P4 $\displaystyle\int_0^3 \frac{dx}{x^2-6x+5} = \int_0^{1^-} \frac{dx}{(x-1)(x-5)} + \int_{1^+}^{3} \frac{dx}{(x-1)(x-5)}$

$$* \int_0^{1^-} \frac{dx}{(x-1)(x-5)} = \int_0^{1^-} \frac{A}{x-1}\,dx + \int_0^{1^-} \frac{B}{x-5}\,dx$$

$$= \lim_{a\to 1^-} A \ln(|x-1|)\Big|_0^a + B \ln(|x-5|)\Big|_0^a$$

$$= \cancel{A}\, A \lim_{a\to 1^-} \underbrace{\ln(|a-1|)}_{\infty} + B \ln(|a-5|) - B\ln(5$$

Por lo tanto la integral diverge.

$\boxed{15}$

$$\int_0^{\infty} \frac{dx}{\sqrt{x}(1+x)} \ (*) = \int_0^{2} \frac{dx}{\sqrt{x}(1+x)} + \int_2^{\infty} \frac{dx}{\sqrt{x}(1+x)}$$

Comparar con $\frac{1}{x^{3/2}}$

$$\lim_{x \to 0^-} \frac{\frac{1}{\sqrt{x}(1+x)}}{\frac{1}{x^{3/2}}} = \lim_{x \to 0^-} \frac{x^{3/2}}{x^{1/2}+x^{3/2}} \quad \frac{0}{0} \ (L'Hopital)$$

$$= \lim_{x \to 0^-} \frac{\frac{3}{2} x^{1/2}}{\frac{1}{2}\frac{1}{x^{1/2}} + \frac{3}{2} x^{1/2}} = \frac{\frac{3}{2} x}{\frac{1}{2} + \frac{3}{2} x} = \frac{1}{2} \neq 0$$

Por lo Tanto se comportan igual

Y como $\int_0^2 \frac{dx}{x^{3/2}} = \lim_{x \to 0^+} \frac{-2}{x^{1/2}} + \frac{2}{\sqrt{2}}$ $\searrow \infty$ Diverge

Por lo Tanto $(*)$ Diverge