**1.** A rectangle with a 6 cm length and 4 cm width is equivalent to a triangle with an 8 cm base. What is the triangle's height relative to this base?   *6 cm*

2. A 6 cm by 4 cm by 2 cm rectangular prism is equivalent to a square based pyramid. If the side length of the pyramid's base is 4 cm, calculate its height.   *9 cm*

3. A cone and a cylinder have congruent circular bases and are equivalent. What can be said about the heights of these two solids?

   The height of the cone is three times the cylinder's height.

4. The rectangle and right trapezoid on the right are equivalent. What is the numerical value of the rectangle's perimeter?
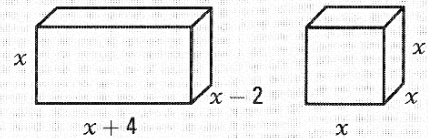
   $2x(x - 3) = (2x + 4) \cdot x \div 2$; $x = 8$;
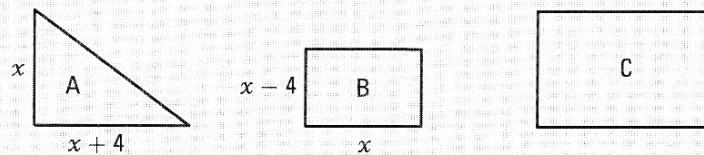
   Perimeter of rectangle = 42 u.
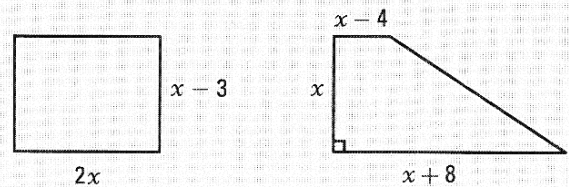
5. The rectangular prism and cube on the right are equivalent. What is the numerical value of the area of each solid?

   $x(x + 4)(x - 2) = x^3$; $x = 4$

   Area of prism: 112 u^2; Area of cube: 96 u^2

6. Figures A and B below are equivalent whereas figures B and C are similar. The area of figure C is 24 cm² greater than twice the area of figure A. Determine the perimeter of figure C.
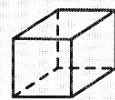
   $\frac{x(x + 4)}{2} = x(x - 4)$; $x = 12$; Area of figure B = 96 cm²; Area of figure C = 216 cm²
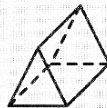
   Scale factor = $\frac{3}{2}$

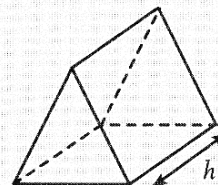   *Perimeter of figure B = 40 cm; Perimeter of figure C = 60 cm.*

7. Consider the three solids represented below.

Prism A   Prism B   Prism C

Prisms A and B are equivalent whereas prisms B and C are similar. The volume of prism C is 8 times greater than the volume of prism A. The total volume of all three prisms is 10 dm³. What is the height h of prism C if the area of prism B's base is 100 cm²?

   v: volume of prism A; We have: $v + v + 8v = 10\ 000$; $v = 1000$ cm³.

   h': height of prism B; We have: $1000 = 100 \times h$; $h' = 10$ cm. $k = 2$. Therefore, h = 20 cm.

8. A rectangular plot of land with dimensions 45 m by 20 m and a square plot of land have the same area. The cost, per metre of fence, is $25.

a) Show that the square plot of land is cheaper to fence in.
Rectangular plot: $3250. Square plot: $3000.

b) Explain why, of all plots with the same area as the rectangular plot, the plot with the minimal cost to fence will be a square plot.
It has been proven that of all equivalent rectangles, the square is the one with the smallest perimeter.

9. We want to construct a box in the shape of a rectangular prism with 216 dm² of material.

a) We choose to make a box with a 60 cm by 40 cm base. What will its volume be?
x: height; 4800 + 120x + 80x = 21 600; x = 84; volume = 201.6 dm³
The volume of such a box is 201.6 dm³.

b) 1. What must the shape of the box be to maximize its volume? Justify your answer.
A cube, since of all rectangular prisms with the same total area, the cube is the one that has the greatest volume.

   2. What are the dimensions of the box that satisfies these conditions?
x: edge of cube; 6x² = 216; x = 6
The box is a cube with 6 dm edges.

   3. What is the maximum volume of the box that can be constructed from the given material? ___*216 dm³*

10. A sphere and a cube each have a volume of 8000 cm³. Which of the two solids has the smallest total area? Justify your answer

a) without calculating the two volumes.
Of all equivalent solids, the sphere has the smallest total area.

b) by calculating the two volumes.
Cube: 2400 cm²; sphere 1934 cm².