

## 8.5 Solving Exponential Equations



"I can solve and check any equation that contains exponential expressions.  
I can apply what I have learned in unfamiliar settings."

The formula to calculate the mass,  $M(t)$ , remaining from an original sample of a substance with mass  $P$ , can be determined using the formula:

$$M(t) = P \left( \frac{1}{2} \right)^{\frac{t}{h}}, \text{ where } t \text{ is time, and } h \text{ is the half-life.}$$

### **Recall:**

the half-life of a substance is the amount of time required to reduce its mass by one-half.

Ex. 1: Jocelyn works in a lab that uses radioactive substances.

The lab received a shipment of 200 g of radioactive iodine and after 7 days, 55.8163 g of the iodine was still remaining.

Calculate the half-life, to the nearest tenth of a day, of radioactive iodine.

Ex. 2: Solve  $5^{x+1} = 7^{x-2}$ , to three decimal places.

Ex. 3: Solve  $25(2^x) = 150$ , to three decimal places.

Ex. 4: Solve algebraically:  $9^{x+1} = \frac{1}{27}$

Ex. 5: Solve algebraically:  $3^{x+2} - 3^{x+1} = 162$