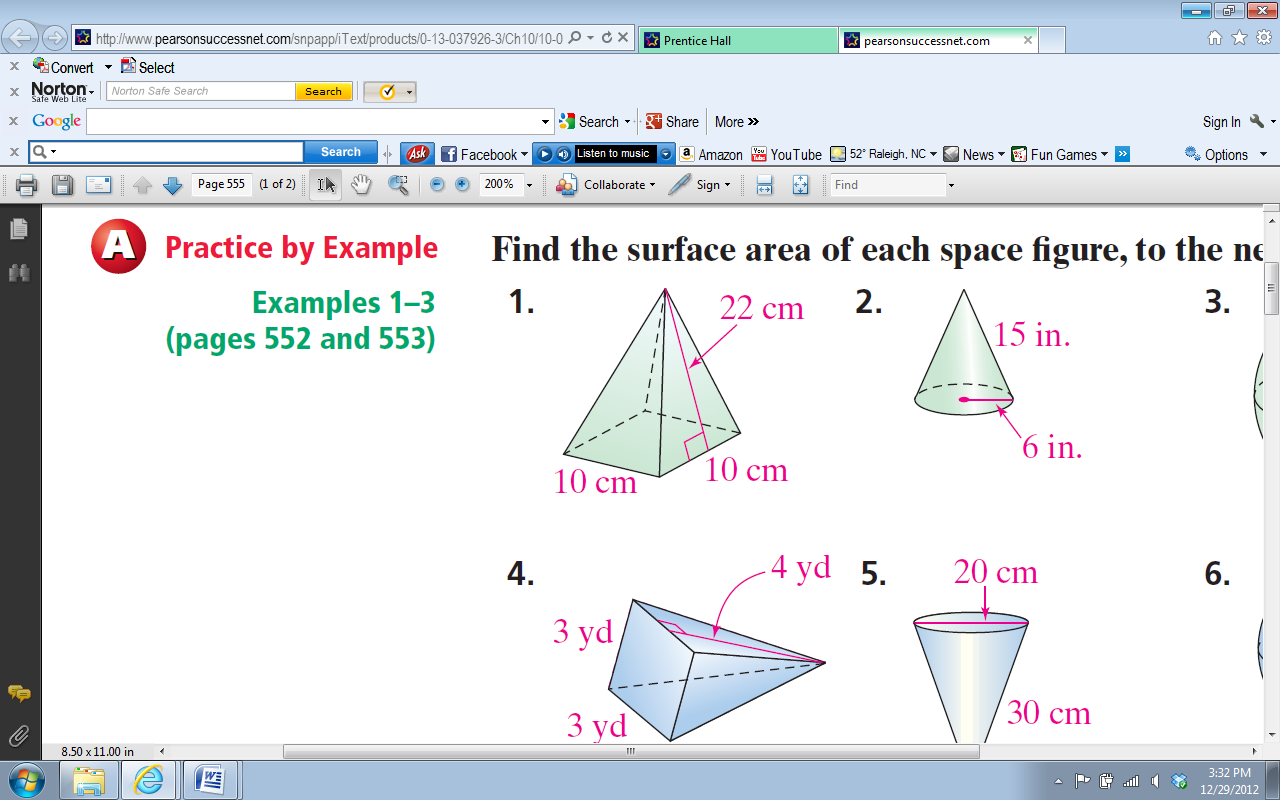
**ML #5: Surface Area and Volume of Pyramids (Math 7)**



