Exercises 2.3 page 60
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The integrating factor is $e^{\int \frac{-dx}{x}} = e^{-\ln x}$
To simplify this expression, use $e^{ab} = (e^a)^b = (e^b)^a$,
with *a* = *-1* and *b* = *lnx*, $(e^{\ln x})^{-1} = (x)^{-1} = \frac{1}{x}$
Also, the integral of sine is a <u>negative</u> cosine

Exercises 3.1, page 91
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For the first part of the problem, i(0) = 0 and E(t) = 120

The solution is $i(t) = 60 - 60e^{-t/10}$

At *t* = 20, $i(20) = 60 - 60e^{-2}$

This value of current becomes the initial condition for the second part, where E(t) = 0.

The solution for the second part is $i(t) = ce^{-t/10}$

Using the initial condition, $i(20) = ce^{-20/10} = 60 - 60e^{-2}$
And $c = \frac{60 - 60e^{-2}}{e^{-2}} = 60e^2 - 60 = 60(e^2 - 1)$

Exercises 3.1, page 90
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"Solve problem 23" means find the equation for the amount of salt, A(t). This problem is similar to the problem discussed on page 87. It can be deduced that the tank will be empty after 100 minutes from the equation for the amount of brine in the tank; the tank starts with 500 gallons, brine is pumped in at a rate of 5 gal/min and pumped out at a rate of 10 gal/min, so each minute there are (10-5) five fewer gallons in the tank. After 100 minutes, the tank is down 5*100 = 500 gallons, i.e. it is empty.
However, there is also no salt left, so the amount of salt A(100) = 0. The quadratic expression A(t)=0 would have to be solved for t to determine when the amount of salt is zero. You don't have to solve the quadratic.