

Name (print neatly): KEY Score: /20**Quiz 2: Thursday, January 29, 2014**

To receive full credit, show all work necessary to justify answers and all steps of solutions and derivations clearly, in logical sequence, using notation developed in class. Partial credit will be given only for significant progress toward a solution.

1. It is known that $a(t)$ is of the form bt^3+c for some real numbers b and c . Suppose \$20 invested at time 0 accumulates to \$24 at time 2.

(a) Find b and c . (Do not round.)

Since $a(t)$ is an accumulation function, we must have

$$\boxed{a(0)=1} \quad \leftarrow \text{key idea!}$$

$$\text{so } b \cdot 0^3 + c = 1$$

$$\underline{\underline{c = 1}}$$

$$\text{so } a(t) = bt^3 + 1.$$

We are given that $20a(2) = 24$

$$20[b(2)^3 + 1] = 24$$

$$8b + 1 = \frac{24}{20}$$

$$8b = 1.2 - 1$$

$$b = \frac{0.2}{8} = \frac{1}{40} = \underline{\underline{0.025}}$$

We conclude that

$$\boxed{a(t) = 0.025t^3 + 1}$$

- (b) Find the accumulated value at time 10 of \$500 invested at time 1. (Round the final answer (only) to the nearest penny.)

Let X be this accumulated value:

$$\text{Then } \frac{X}{500} = \frac{a(10)}{a(1)}$$

$$X = \frac{500 [0.025(10)^3 + 1]}{0.025(1)^3 + 1}$$

$$= \frac{500(26)}{1.025}$$

$$\approx \underline{\underline{\$12,682.93}}$$