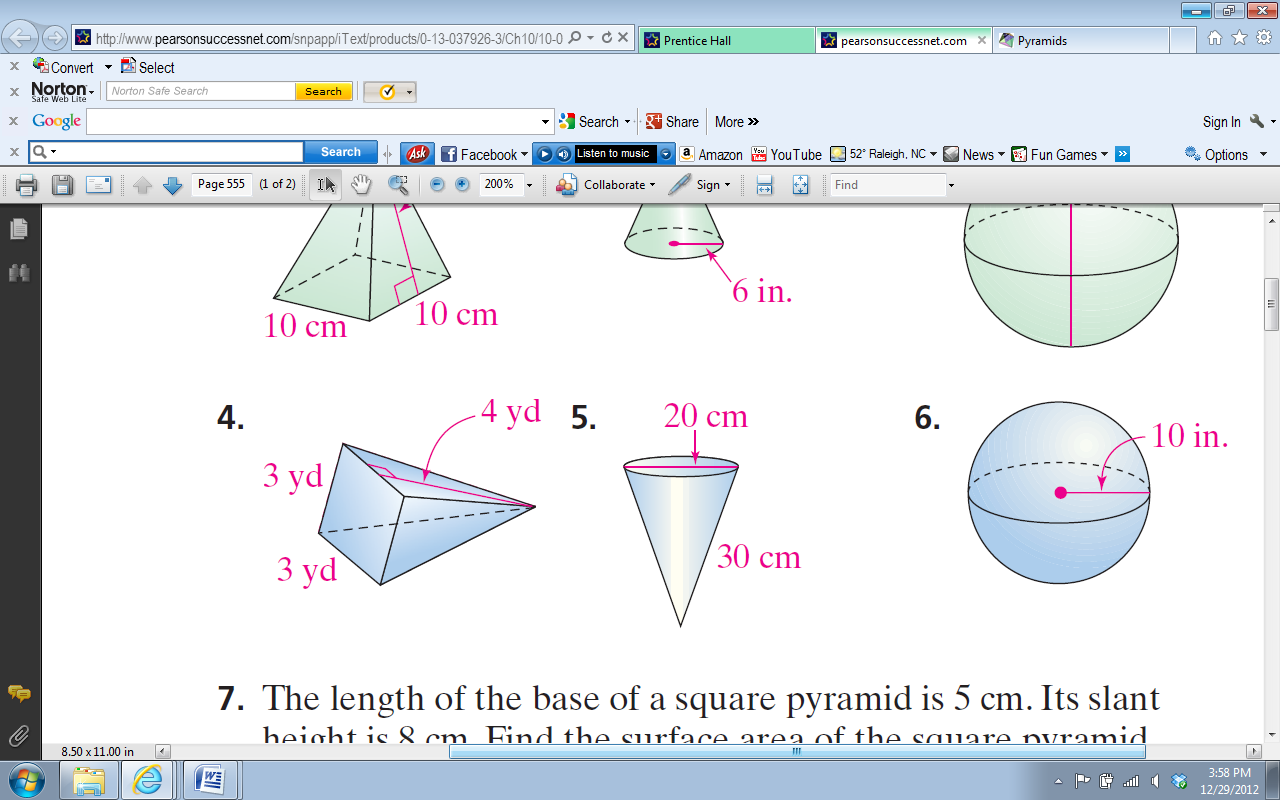
Using the pyramid above, sketch each face of the pyramid and label the dimensions of each face. Then find the area of each face.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Base | Side 1 | Side 2 | Side 3 | Side 4 |
| Area: | Area: | Area: | Area: | Area: |

