College of the Holy Cross, Fall Semester, 2004
Math 132, Midterm 1 (All Sections)
Wednesday, February 23, 6 PM

Name: _____

Instructions Please write your answers in the spaces provided, and show work on the test itself. Use the back of the preceding page if you need more space for scratch work.

Please do not write in the space below

Problem	Points/Poss
1	/ 20
2	/ 10
3	/ 10
4	/ 20
5	/ 20
6	/ 10
7	/ 10
Total	/100

1. [5 points each] Compute the following:

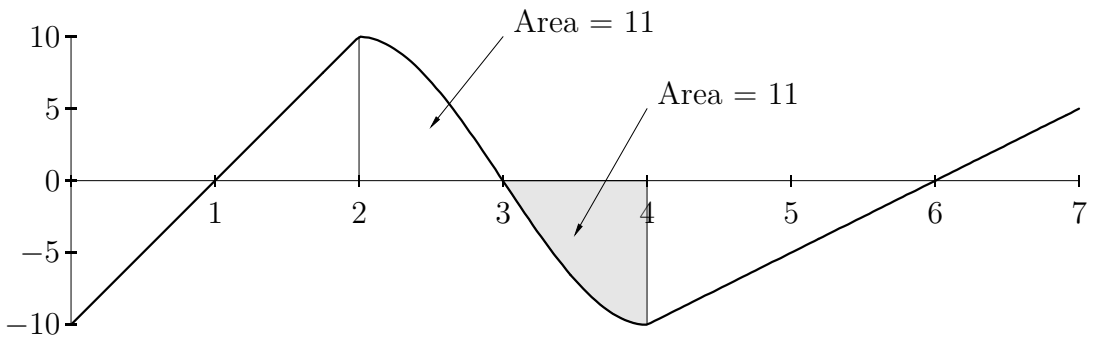
   (a) $\displaystyle\int 2x(x^2+5)^3\,dx$

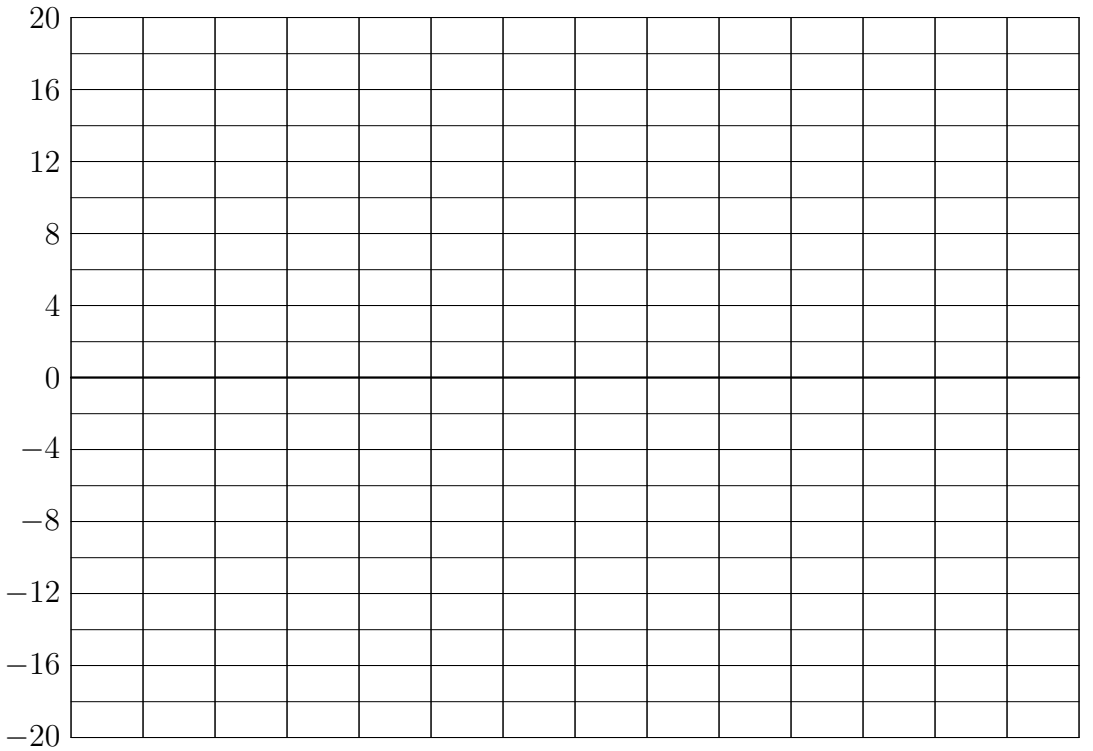
   (b) $\displaystyle\int \sin(3\theta)\,d\theta$

   (c) $\displaystyle\int \frac{dx}{2x+1}$

   (d) $F'(x)$, where $F(x) = \displaystyle\int_\pi^x \frac{t}{1+\sin^2 t}\,dt$

2. [10 points] The graph $y = f(t)$ is shown. In the grid provided, carefully sketch the graph of the function $F(x) = \int_2^x f(t)\,dt$. Clearly mark the coordinates of the critical point(s). (Note the vertical scale, and the lower limit of integration.)





3. [5 points each] A drag racer accelerates at $a(t) = (20 + t)$ ft/sec^2.

   (a) How fast is the car traveling after 6 seconds? Express your answer in *miles per hour*. (15 mph=22 ft/sec)

Speed (in mph): $\boxed{}$

   (b) How far has the car traveled after 6 seconds?

Distance traveled: $\boxed{}$

4. [10 points each] Use the indicated method to find the integrals.

   (a) $\displaystyle\int_1^4 \frac{\sqrt{1+\sqrt{x}}}{\sqrt{x}}\,dx$ (Substitution)

   (b) $\displaystyle\int t\sec^2 t\,dt$ (Integrate by parts)

5. [10 points each] Compute the integrals

(a) $\displaystyle\int \frac{dx}{(4-x^2)^{3/2}}$

(b) $\displaystyle\int \frac{dx}{x^2+4x+8}$

6. [10 points] Evaluate $\displaystyle\int \frac{x^2+1}{x(x+2)(x-1)}\,dx$

7. [10 points] Evaluate any **two** of the following; clearly mark your choices and indicate the method of integration.

   (i) $\displaystyle\int \frac{1}{\sqrt{1-x^4}}\,dx$ (ii) $\displaystyle\int \frac{x}{\sqrt{1-x^4}}\,dx$ (iii) $\displaystyle\int \frac{x^2}{\sqrt{1-x^4}}\,dx$ (iv) $\displaystyle\int \frac{x^3}{\sqrt{1-x^4}}\,dx$