$$= 2\,\frac{(s-2)}{(s-2)^2+3^2} - 5\,\frac{3}{(s-2)^2+3^2}.$$

So

$$\mathcal{L}^{-1}\left\{\frac{2s-19}{s^2-4s+13}\right\} = 2\mathcal{L}^{-1}\left\{\frac{(s-2)}{(s-2)^2+3^2}\right\} - 5\mathcal{L}^{-1}\left\{\frac{3}{(s-2)^2+3^2}\right\}$$

$$= 2e^{2t}\cos 3t - 5e^{2t}\sin 3t.$$

$$\mathcal{L}^{-1}\left\{\frac{3}{s+1}\right\} = 3e^{-t}.$$

Hence,

$$\mathcal{L}^{-1}\left\{\frac{(5s-4)(s-5)}{(s^2-4s+13)(s+1)}\right\} = e^{2t}(2\cos 3t - 5\sin 3t) + 3e^{-t}.$$

Note Each irreducible factor $(s^2+bs+c)^m$ gives rise to terms

$$\frac{A_1 s+B_1}{(s^2+bs+c)} + \frac{A_2 s+B_2}{(s^2+bs+c)^2} + \cdots + \frac{A_m s+B_m}{(s^2+bs+c)^m}.$$