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$$\sum_{n=1}^{\infty} \ln \left( \frac{n^2}{3n^2 + 2} \right)$$

**Solution:** 1. (Source: 11.2.29) The series $$\sum_{n=1}^{\infty} \ln \left( \frac{n^2}{3n^2 + 2} \right)$$ diverges because the limit of its $n$th term $$\lim_{n \to \infty} \ln \left( \frac{n^2}{3n^2 + 2} \right) = \ln \left( \lim_{n \to \infty} \frac{n^2}{3n^2 + 2} \right) = \ln \left( \frac{1}{3} \right)$$ is not zero.
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