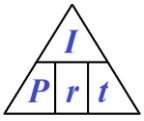
Compound Interest – Unit Review

1. Use the simple interest triangle to write the formula for each of the variables



$I = Prt$ $P = \frac{I}{rt}$ $r = \frac{I}{Pt}$ $t = \frac{I}{Pr}$

2. Write the following interest rates as they would appear in the **simple interest** formula as ***r***.

a) 9.5% $= 0.095$ **b)** 4.25% $= 0.0425$ **c)** 0.75% $= 0.0075$

3. Write the following lengths of time as they would appear in the **simple interest** formula as ***t***.

a) $\frac{30}{12} = 2.5$ **b)** $\frac{25}{52} = 0.4808$ **c)** $\frac{193}{365} = 0.5289$

4. How much interest is earned on $500 invested for 42 months at 5.5% per year **simple interest**?

$I = ?$, $P = 500$, $r = 5.5\% = 0.055$, $t = 42 \text{ months} \div 12 = 3.5$

$I = Prt$
$= 500(0.055)(3.5)$
$= 96.25$

∴ $96.25 interest is earned.

5. How much money must be invested at 6% per year, **simple interest** to earn $500 in interest in two years?

$I: 500$, $P: ?$, $r = 0.06$, $t = 2 \text{ years}$

$P = \frac{I}{rt} = \frac{500}{0.06 \cdot 2} = 4166.67$

∴ $4166.67 must be invested.

6. What **simple interest** rate is needed to grow $150 to $200 in 24 months?

$I = 50$, $P = 150$, $r = ?$, $t = 24 \text{ months} \div 12 = 2 \text{ years}$

$r = \frac{I}{Pt} = \frac{50}{150 \cdot 2} = 0.167$

The rate is ∴ 16.7%

7. Write the following interest rates as they would appear in the compound interest formula as ***i***.

a) 2% bi-weekly $0.02 \div 26$ **b)** 5.5% monthly $0.055 \div 12$ **c)** 12% quarterly $0.12 \div 4$

8. Write the number of compounding periods as it would appear in the **compound interest** formula ***n***.

a) Compounded weekly for 3 years 3×52 **b)** Compounded semi-monthly for 2 years 2×24 **c)** Compounded semi-annually for 20 months $2 \times \frac{20}{12}$

9. Calculate the amount of a $30 000 investment at 6.75% per year, compounded quarterly for 4 years. How much interest was earned?

T: quarterly
A: ?
P: 30000
i: 0.0675 ÷ 4
n: 4 × 4

$A = P(1+i)^n$
$= 30000(1 + 0.0675 \div 4)^{16}$
$= 39210.50$

$I = A - P$
$= 39210.50 - 30000$
$= 9210.50$

∴ $9210.50 interest earned

10. Most department store credit cards charge 24% per year interest compounded monthly on unpaid balances. How much interest would a $1400 credit card debt accrue (be charged) if the balance was not paid for 3 months?

T: c. monthly
A: ?
P: 1400
i: 0.24 ÷ 12
n: 3 months

$A = P(1+i)^n$
$= 1400(1 + 0.24 \div 12)^3$
$= 1485.69$

$I = A - P$
$= 1485.69 - 1400$
$= 85.69$

∴ $85.69 charged

11. How much money would Lily have to invest today to have $500 in three years, at 11% per year, compounded monthly?

T: c. monthly
A: 500
P: ?
i: 0.11 ÷ 12
n: 3 years × 12

$P = A(1+i)^{-n}$
$= 500(1 + 0.11 \div 12)^{-36}$
$= 694.44$

∴ She has to invest $694.44