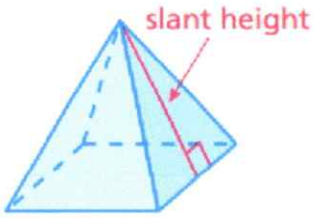
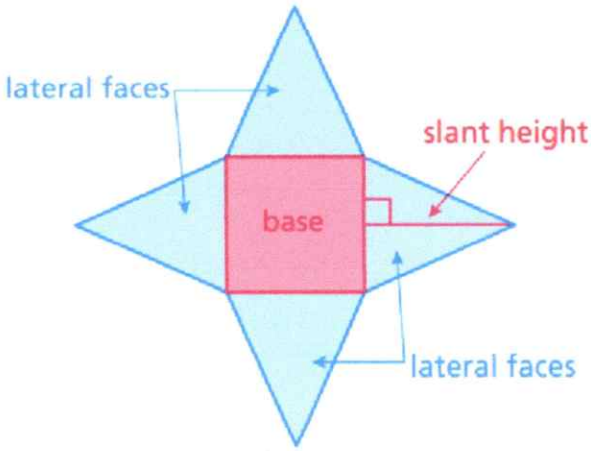
14.2 Surface Area of Pyramids p.596

- A regular pyramid is a pyramid whose base is a regular polygon (all sides equal).
- The lateral faces are triangles (sides)
- The height of each triangle is called the ***slant height*** of the pyramid
- Lateral surface area (LSA) is the combined area of all the faces (triangles); doesn't include the base

Surface Area of a Pyramid

The surface area S of a pyramid is the sum of the areas of the base and the lateral faces.

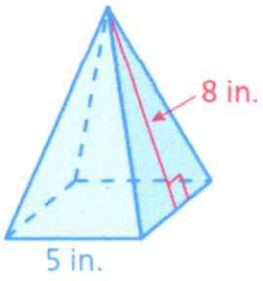




S = area of base + areas of lateral faces

$S = B + LSA$

1.



Base + LSA (4 faces of Δ)

$5^2 + 4\left(\frac{8 \cdot 5}{2}\right)$

$25 + 4(20)$

$25 + 80$

105 in^2

2. What is the surface area of a square pyramid with a base side length of 9 cm and a slant height of 7 cm?

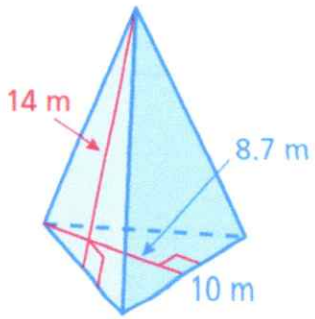
$S = 9^2 + 4\left(\frac{9 \cdot 7}{2}\right)$

$81 + 4(31.5)$

$81 + 126$

207 cm^2

3.

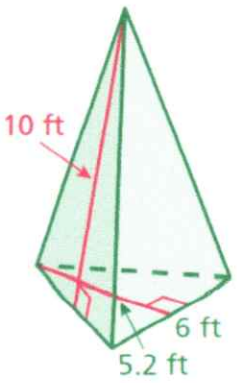


Base Δ: $\frac{(10)(8.7)}{2}$ + LSA (3 Δ's): $3\left(\frac{14(10)}{2}\right)$

$43.5 + 210$

253.5 m²

4.

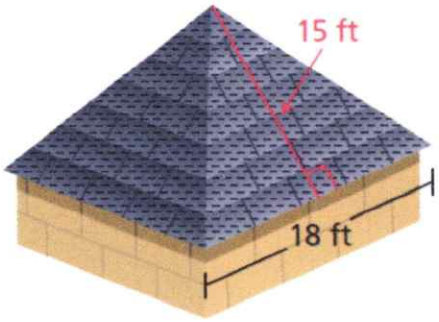


Base Δ: $\frac{6 \cdot 5.2}{2}$ + LSA (3 Δ's): $3\left(\frac{10 \cdot 6}{2}\right)$

$15.6 + 90$

105.6 ft²

5. A roof is shaped like a square pyramid. One bundle of shingles covers 25 square feet. How many bundles should you buy to cover the roof?

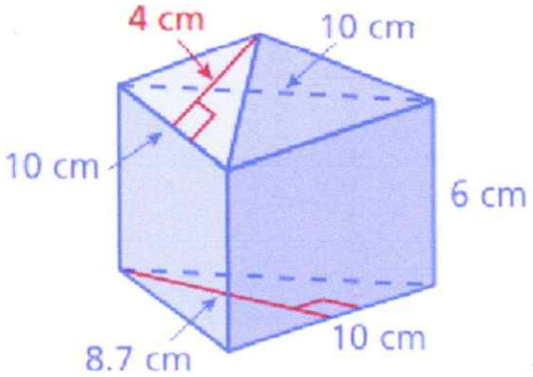


You don't need to find the area of the base. You only need the LSA.

$4\left(\frac{15 \cdot 18}{2}\right) = 540 \text{ ft}^2$

$\frac{540}{25} = 21.6$ You would need to buy 22 bundles

6. Find the surface area of the composite solid.



Top ~ LSA = $3\left(\frac{4 \cdot 10}{2}\right) = 60$

Middle ~ LSA = $3(10 \cdot 6) = 180$

Bottom ~ base = $\frac{8.7(10)}{2} = 43.5$

$60 + 180 + 43.5 =$ **283.5 cm²**