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1.

$$\frac{n(n+1)}{2}$$

2.

$$\frac{d}{dx} [f(g(x))] = f'(g(x)) g'(x)$$

3.

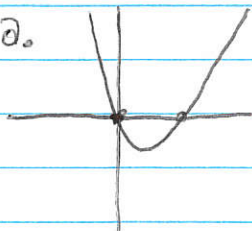
a.  $\frac{d}{dx} \arctan(x^3 - 3x^2 + 5x - 1)$

$$= \frac{1}{(x^3 - 3x^2 + 5x - 1)^2 + 1} \cdot (3x^2 - 6x + 5)$$

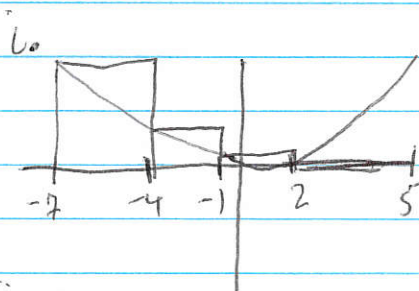
b.  $\frac{d}{dx} \sqrt{1 - \sin(x)} = \frac{1}{2} (1 - \sin(x))^{-1/2} (-\cos(x))$

$$= \frac{-\cos(x)}{2\sqrt{1 - \sin(x)}}$$

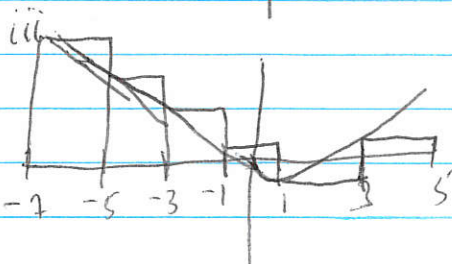
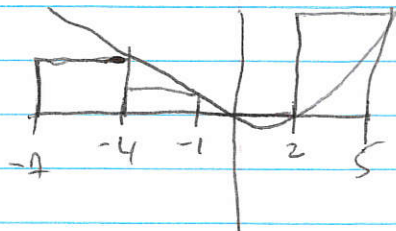
4. a.



b.



ii.



etc.

c. i. 270

ii. 126

iii. 236

iv. 140

5. (a)  $\sin(x)^5 + C$

(b)  $\ln(3 \sin(x) - 2)$  ~~.....~~

In each case, just notice that it looks as though someone has used the chain rule to take a derivative.

Once you learn about u-substitutions you can make this a bit more systematic.