**AP Calculus BC**
**Section 5.4 – Fundamental Theorem of Calculus**

**Find $G'(x)$ if**

1. $G(x) = \int_1^x 2t\,dt$

2. $G(x) = \int_x^1 3t^2\,dt$

3. $G(x) = \int_0^x \left(2t^2 + \sqrt{t}\right) dt$

4. $G(x) = \int_0^{x^3} \cos(2t)\ dt$

5. $G(x) = \int_3^{x^2+x} \sqrt{2t + \sin t}\ dt$

6. $G(x) = \int_{-x}^{x^2} \left(t^3 - 5\right) dt$

7. $G(x) = \int_{x^3}^5 \left(3t^2 - 7t + 2\right) dt$

8. $G(x) = \int_1^{\sin x} 3t\,dt$

9. $G(x) = \int_0^x \dfrac{t}{\cos t}\,dt$

10. $G(x) = \int_0^{x^3+7x} 7\sin t\cos t\ dt$

**AP Calculus BC**
**Section 5.4 – Fundamental Theorem of Calculus**

**Find $G'(x)$ if**

1. $G(x) = \int_1^x 2t\,dt$

$G'(x) = 2x$

2. $G(x) = \int_x^1 3t^2\,dt$

$G'(x) = -3x^2$

3. $G(x) = \int_0^x \left(2t^2 + \sqrt{t}\right) dt$

$G'(x) = 2x^2 + \sqrt{x}$

4. $G(x) = \int_0^{x^3} \cos(2t)\,dt$

$G'(x) = 3x^2 \cos 2x^3$

5. $G(x) = \int_3^{x^2+x} \sqrt{2t + \sin t}\,dt$

$G'(x) = \sqrt{2(x^2+x) + \sin(x^2+x)}\,(2x+1)$

6. $G(x) = \int_{-x}^{x^2} \left(t^3 - 5\right) dt$

$G'(x) = (x^6-5)(2x) + (-x^3-5)(1)$
$= 2x(x^6-5) - x^3 - 5$

7. $G(x) = \int_{x^3}^{5} \left(3t^2 - 7t + 2\right) dt$

$G'(x) = -(3x^6 - 7x^3 + 2)(3x^2)$

8. $G(x) = \int_1^{\sin x} 3t\,dt$

$G'(x) = 3\sin x \cos x$

9. $G(x) = \int_0^x \frac{t}{\cos t}\,dt$

$G'(x) = \frac{x}{\cos x}$

10. $G(x) = \int_0^{x^3+7x} 7\sin t \cos t\,dt$

$G'(x) = 7(3x^2+7)\sin(x^3+7x)\cos(x^3+7x)$