Some Improper Integral Questions

Part I: Identify the type of improper integral and evaluate it if it converges.

1. $\int_3^\infty \frac{1}{x(\ln x)^2}\,dx$

2. $\int_{-1}^1 \frac{x^4+1}{x}\,dx$

3. $\int_{-\infty}^1 \frac{1}{x^{2/3}}\,dx$

4. $\int_0^2 \frac{1}{\sqrt{4-x^2}}\,dx$

5. $\int_0^\infty \frac{1}{x^2}\,dx$

6. $\int_0^{\pi/2} \tan x\,dx$

7. $\int_{-\infty}^\infty \frac{1}{x^2+1}\,dx$

8. $\int_{-\infty}^1 xe^{2x}\,dx$

Part II: Identify the type of improper integral and check whether or not it converges.

1. $\int_{43}^\infty \frac{1}{z^3}\,dz$

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

3. $\int_3^\infty \frac{1}{w+w^2}\,dw$

4. $\int_2^\infty \frac{1}{1+e^x}\,dx$

5. $\int_4^\infty \frac{1}{\sqrt{y^2+1}}\,dy$

6. $\int_3^\infty \frac{2x+5}{x^3+x+2}\,dx$