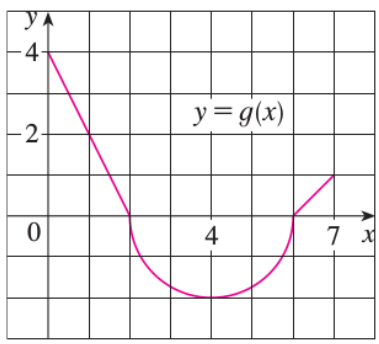
Midterm 1

Name _____

No calculators, notes, or cheating. Each problem is worth 5 points.

1. §5.2 #32: The graph of g consists of two straight lines and a semicircle. Use it to evaluate each integral.



(a) $\displaystyle\int_0^2 g(x)\,dx$

(b) $\displaystyle\int_2^6 g(x)\,dx$

(c) $\displaystyle\int_0^7 g(x)\,dx$

2. §5.3 #7: Evaluate

$$\int_{-1}^{0} (2x - e^x)\, dx.$$

3. §5.5 #44: Evaluate

$$\int_0^{\sqrt{\pi}} x\cos(x^2)\,dx.$$

4. §5.5 #55: Evaluate

$$\int_e^{e^4} \frac{dx}{x\sqrt{\ln x}}.$$

Hint: Substitute $u = \ln x$.

5. §5.6 #18: Evaluate

$$\int_4^9 \frac{\ln y}{\sqrt{y}}\, dy.$$

Hint: Integrate by parts, letting $u = \ln y$ and $dv = y^{-1/2}\, dy$.

6. §5.7 #3: Evaluate

$$\int_{\pi/2}^{3\pi/4} \sin^5 x \cos^3 x \, dx.$$

Hint: Use the identity $\cos^2 x = 1 - \sin^2 x$ and substitute $u = \sin x$. Alternatively you could use $\sin^2 x = 1 - \cos^2 x$ and substitute $u = \cos x$, but it will be messier.

Don't spend too much time simplifying your answer, but maybe notice that $(\sqrt{2})^6 = 2^3 = 8$ and $(\sqrt{2})^8 = 2^4 = 16$.

7. §5.7 #21: Use partial fractions to evaluate

$$\int \frac{5x+1}{(2x+1)(x-1)}\,dx.$$

8. §5.8 #9: Evaluate

$$\int_4^\infty e^{-y/2}\,dy.$$