**Wei Zhang:**hi

**Luhao Wang:**hey

**Wei Zhang:**on the bottom of this spreadsheet

you will see 8 separate sheets one corresponding to each concept

the same is true for the other google sheet i shared with you

all of the one in the other except for manipulations are your property

the names of these six concepts in the spreadsheet and the name of these concepts in the screenshot i sent on facebook may be slightly different but should be similar enough so you know

eight concepts\*\*

**Luhao Wang:**cool

**Wei Zhang:**So, make sure you know which sheets these concepts are

Okay Howard

so for math unlike other subjects we are going to program our problems

let me demonstrate

so the first three columns should be as i typed in they should be constant across the entire spreadsheet

Wei Zhang has left.

Wei Zhang has opened the document.

**Wei Zhang:**what i sent in the screenshot and/or the name of each individual sheet may be too general to be of any help

Howard?

**Luhao Wang:**well I need the names of the courses right

**Wei Zhang:**For this spreadsheet every sheet belongs under Algebra 2

for the other spreadsheet everything belongs under Pre-Calculus

these are US course designations

because course names fluctuate a lot between Canadian provinces

we opt to choose US course names instead

**Luhao Wang:**true

**Wei Zhang:**sounds good?

**Luhao Wang:**yup

**Wei Zhang:**problems can be either multiple choice or short answer multiple choice problems may have 4 or 5 choices

**Luhao Wang:**wait how do I code it

**Wei Zhang:**wait

just watch my example

**Luhao Wang:**ok

Wei Zhang has left.

Wei Zhang has opened the document.

**Wei Zhang:**so the given example looks a little rough

but let's break it down for you

so okay in this question

you have two variables

PLUGIN\_INT\_VAR\_A

and PLUGIN\_INT\_VAR\_B

basically the idea is that when this spreadsheet gets fed into our database

**Luhao Wang:**ok

**Wei Zhang:**the computer can plug in any value for the variables

satisfying certain constraints

and thus make millions of possible problems instnatly

you see here

under Answer Choices

those are the constraints for the two variables

you see how we want BOTH variables A and variable B to be positive, correct?

(negative lengths in a triangle makes no sense)

**Luhao Wang:**uh huh

ye I got it

**Wei Zhang:**Just so you are aware

**Luhao Wang:**so round to nearest 100?

**Wei Zhang:**you can use conditions like &&, !=, == <>, || in your thing

**Luhao Wang:**can u explain those

**Wei Zhang:**so basically our system use Java syntax

Java is a programming language

**Luhao Wang:**Is there like a dictionary or reference or should I remember it

**Wei Zhang:**Refer to this link for explanation of the operators: https://www.tutorialspoint.com/java/java\_basic\_operators.htm

**Luhao Wang:**cool

**Wei Zhang:**in order of the five I gave you

they are:

and, not, equal, not, or

but there are others you can use

and you can combine operations to specify more things

remember

your problem must be realistic

thus that's why i had these conditions for my example

because my triangle lengths had to be positive

makes sense so far?

**Luhao Wang:**yea

**Wei Zhang:**great

okay so you understand that for our problem

the correct answer should be A/B rounded to two decimal places right

But what is this gigantic nonsense under the correct answer?

well basically the problem is if we just put A/B under correct answer

Java conventions automatically truncates the decimal places and puts an integer there

But trig ratios that are only integers are really boring

so we have to round right

What we do is to multiply A by 100 so we can get two extra decimal points worth of data after we divide by B

and then round that using the Java function Math.round

**Luhao Wang:**oh I get it

**Wei Zhang:**You then divide by 100.0

NOT 100

because you want the answer to be a decimal

if you just divided it by 100 your answer would again be an integer

but when you add the .0 to the 100 Java recognizes it as a decimal and returns a float variable instead

Your variables can be of a number of different types: http://www.learnjavaonline.org/en/Variables\_and\_Types

you see both of our variables are integers

since they contain INT inside of them

but you could've also put PLUGIN\_FLOAT\_VAR\_A for example

makes sense?

also

this PLUGIN nonsense

basically, variables need to be named very specifically if you want a variable to appear as a number instead of its name, put PLUGIN in front of it otherwise put NOPLUGIN in front of it for example, NOPLUGIN\_INT\_VAR\_A is an integer variable that will appear as A on the player's screen whereas PLUGIN\_INT\_VAR\_A is an integer variable that will appear as an actual integer on the player's screen

now if you want different bases make it something like PLUGIN\_B10NUMBER\_INT\_VAR\_B for a number or PLUGIN\_B10DIGIT\_INT\_VAR\_B for a digit a digit is an integer with restrictions, as you know Our system can process LaTeX so use latex whenever possible

Wei Zhang has left.

