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Homework: Lesson 01

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Question 1

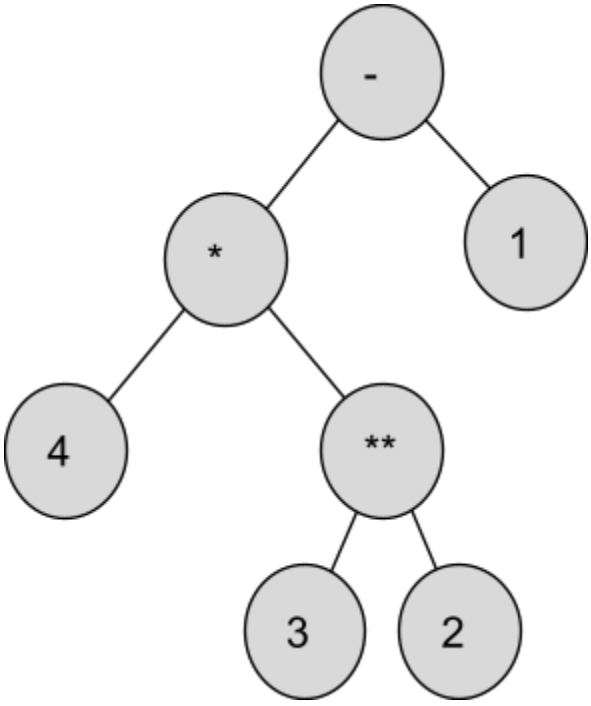
Give the data type and value of each of the following Python3 expressions

	Expression	Data Type	Value
(a)	`23 + 8`	`int`	`31`
(b)	`3 - 8`	`int`	`-5`
(c)	`17 / 5`	`float`	`3.4`
(d)	`3 * '12'`	`string`	`‘121212’`
(e)	`4 * 3 ** 2 + 1`	`int`	`37`

Question 2

Draw the evaluation tree corresponding to the Python3 expression
`4 * 3 ** 2 - 1`

To aid in your illustration, we provide a template tree as a figure below. Please click the figure below, select edit, REMOVE extraneous nodes from the tree, and then replace the “?” label on those nodes that remain to match the desired formula.



Question 3

Use Python to compute the following mathematical expression:

$$\frac{28.5 \cdot 3^{3} - 1500}{11^{2} + 37.3}$$

`Python expression:` `(28.5 * (3**3)-1500) / (11**2+37.3)`

`Calculated answer:` `-4.614655716993051`

Question 4

Heron's formula allows you to compute the area of a triangle based upon the lengths of its three sides, *a*, *b*, and *c*. The formula relies on defining intermediate value $s = \frac{a+b+c}{2}$. The area is then computed as $\sqrt{s(s-a)(s-b)(s-c)}$.

For example if a triangle has side length 5, 12, 13, then we'd get that $s = \frac{5+12+13}{2} = 15$ and then an area of $\sqrt{15 \cdot (15-5) \cdot (15-12) \cdot (15-13)} = \sqrt{15 \cdot 10 \cdot 3 \cdot 2} = \sqrt{900} = 30$.

Give a snippet of Python code that, presuming you start with definitions for a, b, and c, results in assigning a variable named `area` that is equal to the area of a triangle with those side lengths.

Hint: In a coming lesson we will learn how to import a function that computes square roots. For now, note that you can compute the square root of a value by raising it to the power 0.5.

Answer:

```
def heron(a, b, c):
    s = (a + b + c) / 2
    area = (s * (s-a) * (s-b) * (s-c)) ** 0.5
    print(area)

heron(5, 12, 13)
```