

**DoNow**

1. What is an *Improper Integral*?
  - (a) What attributes of a given definite integral make it *improper*?
  - (b) What does *converge* mean in the context of an *improper integral*?

**More Questions**

2. Consider  $\int_1^{\infty} \frac{1}{x^p} dx$ .

For what values of  $p$  does this improper integral converge? Explain.

3. Consider  $\int_0^1 \frac{1}{\sqrt{x}} dx$ . Investigate...

4. Compare and contrast  $\int_0^1 \frac{1}{x^p} dx$  and  $\int_1^{\infty} \frac{1}{x^p} dx$  for various values of  $p$ .

5. Consider having a conversation with the inquisitive 8th grader. How would you explain the fact that  $\int_1^{\infty} \frac{1}{x^2} dx$  converges, but  $\int_1^{\infty} \frac{1}{x} dx$  doesn't? Both functions are asymptotic to the  $x$ -axis. What's going on?

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