Factoring with Square Roots

1. Factor the following Expressions
a) $\left(x-3\right)\sqrt{x-5}-\frac{8}{\sqrt{x-5}}$

b) $\left(x+1\right)^{\frac{1}{2}}(3x^{2}-1)+\left(x+1\right)^{\frac{3}{2}}(x-2)$

c) $\left(x+3\right)^{-\frac{1}{2}}\left(7x-12\right)+2\left(x+3\right)^{\frac{1}{2}}(x-3)$

d) $\left(x+3\right)\sqrt{2x+1}-\frac{4}{\sqrt{2x+1}}(x+1)^{2}$

e) $\left(x-2\right)^{\frac{1}{2}}\left(x^{2}-4\right)-5x\left(x-2\right)^{\frac{3}{2}}$

f) $2\left(5x-4\right)^{-\frac{1}{2}}\left(x-8\right)-2\left(5x-4\right)^{\frac{1}{2}}(x-3)$
2. Solve the following Equations
a) $2\left(x-1\right)\sqrt{x+1}-\frac{4}{\sqrt{x+1}}\left(x-1\right)^{2}=0$

b) $\left(x+5\right)^{\frac{1}{2}}\left(x^{2}+8\right)=3x\left(x+5\right)^{\frac{3}{2}}$

c) $3\left(x-4\right)^{-\frac{1}{2}}\left(2x-3\right)-2\left(x-4\right)^{\frac{1}{2}}\left(x+1\right)=0$