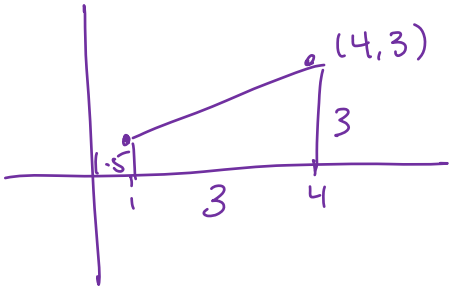
AP Calculus AB **Name** Key
Practice 6.1-6.3 **NO CALCULATOR!!**

1. Rewrite as an integral: $\lim_{n\to\infty}\sum_{k=1}^{n}(\sin^2(c_k)\bullet\cos(c_k))\Delta x$ on [-6,8].

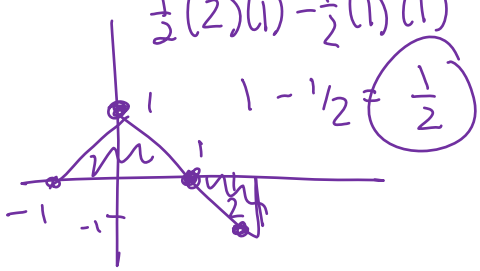
$$\int_{-6}^{8} \sin^2 x \cos x \, dx$$

2. Use geometry to evaluate each integral.

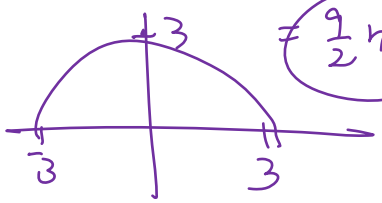
a) $\int_1^4\left(\frac{1}{2}t+1\right)dt = \frac{1}{2}(3)(3+1.5) = 6.75$



b) $\int_{-1}^{2}(1-|x|)\,dx$ $\frac{1}{2}(2)(1)-\frac{1}{2}(1)(1)$ $1-\frac{1}{2}=\frac{1}{2}$



c) $\int_{-3}^{3}\sqrt{9-x^2}\,dx = \frac{1}{2}\pi 3^2 = \frac{9}{2}\pi$



3. Given that $\int_{-1}^{1} f(x)dx = 0$ and $\int_{0}^{1} f(x)dx = 5$, find

a) $\int_{-1}^{0} f(x)dx$

$\int_{-1}^{1} f(x)\,dx - \int_{1}^{0} f(x)\,dx$ $0-5$ $= \boxed{-5}$

b) $\int_{0}^{1} f(x)dx - \int_{-1}^{0} f(x)dx$

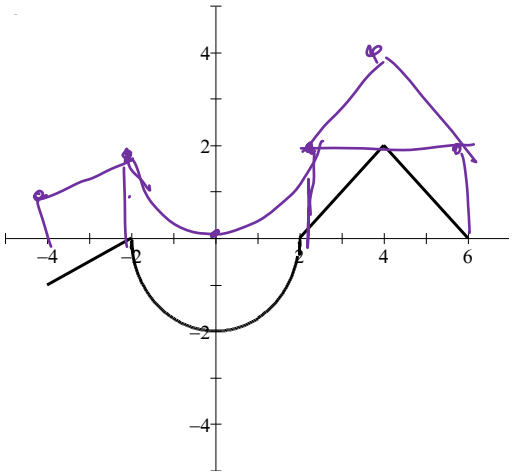
$5-(-5) = \boxed{10}$

c) $\int_{1}^{0} 2f(x)dx$

$2\int_{1}^{0} f(x)\,dx$ $2(-5) = \boxed{-10}$

Calculator OK

4. The graph of f(x) below consists of line segments and a semi-circle. Use geometry to evaluate each definite integral. **(2 points each)**



a) $\int_0^2 f(x)dx = \frac{1}{4}\pi(2)^2 = \boxed{\pi}$

b) $\int_2^6 f(x)dx = \frac{1}{2}(4)(2) = \boxed{4}$

c) $\int_{-4}^6 |f(x)|dx = \frac{1}{2}(2)(1) + \frac{1}{2}\pi(2)^2 + \frac{1}{2}(4)(2)$

$= 1 + 2\pi + 4$

$= \boxed{5 + 2\pi}$

d) $\int_{-4}^6 f(x)dx$

$-1 - 2\pi + 4$ $\boxed{3 - 2\pi}$

e) $\int_4^2 f(x)dx$

$= -\int_2^4 f(x)\,dx = -\frac{1}{2}(2)(2) = \boxed{-2}$

f) $\int_{-4}^6 (f(x)+2)dx$

$\frac{1}{2}(2)(1+2) + \left(4(2) - \frac{1}{2}\pi(2)^2\right) + \frac{1}{2}(4)(2) + 4(2)$

$3 + 8 - 2\pi + 4 + 8$

$\boxed{23 - 2\pi}$