

Interest Problems

Remember the simple interest formulas: $I = Prt$ and $A = P + I$ or $A = P + Prt$

1. Hector took out a small loan of \$900 for 2 years at 10.5% simple interest.

a. How much interest will Hector have to pay?

$$900 * .105 * 2 = 189$$

b. What will be the total amount Hector will have to pay back?

$$900 + 189 = 1089$$

2. The price of a new computer is \$875. The store lets you take the computer now and make no payments for 2 years. If you take that option, you will have to pay them 7% simple interest.

a. If you pay 2 years later, how much interest will you have to pay?

$$875 * .07 * 2 = 122.5$$

b. If you pay 2 years later, what will be the total cost of the computer?

$$875 + 122.5 = 997.5$$

3. Karla lends her sister \$500. When her brother doesn't pay her back for $3\frac{1}{2}$ years, she decides to charge him 25% interest simple.

a. How much interest will the brother owe Karla?

$$500 * .25 * 3.5 = 437.5$$

b. How much total money will he have to pay back?

$$500 + 437.5 = 937.5$$

4. Suppose Mr. Burrow has to take out a loan from the mafia to buy toilet paper during the COVID-19 crisis. He borrows \$69.99 at 70% simple interest, but then he forgets and doesn't pay back the loan until 71 years later.

a. How much interest will Mr. Burrow have to pay?

$$69.99 * .70 * 71 = 3478.503$$

b. How much total money will he have to pay back?

$$69.99 + 3478.503 = 3548.49$$

NOTE: You would round the first answer to \$3478.50 .

(BTW – Mr. Burrow does have plenty of toilet paper.)

5. Romeo buys a \$2,500 wedding ring for Juliet. To pay for it he takes out a loan at 5% simple interest. He pays back the loan 4 years later?

a. How much interest will Romeo have to pay?

$$2500 \cdot .05 \cdot 4 = 500$$

b. How much total money will he have to pay back?

$$2500 + 500 = 3000$$

6. A bond will be worth \$5,000 when it matures. If the bond earns 4% interest and it matures 10 years from now, how much is the purchase price of the bond?

$$5000 = P + P \cdot .04 \cdot 10$$

$$5000 = 1.4P$$

$$5000 / 1.4 = 3571.428571$$

NOTE: You would round to dollars and cents → \$3571.43 .

7. Suzanne loans Tammy \$400. Tammy pays back \$496 three years later.

a. How much interest did Tammy pay?

$$496 - 400 = 96$$

b. What was the rate of simple interest?

$$96 / 1200 = .08$$

$$96 = 400 \cdot r \cdot 3$$

$$96 = 1200r$$

$$.08 \text{ or } 8\%$$

8. The oldest bond in history that is still paying interest was originally taken out in the year 1648 by the Dutch Water Board to build canals in Holland. The bond still exists and is today owned by Yale University. While the bond was originally issued in Dutch guilders, when the euro came into existence, it was re-valued at €500. The bond earns 2% interest each year.

a. How many years has the bond been paying interest?

$$2020 - 1648 = 372 \text{ years}$$

b. What is the total value (in euros) of the interest the bond has earned?

$$500 \cdot .02 \cdot 372 = 3720$$

Remember the compound interest formula: $A = P \left(1 + \frac{r}{n}\right)^{(nt)}$

9. Alyssa invests \$1,250 at 5% interest compounded monthly. How much money will she have after 6 years?

$$A = 1250 \left(1 + \frac{.05}{12}\right)^{(12 \cdot 6)}$$

$$1250 \left(1 + \frac{.05}{12}\right)^{(12 \cdot 6)} = 1686.27218$$

You would round the answers on this whole section to dollars and cents → \$1686.27

10. A newborn child receives a \$20,000 gift toward a college education from her grandparents. How much will the \$20,000 be worth in 17 years if it is invested at 7% and compounded quarterly?

$$A = 20,000 \left(1 + \frac{.07}{4}\right)^{(4*17)}$$

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20000(1+.07/4)^(
4*17)
65068.44269
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11. Zeke's savings account has a balance of \$2513.45. The account earns 2.5% interest, compounded quarterly. How much money will be in the account 3 years from now?

$$A = 2513.45 \left(1 + \frac{.025}{4}\right)^{(4*3)}$$

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2513.45(1+.025/4
)^^(4*3)
2708.575656
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12. Ryan gets a \$3,000 bonus from his first job. He puts the money in a retirement account that earns 8% interest, compounded monthly. How much will that bonus have grown to in 45 years?

$$A = 3000 \left(1 + \frac{.08}{12}\right)^{(12*45)}$$

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3000(1+.08/12)^(
12*45)
108490.7978
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13. A credit card charges 18% interest, compounded monthly. Suppose you charge \$2419.72 on that credit card, and you pay it back 3 months later.

- a. What is "t", the time for this problem?

$$\frac{3}{12} \text{ or } \frac{1}{4} \text{ or } .25$$

- b. How much will you owe on the credit card after 3 months?

$$A = 2419.72 \left(1 + \frac{.18}{12}\right)^{(12*.25)}$$

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2419.72(1+.18/12
)^^(12*.25)
2530.248878
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14. Suppose Mr. Burrow wins \$1,234,567.89 in the lottery. He decides to invest the money in an account that earns 10% interest, compounded daily. How much money will he have 11 years from now?

$$A = 1,234,567.89 \left(1 + \frac{.10}{365}\right)^{(365*11)}$$

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123456789(1+.10/
365)^(365*11)
370828818.6
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15. How much money would you have to invest now in order to have \$5,000 six years from now if you put the money in an account that earns 9% interest, compounded quarterly?

$$5000 = P \left(1 + \frac{.09}{4}\right)^{(4*6)}$$
$$5000 = P \cdot 1.705766576$$
$$\mathbf{\$2931.23 = P}$$

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(1+.09/4)^(4*6)
1.705766576
5000/Ans
2931.233423
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