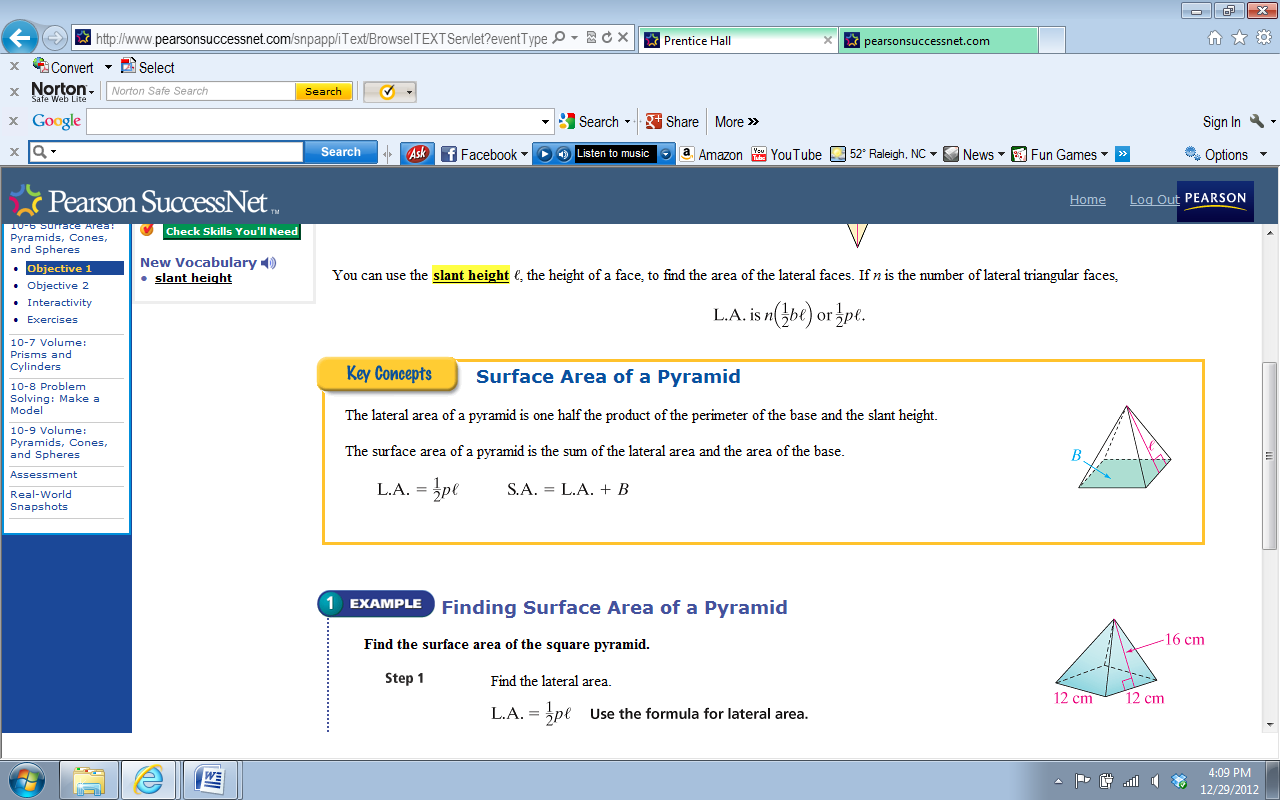
From this information, how could you find the surface area of the pyramid?

What do you notice about all four sides of the pyramid?

Do you think there could be an easier way to find the surface area rather than finding all five areas and adding them together? Try your short cut on the pyramid below.



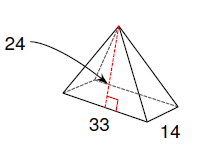
**Looking More Closely at Right Square Pyramids**



The slant height, *l*, is the height of the triangular faces of a square pyramid.

Base, *B*, must be square to be called a square pyramid.

1. The length of the base of a square pyramid is 5 centimeters. The slant height is 8 centimeters. What is the surface area of the pyramid?
2. A square pyramid has a slant height of 6.7 cm. If the square has side lengths of 4.5 cm, what is the surface area of the pyramid?
3. Find the surface area of the pyramid.



1. Explain why a square prism with base length of 4 meters and a height of 5 meters will have a different surface area than a square pyramid with a base length of 4 meters and a slant height of 5 meters. Be sure to show work to support your explanation.

