

1.00/1.001 Introduction to Computers and Engineering Problem Solving

Fall 2002

Problem Set 1

Problem 1. Integer And Double Division (10%)

Within a java® program (main routine), do the following:

- (a) Declare an **int** variable and assign it the value "1/3". Print out the value of the variable.
- (b) Declare a **double** variable and assign it the value "1.0/3.0". Print out the value of the variable.
- (c) Declare a **double** variable and assign it the value "1/3". Print out the value of the variable.

When you are working with floating point numbers, it's a good idea to always add a ".0" to whole numbers to avoid integer rounding problems.

Problem 2. Java® Arithmetic (20%)

You do not need to submit code for this question, however please submit the answers to this question electronically as well as in hard-copy. You could include the answers at the end of Problem 1 using comments. For example:

```
// Problem 2. Answers : a = 1; b = 2; c = 3....
```

After the following piece of code:

```
long a = 50000;  
boolean b;  
int c = 3, d = 7;  
double e = 0.0;  
float f = 4.5F;
```

```

a %= d++ / --c;
b = (f > 4.0);
f *= -2;
if (b)
    e = a*a + c*d;
else
    e = a*a*a;

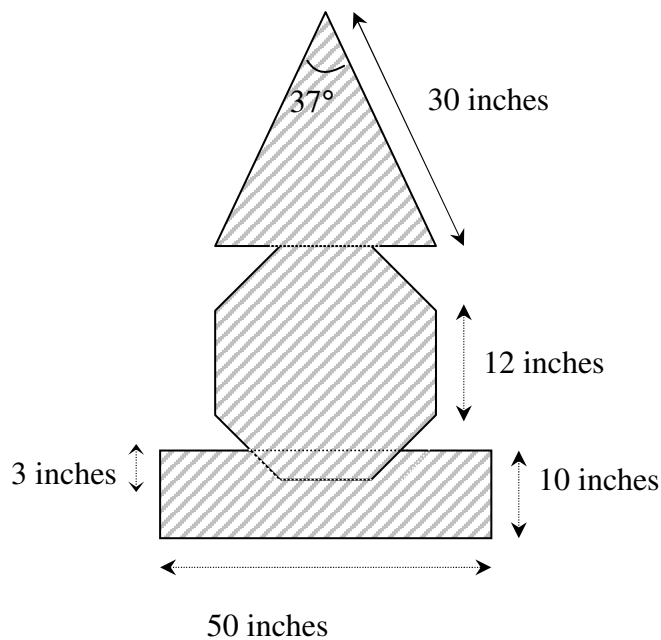
```

What is the value of

1. a?
2. b?
3. c?
4. d?
5. e?
6. f?

Problem 3. Calculating Area (70%)

Please write a program in `main()` which will calculate and output the total area of the shaded area.



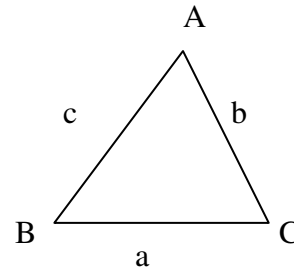
The figure is composed of one isosceles triangle with an apex of 37 degrees, one octagon (all sides are 12 inches and all angles are 135 degrees), and one rectangle. All sides of the rectangle are parallel to some sides of the octagon. The overlap area of the rectangle and the octagon is a trapezoid. You might find `Math.sin(radian)`, `Math.sqrt(x)`, `Math.PI`, `Math.pow(base, exp)` useful. Print out the area of the triangle, the area of

the octagon, the area of the rectangle and the area of the trapezoid. In the end print out the area of the shaded region.

Useful area formulas:

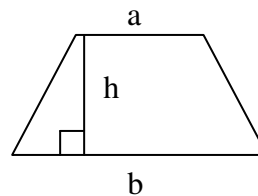
Triangle:

$$\begin{aligned} \text{area} &= 0.5 * a * b * \sin(C) \\ &= 0.5 * b * c * \sin(A) = 0.5 * a * c * \sin(B) \end{aligned}$$



Trapezoid:

$$\text{Area} = 0.5 * (a + b) * h$$



Turnin

Turnin Requirements

- Hardcopy and electronic copy of ALL source code (all .java files).
- Place a comment with your name, username, section, TA's name, assignment number, and list of people with whom you have discussed the problem set on ALL files you submit.
- Do NOT turn in electronic or hardcopies of compiled byte code (.class files).

Electronic Turnin

To electronically turn in your problem sets, follow the same instruction of Problem Set 0

Penalties

- Missing Hardcopy: -10% off problem score if missing hardcopy.
- Missing Electronic Copy: -30% off problem score if missing electronic copy.
- Late Turnin: -30% off problem score if 1 day late. More than 1 day late = NO CREDIT. Please do not turn in a printout if your problem set is late or if you have an extension.