Math 370
Homework 4
due Thursday March 6.

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This assignment gives you practice with labeling and referencing equations, theorems and definitions.

1. The goal is to reproduce the text in each problem. The instructions are written in green and the text to be copied is (mostly) in black.

2. Use the Latex template from the web page. Copy it and insert your work at the end of the file.

3. Start with the title but add your section information to the title by typing
   \title{ \Large {Math 370}, section {\Huge ?.}"   in order to get: (with ? = 1 or ? = 2)

Math 370, section ?.

4. Use "\enumerate" to enumerate problems.

5. The command "\showkeys".

   Its effect. When this command (which appears in the preamble of the template) is active (i.e., there is no % before it), it will cause labels (code names) to be shown in the output. The labels of equations will be printed in a box to the right of the text. The sectioning labels (code names for parts of the text) will appear in boxes to the left of the text. When the reference to the label is used, the showkeys command causes the label to be printed above the reference.

   Why would one use this command in practice? The showkeys command is a tool useful for writing a paper. It makes it unnecessary to memorize the labels. However, once one wants to print the final version of the text one first comments out the showkeys command. Then the additional information provided by showkeys will not be printed in the final version.

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Problems

1. Print this equation using the "equation" environment and label the equation so that you can reference it in the next homework problem.

$$\int_a^b \cos(x)\,dx = \sin(x) \tag{1}$$
$\boxed{\text{eq1}}$

2. Type the following definition using Latex. Use the environment "definition" defined in the preamble with the command \newtheorem. In the definition use the **Roman font**, for that type {\rm just after \begin{definition} and put an } at the end in order to stop t6he Roman font.

   Definition 0.1 The sphere in $\mathbb{R}^3$ with center $C(h,k,l)$ and radius r is the set where $(x-h)^2 + (y-k)^2 + (z-l)^2 = r^2$. Note that this sphere is geometrically the set of points (x,y,z) of distance r from the point (h,k,l).

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3. Type the following theorem and the sentence proceeding it with Latex. Use the environment "theorem" defined in the preamble. It does not matter if your homework attaches a different number to the theorem. It will attach the same number to the equation as above.

Theorem 0.2 (Pythagorean Theorem) *Suppose a right triangle has legs a, b and hypotenuse c. Then:*

$$a^2 + b^2 = c^2$$

.

Theorem 0.2 was found by the Pythagoras long before Newton found the formula for $\int_a^b \cos(x)\,dx$ given in Equation 1 in the previous homework problem.

4. This is an exercise in sectioning commands. When reproducing the text bellow, the two reference numbers in section 2 should be generated by using reference tool \ref. Colors should be produced using the instruction in the preamble.

1 Thus spoke the red hamster

1.1 Of the spirit of gravity

Deep yellow and burning red – this is to my taste.

1.2 The voluntary beggar

These cows, however, seemed to be listening eagerly.

2 Conclusion

As we have seen in the subsection 1.2, the cows have paid much attention to attitudes of the philosopher, such as expressed on page 2.