No calculators today, but drawing pictures can help.

DoNow

1. What is a sequence?

2. 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.

3. 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 asymtopic to the x-axis. What's going on?

Polar Area

4. Graph the constant polar function, $r(\theta) = R$ for $\theta \in [0, 2\pi)$.
   (a) What does a polar area element (dA) look like?
   (b) Use a proportion to write an equation for dA in terms of R and $d\theta$.

5. Consider $r(\theta) = 4\sin\theta$.
   (a) Setup a polar area element, dA.
   (b) Setup an integral and find the area.
   (c) Is your answer correct? (Again, no calculators)

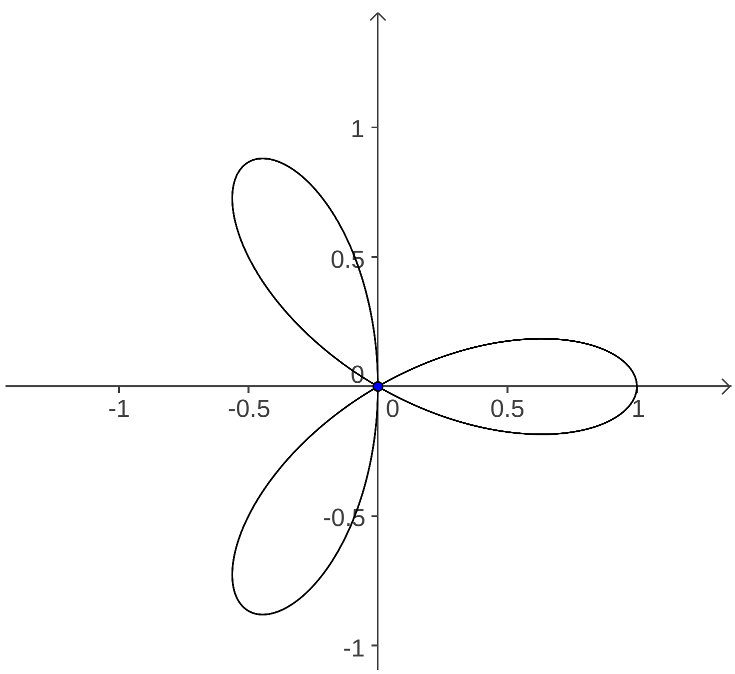
6. The polar graph of $r = \cos(3\theta)$ has three petals. We want to find the area of a single petal.

   (a) Develop an integral to find the area of a petal. Be sure to start with a polar area element, dA.

   (b) The petal is not a circle. Explain why we can use a polar area element to compute the area.

   (c) Setup an integral to get the area of one petal. Explain why the bounds on your integral are correct.

   (d) Evaluate the integral.



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