Calculus III Section 14.3 Homework

1) Draw the region R and evaluate the double integral.

a) $\int_0^{\pi} \int_0^{\sin\theta} r\,dr\,d\theta =$ _?_____

b) Draw region R:

2) Draw the region R and evaluate the double integral

a) $\int_0^{\pi} \int_0^{3} 2r^2 \cos\theta\,dr\,d\theta =$ _?_____

b) Draw the region R.

3) Draw the region R and evaluate the double integral.

a) $\int_0^{\pi/2} \int_1^{3} \sqrt{4-r^2}\,dr\,d\theta =$ _?____

b) Draw the region R.

4) Evaluate the iterated integral by converting to polar coordinates.

Region R in rectangular coordinates: $-3 \le x \le 3; \quad 0 \le y \le \sqrt{9 - x^2}$

a) Region R in polar coordinates: $\_?\_ \le \theta \le \_?\_; \quad \_?\_ \le r \le \_?\_$

b) Convert to polar coordinates: $\int_{-3}^{3} \int_{0}^{\sqrt{9-x^2}} \left(x^2 + y^2\right) dydx = \_?\_$

c) Evaluate $\int_{-3}^{3} \int_{0}^{\sqrt{9-x^2}} \left(x^2 + y^2\right) dydx = \_?\_$

5) Evaluate the iterated integral by converting to polar coordinates.

Region R in rectangular coordinates: $0 \le x \le 4; \quad 0 \le y \le \sqrt{16 - x^2}$

a) Region R in polar coordinates: $\_?\_ \le \theta \le \_?\_; \quad \_?\_ \le r \le \_?\_$

b) Convert to polar coordinates: $\int_{0}^{4} \int_{0}^{\sqrt{16-x^2}} \left(x^2 + y^2\right)^2 dydx = \_?\_$

c) Evaluate $\int_{0}^{4} \int_{0}^{\sqrt{16-x^2}} \left(x^2 + y^2\right)^2 dydx = \_?\_$

6) Evaluate the iterated integral by converting to polar coordinates.

Region R in rectangular coordinates : $-3 \le x \le 3; \quad 0 \le y \le \sqrt{9 - x^2}$

Hint: Region R in polar coordinates: $\_?\_ \le \theta \le \_?\_; \quad \_?\_ \le r \le \_?\_$

Convert to polar coordinates : $\int_{-1}^{1} \int_{0}^{\sqrt{9-x^2}} \sin\left(x^2 + y^2\right) dydx = \_?\_$

Evaluate $\int_{-1}^{1} \int_{0}^{\sqrt{9-x^2}} \sin\left(x^2 + y^2\right) dydx = \_?\_$