

# Percent Homework

B13. Cindy, Clara, and Chloe are three sisters. Each has plans to save for retirement, but their plans are somewhat different. Despite their different lives, by the time each was 25 years old she had the ability to set aside \$3,000 per year for retirement. All three use a retirement account that earns 8% annual compound interest. How much will each sister have saved when she retires at age 65?  $0.08$

Cindy

Sum of Annuity Due                      10 yrs,    \$ 3,000  
Compound Interest                      30 yrs

Final Amount = [ Principal  $\times$  (1 + rate)<sup>(years + 1)</sup> - Principal  $\times$  (1 + rate)]  $\div$  rate

$$\begin{aligned} &= (\$3,000 \cdot 1.08^{11} - \$3,000 \cdot 1.08) \div 0.08 \\ &= \$46,936.46 \end{aligned}$$

Final Amount = Principal  $\times$  (1 + interest rate per payout)<sup>number of payouts</sup>

$$\begin{aligned} &= \$46,936.46 \cdot 1.08^{30} \\ &= \boxed{\$472,305.52} \end{aligned}$$

bonus - what is 4% for an annual use during retirement?

$$0.04 \cdot \$472,305 \approx \boxed{\$18,892}$$

**B13.** Cindy, Clara, and Chloe are three sisters. Each has plans to save for retirement, but their plans are somewhat different. Despite their different lives, by the time each was 25 years old she had the ability to set aside \$3,000 per year for retirement. All three use a retirement account that earns 8% annual compound interest. How much will each sister have saved when she retires at age 65? —

Clara

~~Compound Interest~~ ~~10 yrs~~ *not saving*  
 Sum of Annuity Due      30 yrs,      \$ 3,000

$$\text{Final Amount} = [\text{Principal} \times (1 + \text{rate})^{\text{years} + 1} - \text{Principal} \times (1 + \text{rate})] \div \text{rate}$$

$$= (\$3,000 \cdot 1.08^{31} - \$3,000 \cdot 1.08) \div 0.08$$

$$= \boxed{\$367,037.60}$$

*bonus - what is 4% for an annual use during retirement?*

$$0.04 \cdot \$367,037 \approx \boxed{\$14,681}$$

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Chloe

Sum of Annuity Due                      40 yrs,      \$ 1,500

$$\text{Final Amount} = [ \text{Principal} \times (1 + \text{rate})^{(\text{years} + 1)} - \text{Principal} \times (1 + \text{rate}) ] \div \text{rate}$$

$$= ( \$ 1,500 \cdot 1.08^{41} - \$ 1,500 \cdot 1.08 ) \div 0.08$$

$$= \boxed{ \$ 419,671.56 }$$

bonus - what is 4% for an annual use during retirement?

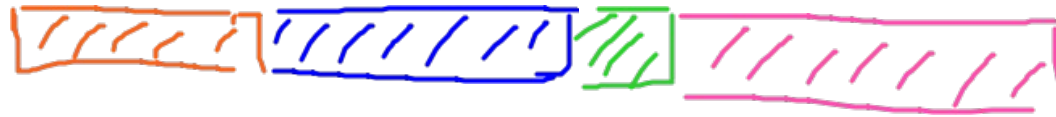
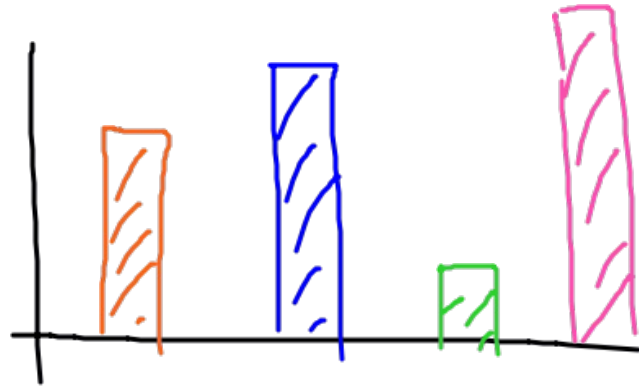
$$0.04 \cdot \$ 419,671.56 \approx \boxed{ \$ 16,787 }$$

"fancy" 5400 \$  
Hotel  $\rightarrow 431 \$ \times 4 = 1720 \$$  gas money  
Car  $\rightarrow 209 \$ \times 4 = 915 + 200 = 1115 \$$

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"vacation for a college student" 1200  
Trans. =  $\$17.90 \times 3 = 80 \$$   $\rightarrow$  bus =  $\$2 \times 3 = 6 \$$   
room =  $44 \$ \times 4 = 176 \$$   
hotel =  $60 \$ \times 4 = 240 \$$

😊 thank you



College  
Tickets: \$1,391  
Scuba Diving: \$164  
Hotel:  $82 \times 7 = \$574$   
Food: \$600  
Emergency: \$100  
Total: \$2,829

Expensive  
Tickets: \$1,391  
Scuba: \$164  
Hotel:  $82 \times 7 = \$574$   
Food & Souvenirs 600  
Snorkeling: \$88  
Emergency: \$100  
Total: \$2,917

# More Practice Final

rate  
0.04

22. An apartment's monthly rent starts at \$623. Every year it increases by 4%. What is the rent after 8 years?

compound interest

Final Amount = Principal  $\times$  (1 + interest rate per payout)<sup>number of payouts</sup>

$$= \$623 \cdot 1.04^8$$

$$= \boxed{\$852.62}$$

22. Joyce uses a zero down plan to buy a computer for \$5,189. She makes no payments for 10 months, but the loan increases with 20% annual interest, compounded monthly. What is the loan balance at the end of those 10 months?

$$0.2 \div 12 = 0.01\bar{6}$$

Compound interest

Final Amount = Principal  $\times$  (1 + interest rate per payout)<sup>number of payouts</sup>

$$= \$5,189 \cdot 1.01\bar{6}^{10}$$

$$= \boxed{\$6,121.66}$$