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| **Computer Science 1** | **Lab 06A**  **1-Day Minor Java Assignment** |
| **Arithmetic with math Library Functions** | **100 *through* 110 Point Versions** |
| **Assignment Purpose:**  The purpose of this program is to gain understanding of how to write complicated mathematical expressions using various functions & values from of the **math** library. | |

You will be given a series of mathematical expressions. You need to translate each expression into a Python program statement to compute its result, and then display it. This will be similar to what you did in Lab 4A with one big exception, this time you are using functions from the **math** library. You will notice that different problems are grouped by type. All *square root* problems use an s variable; all *absolute value* problems use an a variable; etc.

NOTE: Make sure you use **pi** for all calculations involving the value of.

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| **Lab 06A Student Version** | **Do not copy this file, which is provided.** |
| **1 # Lab06Ast.py  2 # "Arithmetic with math Library Functions"  3 # This is the student, starting version of Lab 06A.  4   5   6 from math import \*  7   8 print()  9 print("\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*") 10 print("Lab 06A, Arithmetic with math Library Functions") 11 print("100 Point Version") 12 print("By: JOHN SMITH") # Substitute your own name here. 13 print("\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*") 14 print("\n") 15  16 q = 8.5 17 w = 10 18 x = 5 19 y = 77.77 20 z = 1.21 21  22 s1 = sqrt(25) 23 print("s1 = ",s1) 24** | |

**These are the mathematical expressions that you need to translate into Python:**

**Square Root Problems**

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| **s1 =** | **s2 =** | | **s3 =** | | **s4 =** |
| **s5 =** | | **s6 =** | | **s7 =** | |

**Absolute Value Problems**

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| **a1 = | 7 |** | **a2 = | -7 |** | **a3 = | -x |** |
| **a4 = | y - z |** | **a5 = | z - y |** | **a6 = | |** |

**Factorial Problems**

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| **f1 = 7!** | **f2 = w!** | **f3 = x!** | **f4 = (wx)!** |

**Maximum/Minimum Problems**

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| **m1 =** The greater  of **7** & **2** | **m2 =** The greater  of **w** & **x** | **m3 =** The greater  of & |
| **m4 =** The lesser  of **7** & **2** | **m5 =** The lesser  of **w** & **x** | **m6 =** The lesser  of & |

**Rounding Problems**

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| **r1 = 8.0001**  *rounded up* | **r2 = 8.9999**  *rounded down* | | **r3 = y**  *rounded up* | | **r4 = z**  *rounded down* |
| **r5 = q**  *rounded with*  *banker’s rounding* | | **r6 =**  *rounded with*  *banker’s rounding* | | **r7 =**  *rounded with*  *banker’s rounding* | |

**Complicated Calculations**

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| **c1 =** | **c2 =** |
| **c3 =** The lesser of  and | **c4 =** The greater of  and |
| **c5 = !** | **c6 = q**  *rounded to the nearest integer*  (This is NOT the same as **r5**!) |
| The formula for the area of a circle is  **Area = r2** | |
| **c7 =**  *The area of a circle*  *whose radius is* **40***.* | **c8 =**  *The area of a circle*  *whose radius is* **w***.* |
| The formula for interest that compounds continuously is  **Amount = Prt**  where **P** is the *Principal* (Deposit), **r** is the annual interest *rate*  and **t** is the *time* measured in years. | |
| **c9 =** *The amount you would have if you put $25,000 in*  *the bank and left it alone for*  *5 years at 10% interest.* | **c10 =** *The amount you would have if you put $400,000 in*  *the bank and left it alone for*  *30 years at 7.5% interest.* |

**100 Point Output**

The 100-point version requires that all calculations on page 2 are performed.

You are NOT required to perform the “Complicated Calculations” from page 3.

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|  ----jGRASP exec: python Lab06Av100.py  \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Lab 06A, Arithmetic with math Library Functions 100 Point Version By: JOHN SMITH \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*   s1 = 5.0 s2 = 10.0 s3 = 1.7320508075688772 s4 = 2.23606797749979 s5 = 8.818730067305609 s6 = 9.097801932335084 s7 = 2.922282365322278  a1 = 7 a2 = 7 a3 = 5 a4 = 76.56 a5 = 76.56 a6 = 0.423310825130748  f1 = 5040 f2 = 3628800 f3 = 120 f4 = 30414093201713378043612608166064768844377641568960 512000000000000  m1 = 7 m2 = 10 m3 = 3.141592653589793 m4 = 2 m5 = 5 m6 = 2.718281828459045  r1 = 9 r2 = 8 r3 = 78 r4 = 1 r5 = 8 r6 = 3 r7 = 3   ----jGRASP: operation complete. |

**110 Point Output**

The 110-point version requires that ALL calculations are performed. This means all of the calculations from page 2 AND all of the “Complicated Calculations” from page 3. Even if you do not figure out how to perform all of the “Complicated Calculations”, you will still earn 1 bonus point for everyone that you do. For example, if you figure 3 of them out, you will earn a 103.

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|  ----jGRASP exec: python Lab06Av110.py  \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Lab 06A, Arithmetic with math Library Functions 110 Point Version By: JOHN SMITH \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*   s1 = 5.0 s2 = 10.0 s3 = 1.7320508075688772 s4 = 2.23606797749979 s5 = 8.818730067305609 s6 = 9.097801932335084 s7 = 2.922282365322278   a1 = 7 a2 = 7 a3 = 5 a4 = 76.56 a5 = 76.56 a6 = 0.423310825130748  f1 = 5040 f2 = 3628800 f3 = 120 f4 = 30414093201713378043612608166064768844377641568960 512000000000000  m1 = 7 m2 = 10 m3 = 3.141592653589793 m4 = 2 m5 = 5 m6 = 2.718281828459045  r1 = 9 r2 = 8 r3 = 78 r4 = 1 r5 = 8 r6 = 3 r7 = 3  c1 = 2.0 c2 = 0.6506234126825963 c3 = 1968744043.4072266 c4 = 23.140692632779263 c5 = 20922789888000 c6 = 9 c7 = 5026.548245743669 c8 = 314.1592653589793 c9 = 41218.031767503206 c10 = 3795094.3345434098   ----jGRASP: operation complete. |