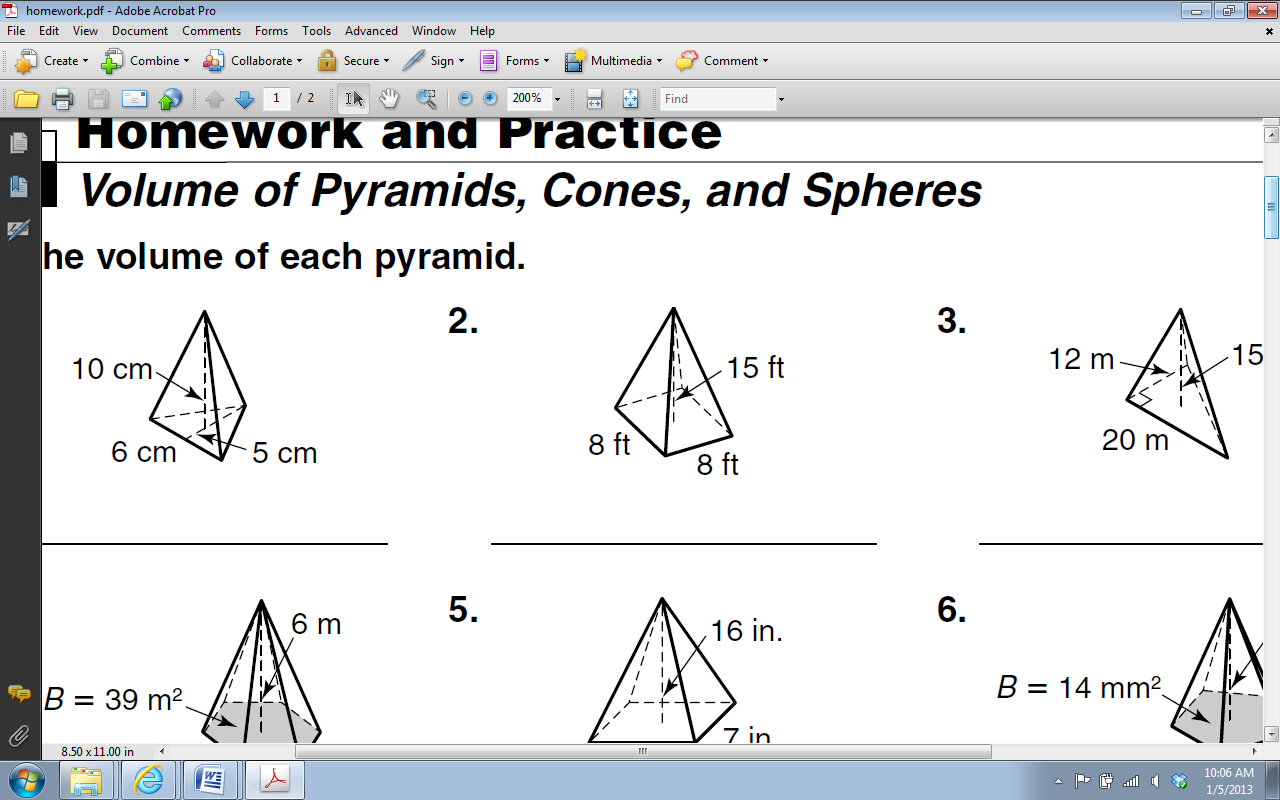
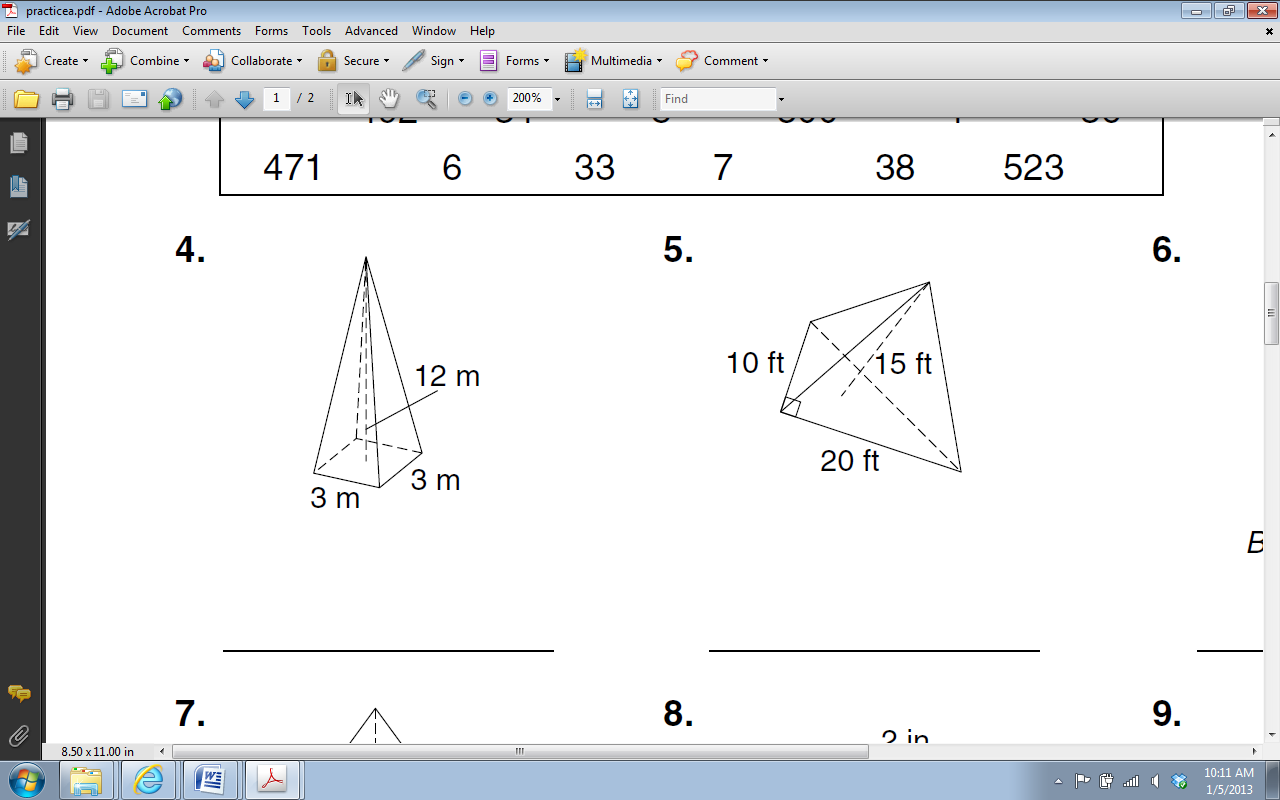
