AP Calculus
Worksheet: Definite and Indefinite Integrals Review

1. Suppose that f and g are continuous functions and that

   $\int_1^2 f(x)dx = -4$ $\quad\quad$ $\int_1^5 f(x)dx = 6$ $\quad\quad$ $\int_1^5 g(x)dx = 8$

   Use the properties of definite integrals to find each integral.

   (a) $\int_2^2 g(x)dx$ $\quad\quad$ (b) $\int_5^1 g(x)dx$ $\quad\quad$ (c) $\int_1^2 3f(x)dx$

   (d) $\int_2^5 f(x)dx$ $\quad\quad$ (e) $\int_1^5 [f(x) + g(x)]dx$ $\quad\quad$ (f) $\int_1^5 [4\,f(x) - g(x)]dx$

2. Suppose that f and h are continuous functions such that

$\int_1^9 f(x)dx = -1$ $\quad\quad$ $\int_7^9 f(x)dx = 5$ $\quad\quad$ $\int_7^9 h(x)dx = 4$

Use the properties of definite integrals to find each integral.

(a) $\int_1^9 -2f(x)dx$ $\quad\quad$ (b) $\int_7^9 [f(x) + h(x)]dx$ $\quad\quad$ (c) $\int_7^9 [2f(x) - 3h(x)]dx$

(d) $\int_9^1 f(x)dx$ $\quad\quad$ (e) $\int_1^7 f(x)dx$ $\quad\quad$ (f) $\int_9^7 [h(x) - f(x)]dx$

3. Evaluate each integral below.

(a) $\int_3^1 7dx$ (b) $\int_0^2 5xdx$ (c) $\int_3^5 \frac{x}{8}dx$

(d) $\int_0^2 (2t-3)dt$ (e) $\int_0^{\sqrt{2}} (t-\sqrt{2})dt$ (f) $\int_2^1 \left(1+\frac{z}{2}\right)dz$

(g) $\int_{-1}^1 (x^3-x)dx$ (h) $\int_{-1/2}^{1/2} (x^2)dx$ (i) $\int_1^3 \frac{1}{x}\,dx$

(j) $\int_2^{-1} (3x+1)dx$ (k) $\int_0^{\pi} (\cos x)dx$ (l) $\int_0^{2\pi} (\sin x)\,dx$

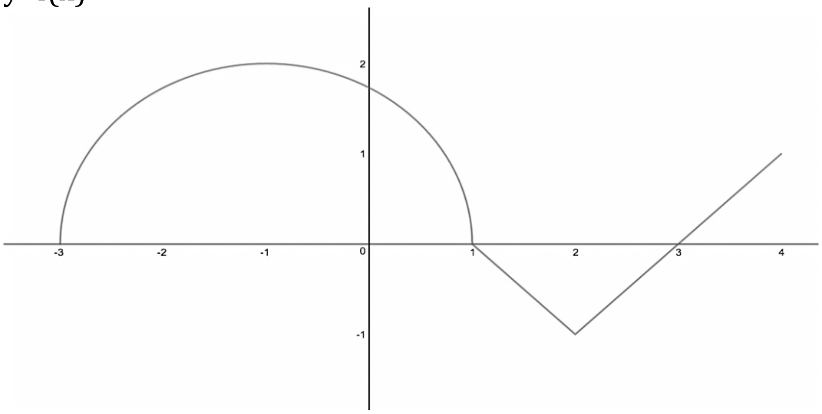
4. Find dy/dx.

(a) y=$\int_0^x \sqrt{1+t^2}\,dt$ (b) $y=\int_x^1 \frac{1}{t}\,dt$ (c) $y=\int_0^{\sqrt{x}} \sin(t^2)\,dt$

(d) $\int_0^{2x} \cos t\,dt$ (e) $y=\int_{x^2}^1 (t^2-1)^2 dt$ (f) $\int_x^3 \frac{1}{2+e}dt$

5. The graph of a function f consists of a semicircle and two line segments as shown below.

y=f(x)



Let $g(x) = \int_1^x f(t)dt$

(a) Find g(1)

(b) Find g(3)

(c) Find g(-1)

(d) Find all values of x on the open interval (-3,4) at which g has a local minimum.

(e) Write an equation for the line tangent to the graph of g at x=-1.

(f) Find the x-coordinate of each point of inflection of the graph of g on the open interval (-3,4).

(g) Find the range of g.