## Voltage dividers

Often, two resistors are put in series to develop a voltage that is some fraction of the voltage applied across them. Such an arrangement is called a voltage divider.


To solve for Vx in the general case of a voltage divider (using the reference designators in the above drawing):

We know: $V x=I *$ r2, so first solve for $I$

$$
\begin{aligned}
& -\mathrm{V}+\mathrm{Ir} 1+\mathrm{Ir} 2=0 \quad(\text { the } \mathrm{KVL} \text { loop for the circuit }) \\
& \mathrm{I}(\mathrm{r} 1+\mathrm{r} 2)=\mathrm{V} \\
& \mathrm{I}=(\mathrm{V} /(\mathrm{r} 1+\mathrm{r} 2))
\end{aligned}
$$

Now, knowing I, multiply by r 2 to get Vx .

$$
\begin{aligned}
& \mathrm{Vx}=(\mathrm{V} /(\mathrm{R} 1+\mathrm{R} 2)) * \mathrm{R} 2, \text { or } \\
& \mathrm{Vx}=\mathrm{R} 2 /(\mathrm{R} 1+\mathrm{R} 2) * \mathrm{~V}
\end{aligned}
$$

This is the general form for determining the voltage created by a voltage divider.

