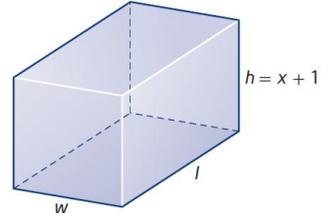


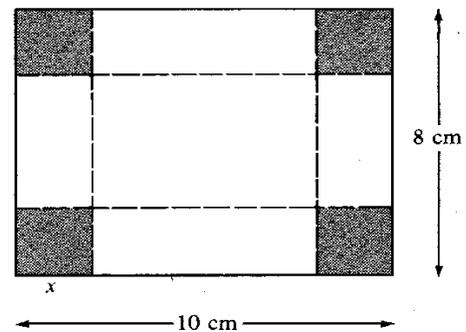
Volume & Polynomials

1. The volume of a rectangular prism is: $V(x) = -x^3 - 3x^2 + 36x - 32$. Factor the polynomial completely and determine expressions for the three dimensions.
2. The volume of a rectangular prism is: $V(x) = x^3 + 3x^2 - 36x + 32$. If the length is $x - 4$, determine expressions for the width and height.
3. The volume of nested boxes is: $V(x) = x^3 + 7x^2 + 14x + 8$. If the height is $x + 1$, determine expressions for the width and length.

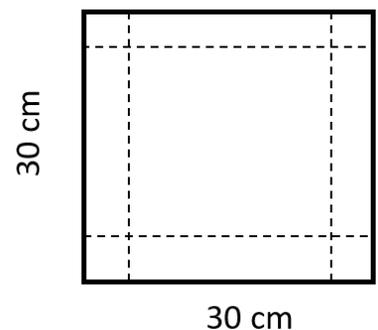


4. The volume of water in a fish tank is: $V(x) = x^3 + 14x^2 + 63x + 90$. If the depth is $x + 6$, determine the possible length and width expressions.
5. A box is constructed so that:
 - The length is twice the width.
 - The height is 2 cm more than the width.
 - The volume is 350 cm^3 .
 Find the dimensions of the box.
6. Fred and Ted are twins. They were born 3 years after their older sister Bethany. The product of their three ages is 5780. How old are the twins?

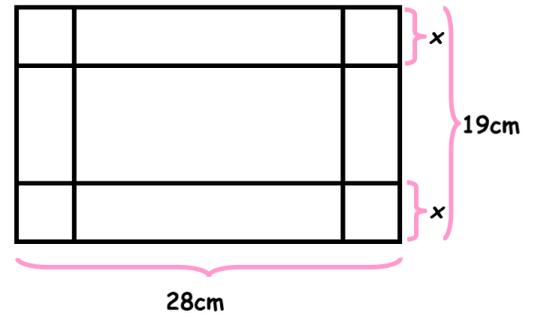
7. A 10 cm by 8 cm piece of cardboard has squares cut from each corner and folded into an open-top box.
 - a) Write expressions for the dimensions.
 - b) Write the volume function.
 - c) Determine the value of x that produces a volume of 48 cm^3 .



8. A 30 cm square sheet is used to form an open-top box.
 - a) Write expressions for the dimensions.
 - b) Write the volume function.
 - c) Determine the value(s) of x that produce a volume of 2000 cm^3 .
 - d) State the domain of possible values for x .



9. A 28 cm by 19 cm sheet is used to form an open-top box.
- Write expressions for the dimensions.
 - Write the volume function.
 - Determine the maximum possible volume.
 - What size square should be cut if the box must hold 750 cm^3 ?



10. Boxes for candies are constructed from 36 cm by 20 cm sheets.

(The base is half the sheet length.)

If the volume must be 512 cm^3 , determine the value of x .

