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## Exam II

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### EXACT TRIG FUNCTION VALUES

[5 *points/ea*] Find the *exact* value for each of the following trigonometric functions. You may not use a calculator for these problems, and you must show the steps you used to arrive to your answer. You may take for granted that you know the exact value  $\sin \theta$  and  $\cos \theta$  for  $\theta = 0^\circ, 30^\circ, 45^\circ, 60^\circ$ , and  $90^\circ$ .

1.  $\sec(-45^\circ)$

2.  $\cot(-765^\circ)$

3.  $\csc(750^\circ)$

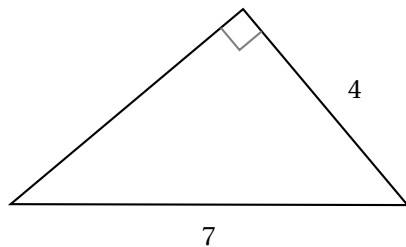
### INCREASING OR DECREASING

4. [15 points] Determine the relation of the following trigonometric values. You may not use a calculator for this problem. Justify how you arrived to your answer.

$\sin 30^\circ$		$\cos 25^\circ$	$\sec 42^\circ$		$\csc 378^\circ$	$\tan -321^\circ$		$\cot 51^\circ$
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### COMPLETING TRIANGLES

5. [10 points] Your instructor was working on making a triangle for a worksheet, but it appears that he forgot to finish it. Help your instructor out by finding all of the missing sides and angles for the triangle. The side lengths should be exact answers, and the angles should be rounded to a tenth of a degree, ie:  $46.7^\circ$ .

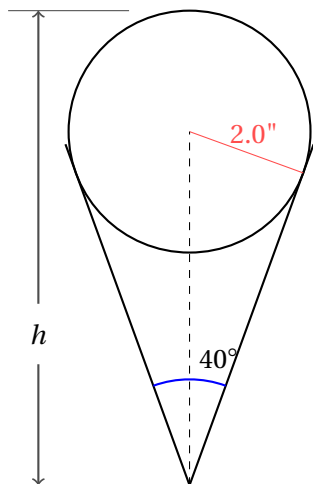


## APPLICATIONS

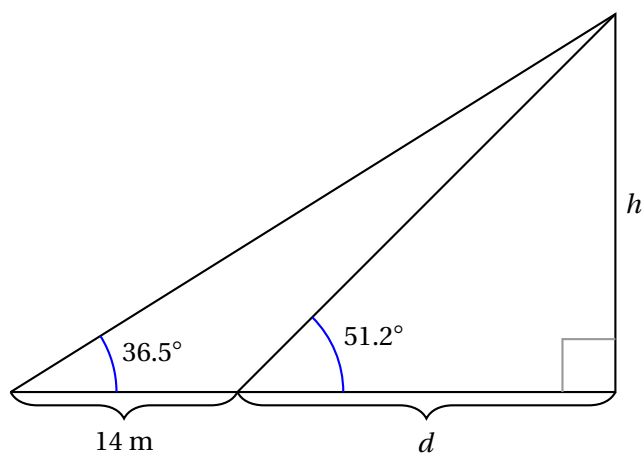
These problems *do* adhere to the significant figures principal, and your answers should too.

6. [20 points] Alice has an ice cream cone with a opening of  $40^\circ$ . She puts an ice cream ball of radius 2.0" into the cone. Find how high the ice cream will sit. That is, find  $h$ .

*Hint:* Recall that lines tangent to a circle are perpendicular to the radius vector of a circle.



7. [20 points] Find  $h$  and  $d$  indicated in the figure below.



8. [20 points] A plane is flying over the Hudson River at an altitude of 4,520 ft and needs to figure out how far he is from the Statue of Liberty. The pilot then measures the angle of depression to the top of the statue as  $13.2^\circ$  and the angle of depression to the bottom of the statue as  $24.1^\circ$ . How far is the plane from the Statue of Liberty? Draw a sketch that illustrates the situation and show all of your work in calculating the answer.