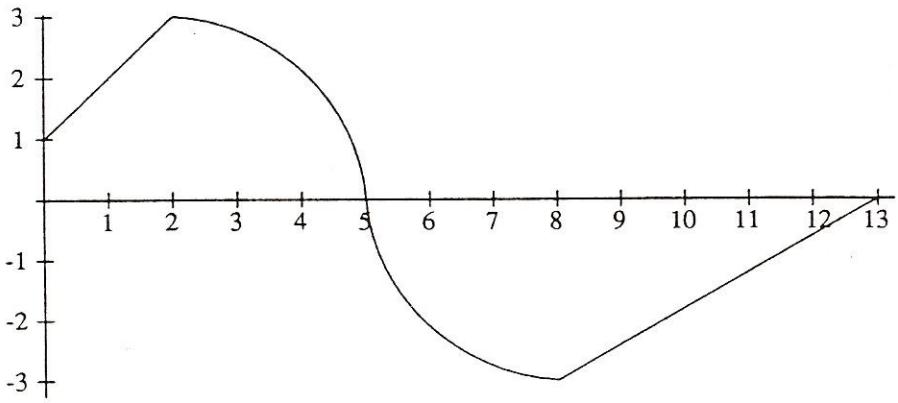
WORKSHEET 13 MATH 1300 April 17, 2008

Goal: To examine properties of the definite integral.

1. Let f be the function graphed below. Note: The graph of f consists of two straight line segments and two quarter-circles.



(a) Evaluate $\int_0^{13} f(x)dx$.

(b) Evaluate $\int_9^{12} f(x)dx$.

(c) Evaluate $\int_0^{13} |f(x)|dx$.

2. Which of the following definite integrals is *not* zero, and why.

(a) $\int_{-\pi}^{\pi} \sin^3(x)dx$.

(b) $\int_{-\pi}^{\pi} x^2 \sin(x)dx$.

(c) $\int_{-\pi}^{\pi} \cos^2(x)dx$.

(d) $\int_{0}^{\pi} \cos(x)dx$.

(e) $\int_{\pi}^{\pi} \cos(x)dx$.

3. Calculate

$$\int_{-3}^{3} (x+5)\sqrt{9-x^2}\,dx.$$

Hint: Use $(x+5)\sqrt{9-x^2} = x\sqrt{9-x^2} + 5\sqrt{9-x^2}$ and THINK GEOMETRICALLY about the graphs of $y = x\sqrt{9-x^2}$ and $y = 5\sqrt{9-x^2}$