m8s05, Quiz 2	Name:	Section:

Answer ALL questions. Unless instructed otherwise, you should show ALL your work and simplify your final answer as much as possible. Please box your final answer to each part.

Problem 1: [12 pts]

(**a**) Compute the 3rd order Taylor polynomial for $x^{1/3}$ centered at $x = 1$.

(**b**) The Taylor series for $x^{-1/2}$ centered at $x = 1$ is given by

$$1 + \sum_{n=1}^{\infty} (-1)^n \frac{1.3.5....(2n-1)}{2^n n!} (x-1)^{2n+1}.$$

Use the Taylor series to compute $\sqrt{\frac{10}{11}}$ as a fraction, accurate to within 10^{-4}. (You must justify that your answer is within this accuracy).

Problem 2: [13 pts] Consider the three points $A(1, 0, -1)$, $B(2, -1, 2)$ and $C(1, 3, 1)$.

(**a**) What is the radius of the sphere centered at the point A that passes through the point B?

(**b**) What is the angle $\angle BAC$? (i.e. the angle at A.) You may leave your answer in the form of an arccos.

(**c**) Find the vector projection of $\vec{AB}$ onto $\vec{AC}$.

(**d**) A point D is constructed on the straight line through A and C so that the triangle $\triangle ABD$ has a right angle at D. Find the coordinates of the point D. (You may find it useful to use your answer to (c)).