

B4.

MATH 1700: Test #4 (Fall 2008)
Solutions

[7] **1.** Evaluate the integral $\int_0^{\frac{\pi}{2}} \frac{2}{1+(2x)^2} dx$. Completely simplify your final answer.

$$Solution. \int_0^{\frac{\pi}{2}} \frac{2}{1+(2x)^2} dx = \tan^{-1}(2x) \Big|_0^{\frac{\pi}{2}} = \tan^{-1}(1) - \tan^{-1}(0) = \frac{\pi}{4}.$$

[9] **2.** Evaluate $\int \ln(2x) dx$.

Solution. Use integration by parts with $u = \ln(2x)$, $dv = dx$. Compute: $du = \frac{2}{2x} dx = \frac{1}{x} dx$, and $v = x$.

$$So, \int \ln(2x) dx = x \ln(2x) - \int x \frac{1}{x} dx = x \ln(2x) - x + c.$$

[8] **3.** Evaluate $\int \cos^{2008} x \sin x dx$.

Solution. Use $u = \cos x$, so that $du = -\sin x dx$. Get

$$\int \cos^{2008} x \sin x dx = \int u^{2008} (-du) = -\frac{u^{2009}}{2009} + c = -\frac{\sin^{2009} x}{2009} + c.$$