

- (25) 1. Finite precision arithmetic.
- (a) Let $a = 0.0079346$ and $b = 42.0963$. Compute the 3 (decimal) digit rounding representations of a and b , call them \bar{a} and \bar{b} respectively.
- $\bar{a} =$
 - $\bar{b} =$
 - What is the relative error in \bar{a} ?
- (b) Describe the machine epsilon?
- (c) What do we mean by overflow?
- (d) What is cancellation?
- (e) What is 17.4267 in base 5? (just kidding)
What can you say about s if $\text{fl}(s + 1,000,000) = 1,000,000$?

(10) 2. Let $P(x) = 4x^3 - x^2 + 2x + 3$.

(a) Use Horner's method to find $P(2)$.

(b) What is the remainder when P is divided by $(x - 2)$?

(5) 3. Briefly describe Mueller's method.

(5) 4. How would you suggest finding all of the roots of a polynomial of degree $n > 8$?

(20) 6. Let $f(x) = x^2e^x$.

(a) State the Taylor polynomial theorem in its general form.

(b) Compute $P_2(x)$, the degree 2 Taylor polynomial for f at $x_0 = 0$.

(c) Use P_2 to approximate $f(0.25)$.

(d) What is the remainder term associated with P_2 at $x = 0.25$?