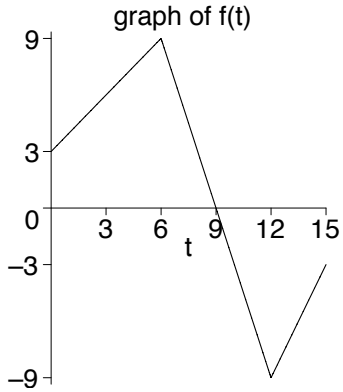
MAC 2311 Calculus 1 **Test 4** 11 Apr 2007 Name: _____

Show **ALL** work for credit; Give **EXACT** answers when possible; **Simplify** answers;

1. Find and simplify $\int_1^3 x^2 + \frac{1}{x^2}\,dx$

2. Find the indefinite integral $\int e^x + \cos x + \frac{1}{1+x^2}\,dx$

3. Let $G(x) = \int_0^x f(t)\,dt$ for the $f(t)$ graphed below. Complete the table of values for $G(x)$ below.




| $x$ | 0 | 3 | 6 | 9 | 12 | 15 |
|---|---|---|---|---|---|---|
| $G(x)$ | | | | | | |

Hint: The corners are located at $(0, 3)$, $(6, 9)$, $(12, -9)$ and $(15, -3)$

4. Find $\int e^{-2x} + (x+2)^{100}\, dx$

5. The velocity function is given to be $v(t) = 4t \sin t^2$, find the accceleration $a(t)$ and the net distance traveled between $t = 0$ and $t = \pi$.

6. Find and simplify $\displaystyle\int_0^1 \frac{y^2}{1+y}\, dy$

7. $F(x) = \int_0^x \frac{t}{1+t^2}\,dt$, find and simpify $F''(x)$. [Hint Fundamental Theorem of Calculus]

8. Find and simplify $\int_{e^{16}}^{e^{64}} \frac{dt}{t\sqrt{\ln t}}$

9. Set up, but do **NOT** evaluate, an integral for the volume of the solid obtained by rotating the triangular region between the curves $y = x - 1$, $y = 0$, and $x = 2$, about the $y$-axis. State the name (slab, disk, washer, shell) of the method you used and sketch the triangular region.

10. Sketch the region enclosed by the curves $y = 3\sqrt{x}$ and $y = x + 2$, and find the area of the region.