

Set 1.6: 46.

Set 1.8: 12, 16.

Chapter 1 Review: 20, 22, 40, 50, 54.

Hints on how to solve the second last question (worth 4 marks):

i) Let $y(t)$ be the amount of salt in the container (in lb.) after time t . This implies that there is $\frac{y(t)}{500}$ of salt in each gal.

ii) Assume that the inflowing solution mixes with the existing one *instantaneously*.

iii) How much new salt is flowing in every minute (this will contribute a positive term to $\frac{dy}{dt}$).

iv) How much salt is leaving the container every minute (check *i*)? This will contribute a negative term to $\frac{dy}{dt}$.

v) Solve the resulting differential equation using $y(0) = 80$ as the initial value.

vi) Find the limit of $y(t)$ as t approaches infinity (let me call it y_∞).

vii) Solve $y(t) = \frac{95}{100}y_\infty$ for t (Maple can help).

Finally, note that the last question involves a very simple (separable) differential equation. The only novel thing is that, instead of specific constants (3, -5, etc.), it involves constant **parameters** a , b and k (to be treated the same way as regular constants). This poses no difficulty to Maple, and should not create any problems for you.