

Name: HW 1.2 Key

1. An account earns compound interest at an annual effective rate of 10% during years 1 - 2, at an annual effective rate of 3% during years 3 - 5, and at an annual effective rate of 7% during years 6 - 10. Find the effective annual rate of interest earned by the account over the entire 10-year period.

☒ A) 6.37% B) 6.18% C) 6.56% D) 6.75% E) 6.94%

$$(1+i)^{10} = (1.10)^2 (1.03)^3 (1.07)^5$$

$$i = \boxed{6.37\%}$$

2. An account earns simple interest at an annual rate of 14%. Let i_t denote the annual effective rate for year t . Find the earliest year for which $i_t < 6\%$.

☒ A) 11 B) 12 C) 13 D) 14 E) 15

$$i_t = \frac{a(t) - a(t-1)}{a(t-1)} = \frac{(1+0.14t) - (1+0.14(t-1))}{1+0.14(t-1)} = \frac{0.14}{1+0.14(t-1)}$$

Using "table" function of TI-30XS: $\boxed{t=11}$

3. Bernie borrows 2200. The loan is charged simple interest at an annual rate of 19% and is repaid at the end of 22 years. Find the annual effective rate of interest that Bernie paid on the loan during the 22-year period.

☒ A) 7.76% B) 7.06% C) 7.30% D) 7.53% E) 8.00%

$$2200(1+0.19(22)) = 11,396$$

$$2200(1+i)^{22} = 11,396$$

$$i = \boxed{7.76\%}$$

4. An amount of 1200 is deposited into a fund that earns interest according to the accumulation function $a(t) = e^{kt^2}$. The accumulated value of the account at the end of year 7 is 1958.78. Find the annual effective interest rate during the first 3 years.

☒ A) 3.05% B) 2.95% C) 3.14% D) 3.23% E) 3.32%

$$1200 e^{k(49)} = 1958.78 \rightarrow k = 0.01$$

$$a(3) = e^{0.01(9)} = 1.09417$$

$$(1+i)^3 = 1.09417$$

$$i = \boxed{3.045\%}$$

5. At $t = 0$, Anna invests 200 into an account earning simple interest at an annual rate of 8%. Her effective rate of interest during year 4 is equal to i .

Also at $t = 0$, Dan invests 800 into an account crediting compound interest at an annual rate of i . What is the value of Dan's account after 8 years?

☒ A) 1319 B) 1161 C) 1200 D) 1240 E) 1280

$$i_4 = \frac{0.08}{1+0.08(3)} = 0.064516$$

$$800 (1.064516)^8 = \boxed{1319.19}$$