(1) $\int_4^8 2x^2 + x^3 \, dx$

$\frac{2x^3}{3} + \frac{x^4}{4} \Big|_4^8$

@ 8 − @ 4

$\left(\frac{2(8)^3}{3} + \frac{8^4}{4}\right) - \left(\frac{2(4)^3}{3} + \frac{4^4}{4}\right)$

$\left(\frac{1024}{3} + 1024\right) - \left(\frac{128}{3} + 64\right)$

$\left(\frac{1024}{3} + \frac{3072}{3}\right) - \left(\frac{128}{3} + \frac{192}{3}\right)$

$\frac{4096}{3} - \frac{320}{3} = \boxed{\frac{3776}{3}}$

(2) $\int_8^{27} \sqrt[3]{x} \, dx$

↓ Rewrite

$\int_8^{27} x^{1/3} \, dx$

$\frac{x^{4/3}}{4/3} = \frac{3}{4} x^{4/3} \Big|_8^{27}$

@ 27 − @ 8

$\frac{3}{4}(27)^{4/3} - \frac{3}{4}(8)^{4/3}$

$\frac{243}{4} - \frac{48}{4} = \boxed{\frac{195}{4}}$

(3) $\int_4^9 \sqrt[2]{x} \, dx$

Rewrite

$\int_4^9 x^{1/2} \, dx$

$\frac{x^{3/2}}{\frac{3}{2}} = \frac{2 \cdot x^{3/2}}{3} \Big|_4^9$

@ 9 − @ 4

$\frac{2(9)^{3/2}}{3} - \frac{2(4)^{3/2}}{3}$

$\frac{54}{3} - \frac{16}{3} = \boxed{\frac{38}{3}}$

(4) $\int_0^{\pi/2} \sin x \, dx$

$-\cos x \Big|_0^{\pi/2}$

@ $\frac{\pi}{2}$ − @ 0

$(-\cos 90) - (-\cos 0)$

$(0) - (-1)$

$\boxed{1}$

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

$\sin x \Big|_0^{\frac{\pi}{2}}$

@ $\frac{\pi}{2}$ − @ 0

$(\sin \frac{\pi}{2}) - (\sin 0)$

$(\sin 90) - (\sin 0)$

$1 - 0 = (1)$

(6) $\int_0^{\pi} \sec^2 x \, dx$

$\tan x \Big|_0^{\pi}$

@ π − @ 0

$(\tan \pi) - (\tan 0)$

$(\tan 180) - (\tan 0)$

$0 - 0 = (0)$

(7) Accidentally the same problem as #4 !

(8) $\int_{\pi/2}^{\pi/4} \cos x + x \, dx$

$\sin x + \frac{x^2}{2} \Big|_{\pi/2}^{\pi/4}$

@ $\pi/4$ − @ $\pi/2$

$\left(\sin \frac{\pi}{4} + \frac{\left(\frac{\pi}{4}\right)^2}{2}\right) - \left(\sin \frac{\pi}{2} + \frac{\left(\frac{\pi}{2}\right)^2}{2}\right)$

$\left(\sin 45 + \frac{\pi^2}{32}\right) - \left(\sin 90 + \frac{\pi^2}{8}\right)$

$\left(\frac{1}{\sqrt{2}} + \frac{\pi^2}{32}\right) - \left(1 + \frac{\pi^2}{8}\right)$

$\left(\frac{\sqrt{2}}{2} + \frac{\pi^2}{32}\right) - 1 - \frac{\pi^2}{8}$

$\left(\frac{16\sqrt{2}}{32} + \frac{\pi^2}{32} - \frac{32}{32} - \frac{4\pi^2}{32}\right)$

$\frac{16\sqrt{2} - 32 - 3\pi^2}{32}$

(9) $\int_{\pi/2}^{\pi} \sec^2 x + x^2 \, dx$

$$\tan x + \frac{x^3}{3} \Big|_{\pi/2}^{\pi}$$

@ π $-$ @ $\pi/2$

$$\left(\tan \pi + \frac{\pi^3}{3}\right) - \left(\tan \frac{\pi}{2} + \frac{\left(\frac{\pi}{3}\right)^3}{3}\right)$$

$$\left(\tan 180 + \frac{\pi^3}{3}\right) - \left(\tan 90 + \frac{\pi^3}{81}\right)$$

$$\left(0 + \frac{\pi^3}{3}\right) - \left(\text{undefined} + \frac{\pi^3}{81}\right)$$

↑ can't finish question