1. Find the general anti-derivative $F(x)$ to the following functions

(a) $f(x) = -8 + \sqrt{x} - \dfrac{7}{x^5}$

$\uparrow$ $\uparrow$ REWRITE AS

$x^{1/2}$ $-7x^{-5}$

$F(x) = \underline{-8x + \dfrac{2}{3}x^{3/2} + \dfrac{7}{4}x^{-4} + C}$

$F(x) = -8x + \dfrac{2}{3}x^{3/2} + \dfrac{7x^{-4}}{-4} + C$

(b) $f(\theta) = 3\csc^2(\theta) - 4\sec(\theta)\tan(\theta)$

$F(\theta) = \underline{-3\cot(\theta) - 4\sec(\theta) + C}$

2. Evaluate the definite integral.

(a) $\displaystyle\int_{-2}^{3} x^3 - 3x + 7 \, dx$ $= \underline{174/4}$

$= \dfrac{1}{4}x^4 - \dfrac{3}{2}x^2 + 7x \Big|_{-2}^{3}$

$= \left[\dfrac{1}{4}(3)^4 - \dfrac{3}{2}(3)^2 + 7(3) \right] - \left[\dfrac{1}{4}(-2)^4 - \dfrac{3}{2}(-2)^2 + 7(-2) \right]$

$= \left[27.75 \right] - \left[-16 \right]$

$= 43.75 \quad \text{or} \quad 174/4$

3. Evaluate the following integrals using u-substitution.

(a) $\int \cos(x) \sec^2(\sin x)dx$ $\qquad = \underline{\tan\left(\sin x\right) + C}$

(1) LET $u = \sin x$

(2) $du = \cos(x)dx$

(3) SUBSTITUTE

$$\int \sec^2(u)du$$

$$= \tan(u) + C$$

$$= \underline{\tan\left(\sin x\right) + C}$$

4. Evaluate the following integrals.

(a) $\int_2^3 3x\sqrt{x^2 - 4}\, d\theta$ $\qquad = \underline{5^{3/2} \approx 11.18}$

(1) LET $u = x^2 - 4$

(2) $du = 2x\, dx$

$\Rightarrow \frac{1}{2}du = x\, dx$

(3) IF $x = 3$, $u = 3^2 - 4 = 5$

IF $x = 2$, $u = 2^2 - 4 = 0$

(4) $\int_0^5 \frac{3}{2}\sqrt{u}\, du = \int_0^5 \frac{3}{2}u^{1/2}du = u^{3/2}\Big|_0^5$

$$= 5^{3/2} - 0^{3/2}$$

$$= 5^{3/2}$$