Homework 20-10

2U: Finance

Solve the following problems.

1. Tong loaned Jody $50 for a month. He charged 5% simple interest for the month. How much did Jody have to pay Tong?

2. Jessica's grandparents gave her $2000 for college to put in a savings account until she starts college in four years. Her grandparents agreed to pay her an additional 7.5% simple interest on the $2000 for every year. How much extra money will her grandparents give her at the end of four years?

3. David read an ad offering $8\frac{3}{4}\%$ simple interest on accounts over $500 left for a minimum of 5 years. He has $500 and thinks this sounds like a great deal. How much money will he earn in the 5 years?

4. Javier's parents set an amount of money aside when he was born. They earned 4.5% simple interest on that money each year. When Javier was 15, the account had a total of $1012.50 interest paid on it. How much did Javier's parents set aside when he was born?

5. Kristina received $125 for her birthday. Her parents offered to pay her 3.5% simple interest per year if she would save it for at least one year. How much interest could Kristina earn?

6. Kristina decided she would do better if she put her money in the bank, which paid 2.8% interest compounded annually. Was she right?

7. Suppose Jessica (from problem 2) had put her $2000 in the bank at 3.25% interest compounded annually. How much money would she have earned there at the end of 4 years?

8. Mai put $4250 in the bank at 4.4% interest compounded annually. How much was in her account after 7 years?

9. What is the difference in the amount of money in the bank after five years if $2500 is invested at 3.2% interest compounded annually or at 2.9% interest compounded annually?

10. Ronna was listening to her parents talking about what a good deal compounded interest was for a retirement account. She wondered how much money she would have if she invested $2000 at age 20 at 2.8% annual interest compounded quarterly (four times each year) and left it until she reached age 65. Determine what the value of the $2000 would become.

Zaina is wanting to buy a giraffe for her 18th birthday. She has wanted one ever since she was 2. As a result, on her 3rd birthday, her parents started a bank account and put in $5000. Each birthday after that, they put in $\$1000$ into the bank account. Considering the amount of money they were paying, the bank gave a generous interest rate of 24% p.a. compounded monthly.

A) How much was in the bank account on Zaina's 4th birthday?
B) How much was in the bank account on Zaina's 6th birthday?
C) Write an expression for the amount of money in the account on Annabel's nth birthday.
D) A baby giraffe costs $30,000. If on her 18th birthday, Zaina's parents withdraw all the money from the bank account **without** making their yearly instalment that day, will they have enough to buy Zaina the baby giraffe?

3U: Trigonometry

1. Find all solutions for $\sin\left(x+\frac{\pi}{3}\right)=1$ in $0<x<4\pi$ (3 marks)

2. Solve $4\sin^2(x)+8\cos(x)-7=0$, for $0<x<2\pi$ (3 marks)

3. Show that:

$$\cos\left(\frac{\pi}{3} - A\right) - \cos\left(A + \frac{\pi}{3}\right) = \sqrt{3}\sin(A) \text{ (3 marks)}$$

4. Suppose $\tan(a) = \frac{2}{5}$. By using the t-formulae, find the *exact* value of:

$$2\cos(2a) - 2\sin(2a) \text{ (2 marks)}$$

5. Find the exact value of:

$$\sin(15°) + \sin(105°) \text{ (2 marks)}$$

6. Rewrite the following expression as sums of trig functions (1 mark):

$$\sin 8x \cos 3x$$

7. Show that (2 marks):

$$(\cos(A) + \sin(A))^2 - 2(1 - \cos^2(A)) = \cos(2A) + \sin(2A)$$