**CS5250 Advanced Operating Systems**

**Pop Quiz 3**

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Write the snippet of x86-64 assembly code that will compute the polynomial:

*a* = 3*x*3 – 4*x*2 + 5*x* – 6

where “*a*” is **%rax** and *x* is in the memory location pointed to by **%rbp**. Both *a* and *x* are 64-bit integers. You may assume that all registers *other than* **%rbp**, **%rsp** and **%rip** are available for your use. The final answer is to be left in **%rax**.

Solution:

*a* = 3*x*3 – 4*x*2 + 5*x* – 6

*= x [ 3x2 - 4x + 5] - 6*

*=x [ x (3x - 4) + 5] - 6*

Code:

**movq (%rbp), %rax #rax = x**

**movq (%rbp), %rbx #rbx = x**

**addq %rbx, %rax #rax = 2x**

**addq %rbx, %rax #rax = 3x**

**subq $4, %rax #rax = 3x-4**

**imulq %rbx %rax #rax = x(3x-4)**

**addq $5, %rax #rax = x(3x-4)+5**

**imulq %rbx, %rax #rax = x[x(3x–4)+5]**

**subq $6, %rax #rax = x[x(3x-4)+5]-6**