Work on these with your partner(s) at the board

Explain why each integral is improper, determine if the integral converges or diverges, and for those that do converge, find the value of the integral.

1. $\int_1^\infty \frac{1}{x^3}\,dx$

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

3. $\int_1^\infty \frac{1}{\sqrt{x}}\,dx$

4. $\int_1^\infty \frac{1}{x^2+1}\,dx$

5. $\int_0^1 \frac{1}{x^3}\,dx$

6. $\int_0^1 \frac{1}{\sqrt{x}}\,dx$

7. $\int_0^1 \frac{1}{x}\,dx$

8. $\int_0^{\pi/2} \tan(x)\,dx$