Math 182 Quiz 3 **21 Feb 2022**

1. Determine which of the following integrals coverges and which diverges. If an integral diverges, explain why. If it converges, explain to which value it converges.

   (a) $\int_{-1}^{5} \frac{1}{(x+1)^4} dx$.

   (b) $\int_{3}^{\infty} \frac{1}{(x-1)^{\frac{1}{4}}} dx$.

2. Let $\mathbf{R}$ be the finite region bounded by the graphs of $y = (x-5)^2 + 4$ and $y = 5x - 21$. Sketch an illustration of $\mathbf{R}$, and then explain how to express the area of $\mathbf{R}$ in the following two ways:

   (a) As a definite integral with respect to x.(Do not evaluate definite integral.)

   (b) As a definite integral with respect to y. (Do not evaluate definite integral.)

Answers

(a)
- $\int_{-1}^{5} \frac{1}{(x+1)^4} dx$ diverges.
- $\int_{5}^{\infty} \frac{1}{(x+1)^4} dx$ converges to $\frac{1}{648}$.

3. Question 2

(a) $\int_{5}^{10} \left(-(x-5)^2 + 5x - 25\right) dx$

(b) $\int_{-1}^{48} \left(\frac{1}{7}y + \sqrt{y+1} + \frac{1}{7}\right) dy$