Wei Zhang has opened the document.

**Luhao Wang:**You there?

Hello

**Wei Zhang:**yup but you understand how this works

?

**Luhao Wang:**Ya its pretty intuitive

**Wei Zhang:**great

basically you want to create problems general enough

that you can solve in tenerality

this is what makes the process fun

cuz numerical problems are boring

but when you solve general problems

they can get hard

if you have cases for problems

you can use if else statements

like things like

**Luhao Wang:**Example?

ok

Wei Zhang has left.

**Luhao Wang:**you left again

**Wei Zhang:**it told me you left

i can see everything

**Luhao Wang:**Literally it says you left

**Wei Zhang:**PLUGIN\_INT\_VAR\_A >= 0 ? 10000 : PLUGIN\_INT\_VAR\_B \* Math.PI

**Luhao Wang:**ok

**Wei Zhang:**this thing i just typed

**Luhao Wang:**ye

**Wei Zhang:**is a ternary operator

**Luhao Wang:**?

**Wei Zhang:**which is shorthand for the if else statement i typed

actually for my if else statement

you need to put the world "return" in front of the expression you want to return if (PLUGIN\_INT\_VAR\_A >= 0) { return 10000; } else { return PLUGIN\_INT\_VAR\_B \* Math.PI; }

if this is confusing then try your best not to make questions that have conditional answers

In your correct answers

now sometimes in your correct answer you need to use things like modular arithmetic or square root or other math functions you need to use programming syntax, as usual for mod, use % now, in our example I used something called Math.abs which is a Java function that takes the absolute value of whatever that's inside the brackets Here is a list of functions you are allowed to use: https://docs.oracle.com/javase/7/docs/api/java/lang/Math.html SAVE THIS LINK When you use them, always put Math. in front of the method name so if you want to say take the cube root you want to put Math.cbrt does that make sense?

**Luhao Wang:**wait lemme read this

whats Math.Pl

ok nvm

I c

Wei Zhang has left.

**Wei Zhang:**yup pi

in Java

pi is just a string

of characters

while Math.PI is the constant as we know it

**Luhao Wang:**what does return 10000 mean

**Wei Zhang:**it means the answer is 10000

thus you return the answer 10000

as said

if the conditionals stuff is confusing

**Luhao Wang:**So if A>/=0 then 10000 otherwise the answer is B?

**Wei Zhang:**try not to use them

yup

**Luhao Wang:**ok

**Wei Zhang:**B times pi

but yeah you get the idea

You read the part about different functions you can use in your answer?

**Luhao Wang:**ya

**Wei Zhang:**great

save all the links i gave you today

**Luhao Wang:**so if I want cube root do I put B\*Math.cbrt

**Wei Zhang:**the cube root of B?

**Luhao Wang:**ye

**Wei Zhang:**Math.cbrt(B)

whatever goes inside the brackets of a function is the argument of that function

just like f(x) for example in math

**Luhao Wang:**aight

**Wei Zhang:**great

So

**Luhao Wang:**yes

**Wei Zhang:**alright now that those fields are taken care of the difficulty is a number between 1 and 10 the average should be 5 and that means CURRICULAR LEVEL

anything that vaguely resembles contest territory should be up in the 8s, 9s, or 10s and don't make many of those make most curricular level if not all for point distribution indicate the number of points you think the problem is worth between 1-5 points keep most problems between2-4 points

**Luhao Wang:**ok

So 1 for this problem?

or 2?

