What is the Time Value of Money?

Worksheet

The time value of money states that money available now is worth more than the same amount later, because of its earning potential; future value FV = PV (1 + r)^n grows a present sum PV at rate r over n periods.

FV = PV(1 + r)^n

Questions

1. You invest $8,000 at 4% annual interest for 5 years. What is the approximate future value?
A) $8,320
B) $9,733
C) $10,000
D) $8,000

2. What does a higher interest rate do to future value, holding PV and n constant?
A) Decreases it
B) Has no effect
C) Increases it
D) Makes it negative

3. What is the present value of $12,000 to be received in 3 years at a 10% discount rate?
A) $9,015
B) $12,000
C) $10,800
D) $8,000

4. Which factor does NOT appear in the future value formula FV = PV(1+r)^n?
A) Present value (PV)
B) Interest rate (r)
C) Number of periods (n)
D) Inflation rate specifically

5. You invest $10,000 today at an annual interest rate of 5%, compounded annually. What will it be worth in 10 years?

6. How much would $5,000 grow to in 6 years at an 8% annual rate?

7. You want $20,000 in 5 years and can earn 6% annually. How much must you invest today (present value)?

8. Define: What is the time value of money?

9. Define: What is the future value formula?

10. Define: What is present value?

Answer Key

1. B) $9,733 - FV = 8,000 (1.04)^5 8,000 1.2167 $9,733.

2. C) Increases it - A higher rate compounds faster, increasing future value.

3. A) $9,015 - PV = FV/(1+r)^n = 12,000/(1.10)^3 12,000/1.331 $9,015.

4. D) Inflation rate specifically - The basic FV formula uses PV, r, and n - a separate inflation rate isn't one of its variables (though r may implicitly include it).

5. FV = PV (1+r)^n = 10,000 (1.05)^10 (1.05)^10 1.6289 FV 10,000 1.6289 = $16,289

6. FV = 5,000 (1.08)^6 (1.08)^6 1.5869 FV 5,000 1.5869 $7,934.37

7. FV = PV (1+r)^n PV = FV / (1+r)^n PV = 20,000 / (1.06)^5 (1.06)^5 1.3382 PV 20,000 / 1.3382 $14,946

8. The principle that a dollar today is worth more than a dollar in the future because it can earn interest or returns.

9. FV = PV (1 + r)^n, where r is the interest rate per period and n is the number of periods.

10. The current worth of a future sum of money, discounted at a given rate: PV = FV / (1 + r)^n.