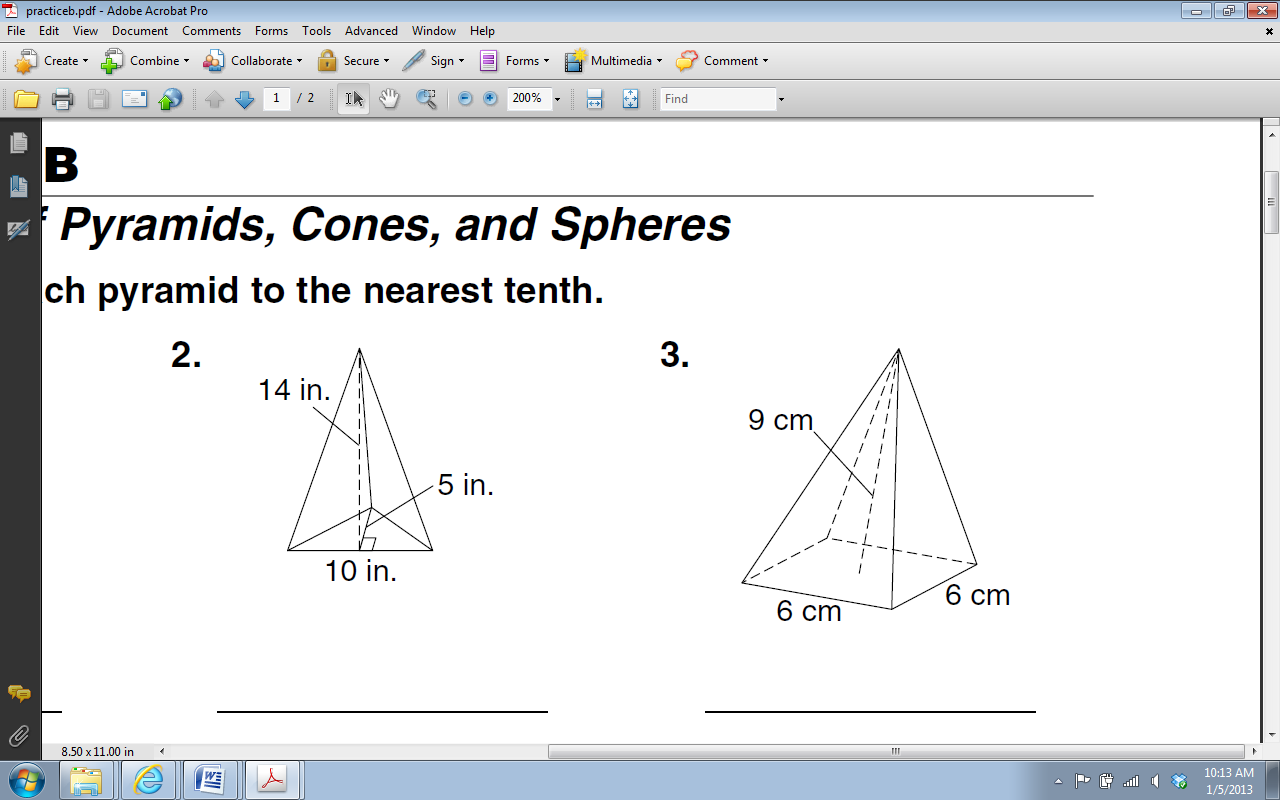
**Understanding Volume of Square Pyramids**