**Wei Zhang:**for this problem?

it's so easy so let's say 1

although you could argue 2

since there's no diagram

Now that brings me to diagrams

if you want an image in your problem just refer to a link in your problem like put the url in your problem

if you have to draw your own image say on geogebra upload it to your google drive turn sharing settings on to for public then put the link given to you in google drive in your problem

**Luhao Wang:**ok

Wei Zhang has left.

**Wei Zhang:**for multiple choice problems you can award a different number of points for each choice chosen for example do you see the example? the point distribution here means if they choose choice A they get 2 points if they choose choice C they get no points if they choose choice B they get 1 point sounds good?

**Luhao Wang:**yea

**Wei Zhang:**For hints, it's self explanatory just remember to put hints in correct order if you have multiple of them like Hint 1 in a cell above Hint 2 For Follow-up Question that's a Boolean field either T or F if it's T then the VERY NEXT QUESTION in the spreadsheet is the follow-up question to the current question so in the next question you can refer to the context of the previous question if the field is F then you can't do that sounds good?

The header for Follow-UP question is slightly misleading because there's no question number associated

when you make multiple choice questions, don't merge cells

you see my example with the third question?

**Luhao Wang:**ok

can you give me an example of hints

**Wei Zhang:**so Bob is smart is the first hint to come up

Alex is smart is the second

Wei Zhang has left.

Wei Zhang has opened the document.

**Wei Zhang:**in multiple choice questions, your choices will take up separate lines that's why you need to skip lines ALright this covers how you should write your problems Are there any questions?

**Luhao Wang:**Nop

\*Nope

**Wei Zhang:**note that, in your questions, do not duplicate variable names the variable name is whatever that comes after the VAR\_ in the full variable name

duplicated variables look like PLUGIN\_INT\_VAR\_C vs PLUGIN\_FLOAT\_VAR\_C for example

**Luhao Wang:**I see

**Wei Zhang:**okay any more questions? because after this we'll take two minutes to set up your volunteer log and then you're done

**Luhao Wang:**Do i have to specify difficulty for each follow up

**Wei Zhang:**Well the idea is that a follow up field just tells you the next question is connected to the previous

other than that the problems are entirely separate problems

**Luhao Wang:**ok

**Wei Zhang:**so yes you need to enter all the fields for the next problem just like you did in the previous one

makes sense?

**Luhao Wang:**Also one more thing how does the Boolean field thing work

**Wei Zhang:**T or F

T for true

F for false

**Luhao Wang:**where do I write T or F

or is it like set

**Wei Zhang:**example shown

**Luhao Wang:**I see

So F for the follow up if there are no more follow ups

**Wei Zhang:**yup

but you can start a new follow up anywhere

the only point of follow up

is to chunk questions together

in our system

these problems are randomized according to chunk

so if there's no follow up there's no guarantee one problem will appear before another

but if there is

**Luhao Wang:**oh

**Wei Zhang:**the problems will occur in the order specified

**Luhao Wang:**alright

I've got no more questions

**Wei Zhang:**awesome

i know this is a lot

but hey

think about it

your 5 questions per day

**Luhao Wang:**ya im learning something new

and that

**Wei Zhang:**is actually more like 5 billions questions per day

right?

**Luhao Wang:**true

lol

efficiency

**Wei Zhang:**exactly

the funny thing is

this system we have

seem to be very rare in the market

the only other company i think that uses something similar to this

is Khan Academy

so we have quite a bit of market advantage, if you know what i mean

**Luhao Wang:**Did you guys program it

**Wei Zhang:**yes of course

**Luhao Wang:**nice did you learn bit in your Uni courses or selftaught

**Wei Zhang:**uni courses, but i'm not the programmer on our team

our head programmer did this

**Luhao Wang:**the award winning programmer?

**Wei Zhang:**idk who is the award winning one

i think both are

and we are adding another award winning one to our team

so not super specific

:P

**Luhao Wang:**dayum too much talent

**Wei Zhang:**^^

So yes

if you were just making like stupid textbook problems per day

you'd be done your daily share

in like what

15 minutes?

This is why I expect you to take around an hour per day, max

**Luhao Wang:**Ok thats doable

**Wei Zhang:**awesome

okay lets go back to fb chat