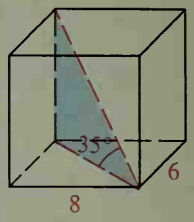
31. The length of a rectangular solid is twice the width, and the height is three times the width. If the volume is 162 cm^3, find the total area of the solid.

32. A right prism has square bases with edges that are three times as long as the lateral edges. The prism's total area is 750 m^2. Find the volume.

33. A diagonal of a box forms a 35° angle with a diagonal of the base, as shown. Use trigonometry to approximate the volume of the box.



34. Refer to Exercise 33. Suppose another box has a base with dimensions 8 by 6 and a diagonal that forms a 70° angle with a diagonal of a base. Show that the ratio of the volumes of the two boxes is $\frac{\tan 35°}{\tan 70°}$.

C **35.** A right prism has height x and bases that are equilateral triangles with sides x. Show that the volume is $\frac{1}{4}x^3\sqrt{3}$.

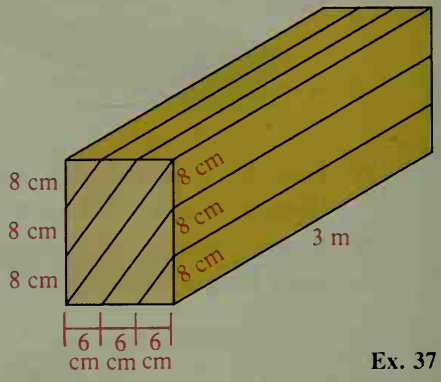
36. A right prism has height h and bases that are regular hexagons with sides s. Show that the volume is $\frac{3}{2}s^2h\sqrt{3}$.

37. A rectangular beam of wood 3 m long is cut into six pieces, as shown. Find the volume of each piece in cubic centimeters.

38. A diagonal of a cube joins two vertices not in the same face. If the diagonals are $4\sqrt{3}$ cm long, what is the volume?

39. All nine edges of a right triangular prism are congruent. Find the length of these edges if the volume is 54 $\sqrt{3}$ cm^3.

40. If the length and width of a rectangular solid are each decreased by 20%, by what percent must the height be increased for the volume to remain unchanged? Give your answer to the nearest whole percent.



Ex. 37

Challenge

1. Given two rectangles, find one line that divides each rectangle into two parts of equal area.

2. Given three rectangular solids, tell how to find one plane that divides each of these solids into two parts of equal volume.