* Find the volume of each rectangular prism and then find the ratio of the volume for the pyramid to the volume of the rectangular prism in each row. Be sure to fully simplify the ratio.

|  |  |  |
| --- | --- | --- |
| Rectangular Prisms | Pyramids | Ratio of Volumes  Pyramid : Rectangular Prism |
|  |  |  |
| Side Length of Square Base: 6 cm  Height of Prism: 10 cm  Volume: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **Side Length of Square Base: 6 cm**  **Height of Pyramid: 10 cm**  **Volume: 120 cm3** |  |
| Side Length of Square Base: 9 in  Height of Prism: 15 in  Volume: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **Side Length of Square Base: 9 in**  **Height of Pyramid: 15 in**  **Volume: 405 in3** |  |
| Side Length of Square Base: 18 ft  Height of Prism: 7 ft  Volume: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **Side Length of Square Base: 18 ft**  **Height of Pyramid: 7 ft**  **Volume: 756 ft3** |  |

* Looking at the ratios you wrote for the volume of the pyramid to the volume of the rectangular prism, what conclusions can you make?
* Can you use this conclusion to write a formula for how to find the volume of a right square pyramid?

**VOLUME OF A PYRAMID:**

* **Use your formula to find the volume of the following right square pyramid:**

**3)**

**1)**

**2)**

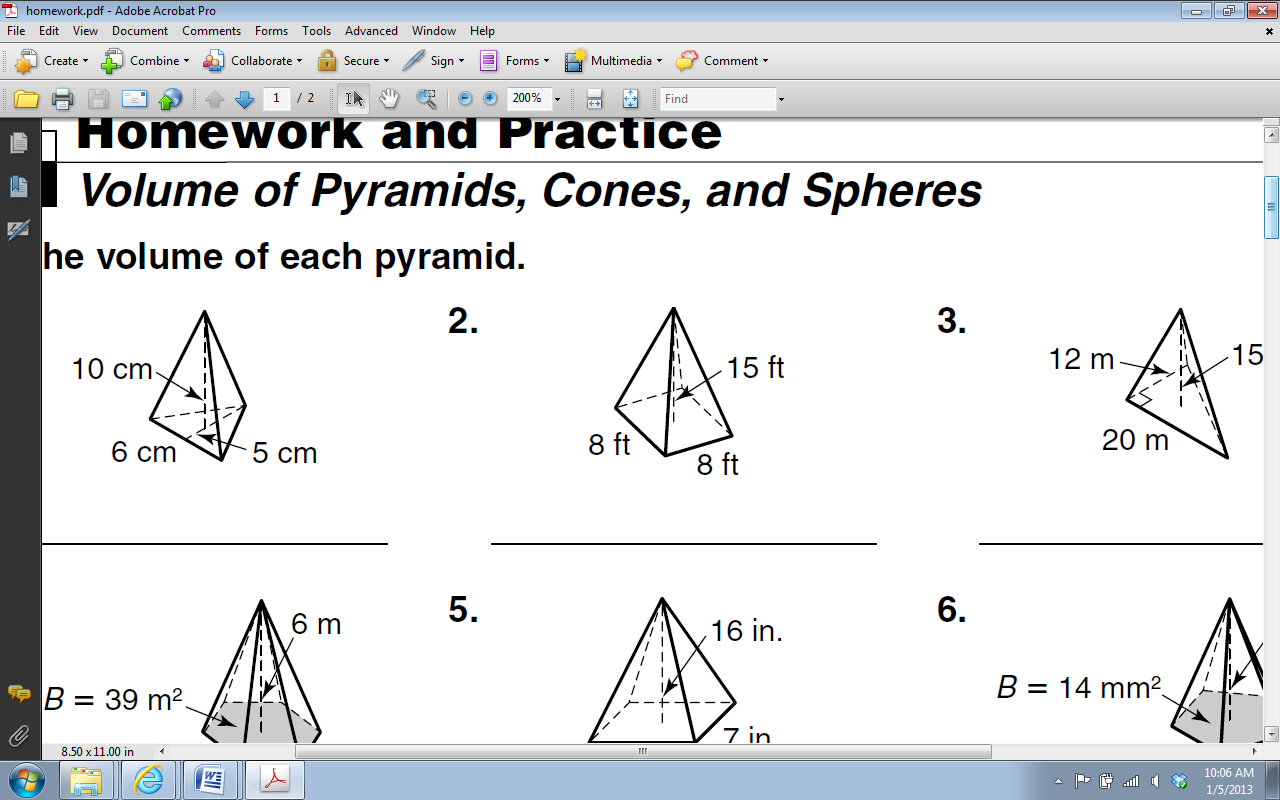
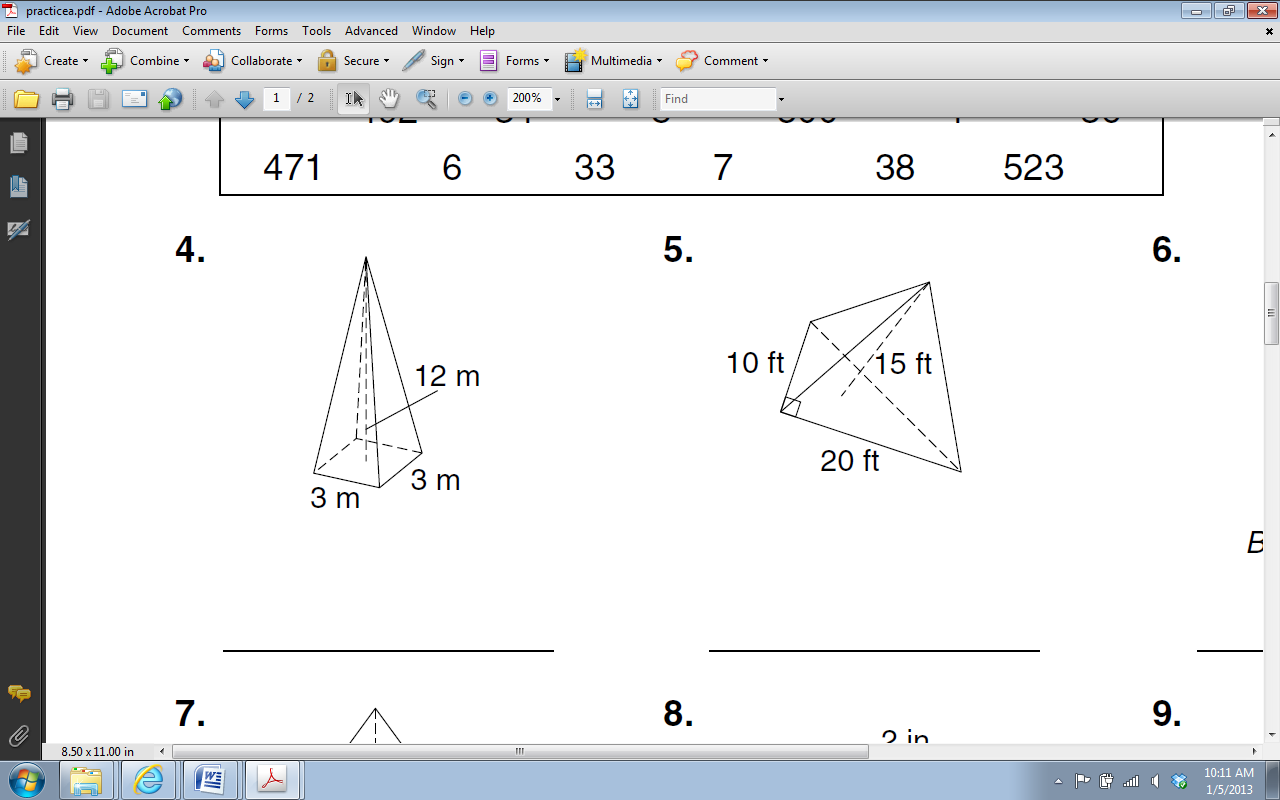
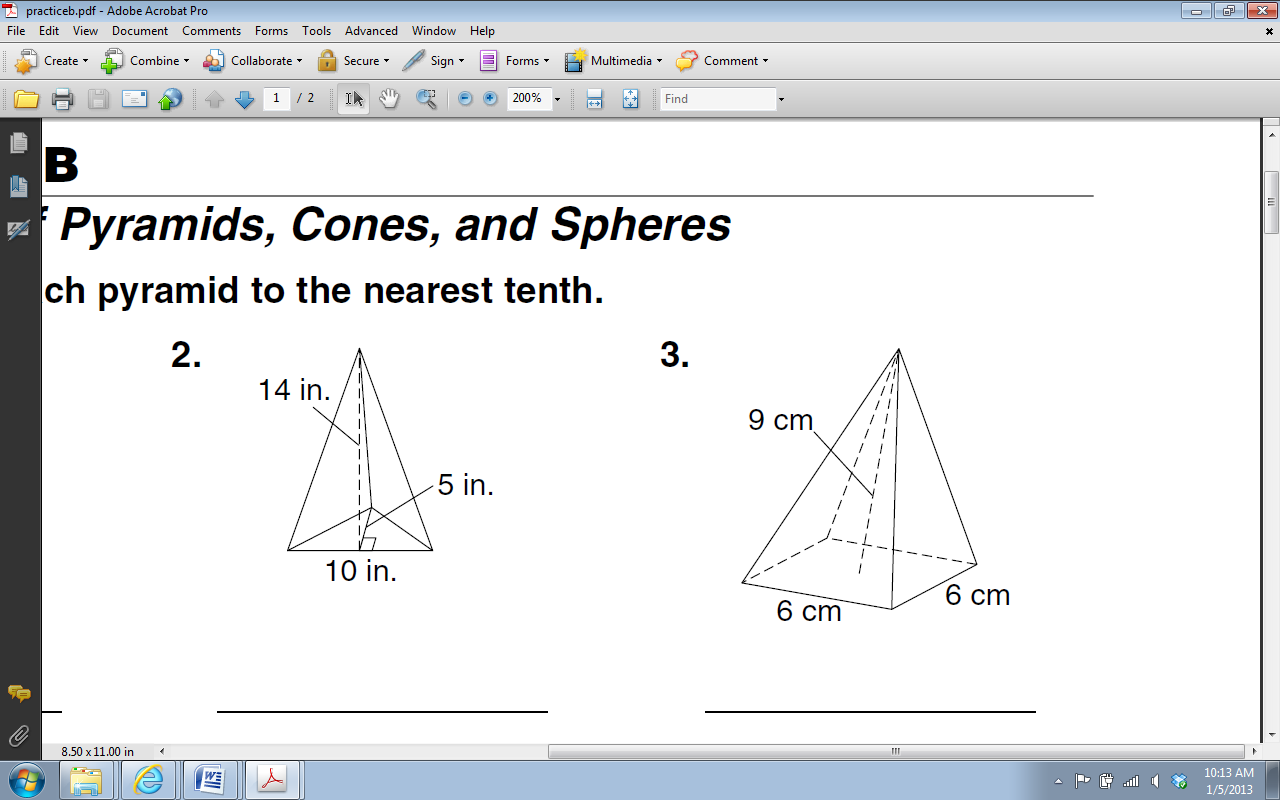
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|  |  |  |
| --- | --- | --- |
| Rectangular Prisms | Pyramids | Ratio of Volumes  Pyramid : Rectangular Prism |
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| Side Length of Square Base: 9 in  Height of Prism: 15 in  Volume: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **Side Length of Square Base: 9 in**  **Height of Pyramid: 15 in**  **Volume: 405 in3** |  |
| Side Length of Square Base: 18 ft  Height of Prism: 7 ft  Volume: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **Side Length of Square Base: 18 ft**  **Height of Pyramid: 7 ft**  **Volume: 756 ft3** |  |

* Looking at the ratios you wrote for the volume of the pyramid to the volume of the rectangular prism, what conclusions can you make?
* Can you use this conclusion to write a formula for how to find the volume of a right square pyramid?

**VOLUME OF A PYRAMID:**

* **Use your formula to find the volume of the following right square pyramid:**

**3)**

**1)**

**2)**