Name
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SHOW AS MUCH WORK AS POSSIBLE BECAUSE YOU MAY RECEIVE PARTIAL CREDIT FOR THE WORK YOU DO IF YOUR ANSWER IS INCORRECT.

1. Your friend buys $10 in lottery tickets each week. To show him what a poor investment that is, you decide to save $10 a week in your 3.9% APR bank account instead.

    a. What is your bank account's periodic interest rate?   0.075%

    $$\frac{r}{m} = \frac{0.039}{52} = 0.00075 = 0.075\%$$

    b. How much will each of you "invest" in one year? $520

    c. How much will your account be worth after one year? $530.07

    $$FV = P \cdot \frac{\left(1+\frac{r}{m}\right)^{mt} - 1}{r/m} = 10 \cdot \frac{\left(1+0.00075\right)^{52} - 1}{0.00075} = \$530.07$$

    d. Your friend gets lucky and wins $50,000. How many years will it take for your account to be worth that much (round up to the nearest year)?   40 years

    $$mt = \frac{\log\left(1 + \frac{FV}{P} \cdot \frac{r}{m}\right)}{\log\left(1 + \frac{r}{m}\right)} = \frac{\log\left(1 + \frac{50000}{10} \cdot 0.00075\right)}{\log\left(1 + 0.00075\right)} = 2078.3 \, weeks$$

    $$t = \frac{2078.3}{52} \approx 40 \, years$$

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