Exam 3 — Session 67

1) $\int_{-3}^{3^1} (y^2 - 4y - 2y + y^2)\,dy = \int_{-3}^{3^1} (2y^2 - 6y)\,dy$

$= \frac{2}{3}y^3 - 3y^2 \Big|_{-3}^{3^1} = \cdots = -\frac{7}{3} - (-45) = 45 - \frac{7}{3}$ ✗

2) $\int_{0}^{\ln 2} \pi(2^2 - e^{2x})\,dx$ ✗

3a) $x \sin \pi x = \int_0^{x^2} f(t)\,dt = g(x^2) \Rightarrow 2g'(x^2) = x \cdot \pi \cdot \cos \pi x +$ $\sin \pi x$

$\Rightarrow 2g'(x^2) = f(t) = \frac{\pi}{2}\cos \pi x + \frac{\sin \pi x}{2x} \Rightarrow f(4) = \frac{\pi}{2}$ ✓

3a) $\int_0^3 (1+x)^2\,dx = \frac{x^3}{3} + x^2 + x \Big|_0^3 = 21$ ✓

r h

4a) $(\frac{r}{3}, \frac{h}{3})$ ✓

4b) $a \Rightarrow (\frac{r}{3})^2 \cdot \pi \cdot \frac{rh}{2}$ ✗

5) $\frac{1}{3}\left(\frac{y_0 + y_2}{2}\right)\Delta x + \frac{2}{3}y_1 \Delta x = \frac{1}{6}(y_0 + 4y_1 + y_2)\Delta x$ ✓

a)

6a) $dy = \frac{1}{10}y\,dt \Rightarrow y(t) = 10\,dy$ b) $\Rightarrow y = (\frac{9}{10})^t b$ ✗

$\Rightarrow 6(b) (\frac{9}{10})^t = \frac{1}{2} \Rightarrow t =$