Topic: Single deposit, compounded n times, present value

Question: Find the present value of a single deposit that has a future value of $\$945$ after 6 years, if the account carries an annual interest of $5.5\,\%$, but compounds monthly.

Answer choices:

A $\$679.90$

B $\$824.63$

C $\$743.88$

D $\$523.81$

Solution: A

Since we've been asked to find present value, we'll solve the future value formula for PV.

$$FV = PV\left(1 + \frac{r}{n}\right)^{nt}$$

$$PV = \frac{FV}{\left(1 + \frac{r}{n}\right)^{nt}}$$

Plugging the values we've been given into this formula, remembering that $n = 12$ since there are 12 months in a year and interest is compounded monthly, we get

$$PV = \frac{945}{\left(1 + \frac{0.055}{12}\right)^{(12)(6)}}$$

$$PV = \frac{945}{1.005^{72}}$$

$$PV \approx \$679.90$$

Topic: Single deposit, compounded n times, present value

Question: Find the present value of an investment that has a future value of $\$7{,}345.25$ after 10 years, if the weekly compounded annual interest rate is $4.3\,\%$.

Answer choices:

A $\$3{,}846.43$

B $\$6{,}486.43$

C $\$2{,}346.43$

D $\$4{,}779.00$

Solution: D

Since we've been asked to find present value, we'll solve the future value formula for PV.

$$FV = PV\left(1 + \frac{r}{n}\right)^{nt}$$

$$PV = \frac{FV}{\left(1 + \frac{r}{n}\right)^{nt}}$$

Plugging the values we've been given into this formula, remembering that $n = 52$ since there are 52 weeks in a year and interest is compounded weekly, we get

$$PV = \frac{7{,}345.25}{\left(1 + \frac{0.043}{52}\right)^{(52)(10)}}$$

$$PV = \frac{7{,}345.25}{\left(1 + \frac{0.043}{52}\right)^{520}}$$

$$PV \approx \$4{,}779.00$$