q== ==q

v== Please check your responses with <https://qrproblems.org/prob> or scan the QR code. You will need to put in your Problem Number and index number (given above) to check your responses. When you are finished checking, click the “get rtn Code” button at the bottom of the sheet - **Write the score and the rtn Code in the space provided above**. No credit for the computer graded part of problem if a clear rtn Code is not provided. Documenting your work is important – please return this sheet along with your work. If you run into problems, see if you can get the answers to the base-case problem and use the problem hints.==v

s== Directions for contributors: The QRP solve BringMN macro will delete these direction (and anything between s double equal and double equal s markup tags like those around this section).

1) Compose the problem in this template. Any variable parameters should be put in the form ##varname,[var type],[Base case value]##. var type can have value of num, txt, arr or img. Repeated instances of the variable should be exactly the same as the first occurrence (use copy/paste). Denote different parts of the problem that will be computer checked with p==a==p, p==b==p…p==j== p (these will be replaced with a) b) later by a macro in QRP solve)

2) Add higher level qualitative questions at the end of the problem (between w== and ==w).

3) Save and close this document then open the QRPSolve template. –This bring the variable names into the solution template.

4) solve the problem – see QRPsolve template for directions on this.

5) Run Prep macro in QRPSolve template to prep this document and I/O files for upload

6) Upload required files to QRPproblems web site and provide metadata. A simple example is shown below, and this can be deleted or replaced:

- Note anything included between the t== and ==t will be included with the base case values in the area denoted by u== and ==u in the final version. v== ==v denotes the header and will be only included on the first page of a multi problem assignment. w== ==w denotes the written response area that must be graded by a human. q== ==q denotes where the quote goes – delete this markup if you do not want the random quotes to show up.

==s

t== The disc was made of ##material,txt,iron##, had a diameter of ##diam,num,1.0## meters and a thickness of ##thick,num,10## mm. If the ##material,txt,iron## costs $##price,num,2.14## per pound, determine the

p==a==p volume of the disc in cubic centimeters

p==b==p specific gravity of the disc

p==c==p mass of the disc in kg

p==d==p the material cost (in $) for one of these discs

==t

s== The base case will go in the base case input tags below (please do not remove them) ==s

x== **Base Case Index = 1**

==x

u==

==u

w== The following short answer / reflection questions are available with this problem

i) Answer in type written form the following. Did you get the answer to the problem on the first try? If not, what mistake did you make? How could you minimize this mistake in the future? What concepts were involved in this problem? Give one specific example where the concepts in this problem could be applied to another system.

ii) Comparing the disc above to a utility access cover in the middle of some streets (aka manhole covers). Would this be a good material for these covers? Why or why not? Besides making them out of different material what two different modifications could be performed on the discs to make them more suitable for this application.

iii) What are some safety and societal implications of making street covers out of the material selected. Write at least four sentences exploring this.

==w