

## Solutions

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### 2.1

Rate and time both use years.

$$I = Prt = 800(0.05)(3) = 120$$

Interest 120 units.

### 2.2

Apply two annual multipliers.

$$A = P(1 + r)^n = 800(1.05)^2 = 882$$

Value 882 units.

### 2.3

Use the specified monthly rate with six monthly periods.

$$A = P(1 + r_m)^n$$

$$A = 1000(1.01)^6$$

Correct matching rate and period.

$$A = 1000(1.01)^6 \approx 1061.52$$

Value 1061.52 units.

### 2.4

Use the stated interest-before-payment recurrence.

$$B_n = B_{n-1}(1 + r) - M$$

$$B_1 = 600(1.01) - 100 = 506$$

First balance 506.

$$B_2 = 506(1.01) - 100 = 411.06$$

Second balance 411.06.

### 3.1

A adds simple interest to principal.

$$A_S = P(1 + rt) = 2000(1 + 0.06(3)) = 2360$$

A value 2360. B uses repeated multiplication.

$$A_C = P(1 + r)^n = 2000(1.055)^3 = 2348.48275$$

B value 2348.48 to two decimal places.

$$\Delta = A_S - A_C = 2360 - 2348.48275 \approx 11.52$$

Difference 11.52. A's final value is higher under the specified terms. This does not compare risk, availability or any unstated conditions.

### 3.2

Use the recurrence with interest first.

$$B_n = B_{n-1}(1 + r) - M$$

$$B_1 = 1000(1.02) - 300 = 720$$

First balance.

$$B_2 = 720(1.02) - 300 = 434.40$$

Second balance.

$$B_3 = 434.40(1.02) - 300 = 143.088$$

Third balance. Period 4's final payment includes its interest.

$$M_4 = B_3(1 + r) = 143.088(1.02) = 145.94976 \approx 145.95$$

Final payment 145.95.

$$T = 3M + M_4 = 3(300) + 145.94976 \approx 1045.95$$

Total paid 1045.95.

$$I = T - P = 1045.94976 - 1000 \approx 45.95$$

Total interest 45.95. Carry unrounded balances through this mathematical model; an actual contract may specify a different rounding rule.