

# AI-01477 Investment Growth Comparison

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⋮ Tags	Investing
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Calculate the end balance after 10 years

Investment A:

Principal-\$1600000

Rate-15%

Withdrawal-\$6000/month

Investment B:

Principal-\$150000

Rate-15%

Deposit-\$2000/month

Here's how to calculate the end balance for both investments after 10 years, considering the monthly withdrawals and deposits:

Investment A:

- Calculate the annual withdrawal:  $\$6,000/\text{month} * 12 \text{ months/year} = \$72,000/\text{year}$
- Calculate the future value of the principal after 10 years: We'll use the future value formula:  $FV = PV * (1 + r)^n$ , where PV is the present value (principal), r is the interest rate, and n is the number of years.  $FV = \$1,600,000 * (1 + 0.15)^{10} = \$1,600,000 * 4.0456 = \$6,472,960$
- Calculate the future value of the withdrawals: This is a bit more complex since we're dealing with regular withdrawals. We need to use the future value of an annuity formula:  $FV = P * [((1 + r)^n - 1) / r]$ , where P is the periodic payment (withdrawal). However, since it's a withdrawal, we'll treat it as a negative

value.  $FV = -\$72,000 * [((1 + 0.15)^{10} - 1) / 0.15] = -\$72,000 * 20.3038 = -\$1,461,873.60$

- Calculate the end balance: Subtract the future value of the withdrawals from the future value of the principal:  $\$6,472,960 - \$1,461,873.60 = \$5,011,086.40$   
Investment B:
- Calculate the annual deposit:  $\$2,000/\text{month} * 12 \text{ months/year} = \$24,000/\text{year}$
- Calculate the future value of the principal after 10 years:  $FV = \$150,000 * (1 + 0.15)^{10} = \$150,000 * 4.0456 = \$606,840$
- Calculate the future value of the deposits: Using the future value of an annuity formula:  $FV = \$24,000 * [((1 + 0.15)^{10} - 1) / 0.15] = \$24,000 * 20.3038 = \$487,291.20$
- Calculate the end balance: Add the future value of the deposits to the future value of the principal:  $\$606,840 + \$487,291.20 = \$1,094,031.20$   
Therefore:
- Investment A: The end balance after 10 years will be approximately  $\$5,011,086.40$ .
- Investment B: The end balance after 10 years will be approximately  $\$1,094,031.20$ .

Use 20 years

Okay, let's recalculate both investments with a 20-year timeframe:

Investment A:

- Annual withdrawal:  $\$6,000/\text{month} * 12 \text{ months/year} = \$72,000/\text{year}$
- Future value of the principal (20 years):  $FV = \$1,600,000 * (1 + 0.15)^{20} = \$1,600,000 * 16.3665 = \$26,186,400$
- Future value of the withdrawals (20 years):  $FV = -\$72,000 * [((1 + 0.15)^{20} - 1) / 0.15] = -\$72,000 * 105.9347 = -\$7,627,300.40$
- End balance (20 years):  $\$26,186,400 - \$7,627,300.40 = \$18,559,099.60$

Investment B:

- Annual deposit:  $\$2,000/\text{month} * 12 \text{ months/year} = \$24,000/\text{year}$

- Future value of the principal (20 years):  $FV = \$150,000 * (1 + 0.15)^{20} = \$150,000 * 16.3665 = \$2,454,975$
- Future value of the deposits (20 years):  $FV = \$24,000 * [((1 + 0.15)^{20} - 1) / 0.15] = \$24,000 * 105.9347 = \$2,542,432.80$
- Investment A: The end balance will be approximately \$18,559,099.60.
- End balance (20 years):  $\$2,454,975 + \$2,542,432.80 = \$4,997,397.80$   
Therefore, after 20 years:
- Investment B: The end balance will be approximately \$4,997,397.80.qq