Homework Quiz I : July 3rd 2007

§5.5#40

$$\int_0^7 \sqrt{4+3x}\,dx = \int_4^{25} \sqrt{u}\,\frac{du}{3}$$

$u = 4+3x$
$du = 3dx$
$dx = du/3$
$u(0) = 4$
$u(7) = 25$

$$= \frac{2}{9} u^{3/2}\Big|_4^{25}$$

$$= \frac{2}{9}\left((25)^{3/2} - (4)^{3/2}\right)$$

$$= \frac{2}{9}(125 - 8) = \frac{234}{9} = \boxed{26}$$

§5.7#1

$$\int \sin^3\theta\cos^2\theta\,d\theta = \int (1-\cos^2\theta)\cos^2\theta\sin\theta\,d\theta$$

$u = \cos\theta$
$du = -\sin\theta\,d\theta$

$$= \int (1-u^2)u^2(-du)$$

$$= \int (u^4 - u^2)\,du$$

$$= \frac{u^5}{5} - \frac{u^3}{3} + C$$

$$= \boxed{\frac{\cos^5\theta}{5} - \frac{\cos^3\theta}{3} + C}$$