Student: Cole Lamers **Date:** 10/05/19	**Instructor:** Viktoriya Shcherban **Course:** Calc 1 11:30 AM / Internet (81749&81750) Shcherban	**Assignment:** 5.6 Definite Integral Substitutions and the Area B

1. Use the Substitution Formula to evaluate the integrals $\int_0^8 \sqrt{y+1}\,dy$ and $\int_{-1}^0 \sqrt{y+1}\,dy$.

$\int_0^8 \sqrt{y+1}\,dy =$ $\frac{52}{3}$

(Simplify your answer.)

$\int_{-1}^0 \sqrt{y+1}\,dy =$ $\frac{2}{3}$

(Simplify your answer.)

2. Use the substitution formula $\int_a^b f(g(x))g'(x)dx = \int_{g(a)}^{g(b)} f(u)du$, where $g(x) = u$, to evaluate the following integrals.

(a) $\int_0^1 t\sqrt{1-t^2}\,dt$ **(b)** $\int_{-2}^2 t\sqrt{1-t^2}\,dt$

(a) $\int_0^1 t\sqrt{1-t^2}\,dt =$ $\frac{1}{3}$ (Simplify your answer. Type an integer or a simplified fraction.)

(b) $\int_{-2}^2 t\sqrt{1-t^2}\,dt =$ 0 (Simplify your answer. Type an integer or a simplified fraction.)

3. Use the substitution formula to evaluate the integral.

$$\int_{\frac{\pi}{4}}^{\frac{\pi}{2}} -2\cot x \csc^2 x\,dx$$

$$\int_{\frac{\pi}{4}}^{\frac{\pi}{2}} -2\cot x \csc^2 x\,dx = -1$$

4. Use the substitution formula to evaluate the integrals.

a. $\int_{-1}^{1} \frac{8r}{(r^2+5)^2}\,dr$ **b.** $\int_{0}^{1} \frac{8r}{(r^2+5)^2}\,dr$

a. $\int_{-1}^{1} \frac{8r}{(r^2+5)^2}\,dr =$ 0 (Simplify your answer.)

b. $\int_{0}^{1} \frac{8r}{(r^2+5)^2}\,dr =$ $\frac{2}{15}$ (Simplify your answer.)

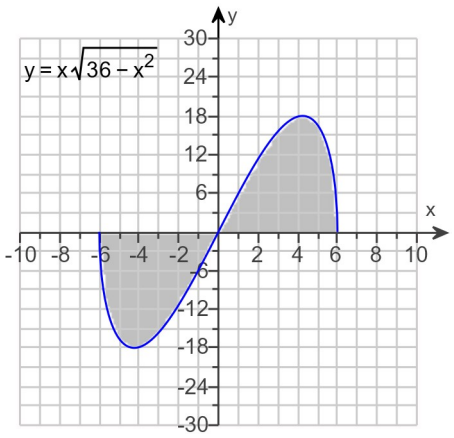
5. Use the substitution formula $\int_{a}^{b} f(g(x))g'(x)dx = \int_{g(a)}^{g(b)} f(u)du$ where $g(x) = u$, to evaluate the following integrals.

(a) $\int_{0}^{4\pi} \frac{\cos z}{\sqrt{4+\sin z}}dz$ **(b)** $\int_{-3\pi}^{3\pi} \frac{\cos z}{\sqrt{4+\sin z}}dz$

(a) $\int_{0}^{4\pi} \frac{\cos z}{\sqrt{4+\sin z}}dz =$ 0 (Simplify your answer. Type an integer or a fraction.)

(b) $\int_{-3\pi}^{3\pi} \frac{\cos z}{\sqrt{4+\sin z}}dz =$ 0 (Simplify your answer. Type an integer or a fraction.)

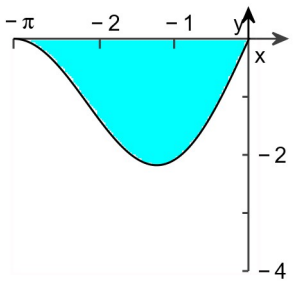
6. Find the total area of the shaded regions.



The total area of the shaded regions is 144. (Simplify your answer.)

7.

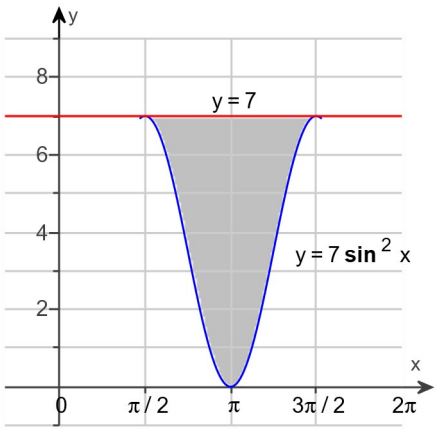
Find the total area of the shaded region shown to the right given by the curve $y = 2(\sin x)\sqrt{1 + \cos x}$.



The total area of the shaded region is $\frac{2^{\frac{7}{2}}}{3}$. (Type an exact answer.)

8.

Find the total area of the shaded region.



The total area of the shaded region is $\frac{7\pi}{2}$.

(Type an exact answer, using π as needed.)