(x) = \begin{cases} \sin x & 0 \le x < \pi/2 \\ \cos x & \pi/2 \le x \le \pi \end{cases}$

$= \int_0^{\pi/2} \sin x\,dx + \int_{\pi/2}^{\pi} \cos x\,dx$

$= -\cos x \Big|_0^{\pi/2} + \sin x \Big|_{\pi/2}^{\pi}$

$= -\cos \pi/2 + \cos 0 + \sin \pi - \sin \pi/2$

$= 0 + 1 + 0 - 1$

$\boxed{= 0}$

44) $\frac{4}{x^3}$ is not continuous on $[-1, 2]$ so the Fundamental Theorem of Calculus can not be applied.
In fact, $\frac{4}{x^3}$ has infinite discontinuity at $x=0$ so $\int_{-1}^{2} \frac{4}{x^3}$ does not exist.