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Math 1010, Exam #3, Fall 2013 Name KEY

Instructions: Show all work. Round answers to dollars and cents, or two decimals places unless otherwise indicated.

1. Find the simple interest on $700 invested at 5% annually for 2 years. (5 points)

$I = PRT$

$700 * .05 * 2 = \$70$

2. A loan of $5,000 at 12% annually requires $1200 interest. For how long was the money borrowed? (6 points)

$$T = \frac{I}{PR} = \frac{1200}{5000 * .12} = 2 \text{ years}$$

3. Find the exact time from February 12 to November 26 in a leap year. (5 points)

28 − 12 = 16 Feb. + 1
+ 26 Nov
+ 31 March
+ 30 April
+ 31 May
+ 30 June
+ 31 July
+ 31 Aug.
+ 30 Sept
+ 31 Oct

288 days

4. A copier that originally cost $300 was purchased with a loan for 12 months at 21% annual simple interest. What was the total cost of the copier? (5 points)

$$300 * .21 * \frac{12}{12} = 63$$

$300 + 93 = \$363$

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5. A promissory note using the banker's rule has a face value of $2,500 and is discounted by the bank at the rate of 13%. If the note is made for 75 days, find the amount of the discount. (7 points)

banker's rule – ordinary when lending *
exact when borrowing

$\$2500 * .13 * \frac{75}{360} = \$67.71$

6. Find the ordinary interest paid on a loan of $1,600 for 90 days at a simple interest rate of 13% annually. (7 points)

$1600 * .13 * \frac{90}{360} = \$52.00$

7. Redo problem #6, but find the exact interest on the same terms. What is the dollar value difference between the two methods? (7 points)

$1600 * .13 * \frac{90}{365} = \$51.29$

$52 - 51.29 = \$.71$

8. Use a formula to calculate the interest on a loan of $7,400 for five years at 8% annual interest if interest is compounded quarterly. You may check your work in the finance program in the calculator only. (6 points)

$$7400\left(1+\frac{.08}{4}\right)^{5*4} = 7400(1.02)^{20} =$$

$$\$10,996.01 - 7400 =$$

FV

$$I = \$3596.01$$

9. Find the effective rate for the loan described in problem #8. (5 points)

$$7400\left(1+\frac{.08}{4}\right)^{4} = \$8010.00$$

$$8010 - 7400 = 610$$

$$\frac{610}{7400} = .0824\ldots \qquad 8.24\%$$

10. You are hoping to buy a car in three years and would like to have $2000 to put down. How much money do you have to set aside now at 2% compounded monthly in order to have the $2000 when you buy the car? (7 points)

$$2000 = P\left(1+\frac{.02}{12}\right)^{12*3}$$

$$P = \frac{2000}{\left(1+\frac{.02}{12}\right)^{36}} = \$1883.62$$

11. Which of the following two options yields the greatest return on an investment? (10 points)
Option 1: 7.5% interest compounded daily.
Option 2: 7¾% compounded annually.

$\left(1+\frac{.075}{365}\right)^{365} = 1.077875\ldots$

$\left(1+\frac{.0775}{1}\right)^{1} = 1.0775$

7.5% compounded daily is more.

12. The installment price of a GE refrigerator is $1,299.99 for an 18-month loan. If a $300.00 down payment is made, find the installment payment. (7 points)

$1299.99 - 300.00 = 999.99 \div 18 \Rightarrow$

$55.56

13. Office equipment was purchased on the installment plan with 12 monthly payments of $11.20 each. If the cash price was $120, and there was no down payment, find the annual percentage rate. (5 points)

$12 \times 11.20 = 134.40$

$134.40 - 120.00 = \$14.40$

$\frac{14.40}{120} = .12 \Rightarrow 12\%$

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V

14. A 30-month loan has interest of $3,987, is paid in full with 7 months remaining. Find the amount of interest to be refunded using the Rule of 78. (8 points)

$1+2+3+4+5+6+7 = 28 \qquad \frac{7(8)}{2} = \frac{56}{2} = 28$

$1+2+\cdots+29+30 = 465 \qquad \frac{30(31)}{2} = 15*31 = 465$

$\frac{28}{465} = .0602\ldots$

$\$3,987 \times .0602 = \$240.08$

15. Use the following chart to find the average daily balance, finance charge and unpaid balance for August. The monthly interest rate is 1.75%. The billing cycle has 31 days. (15 points)

Date Posted	Activity	Amount
August 1	Billing date	Previous balance: $440.05
August 6	Payment	$80.00
August 11	Purchase	$23.50
August 18	Purchase	$44.78
August 30	Purchase	$220.11

1-5	440.05
6-10	360.05
11-17	383.55
18-29	428.33
30-31	648.44

5×440.05
5×360.05
7×383.55
12×428.33
2×648.44

$\frac{13,122.19}{31} = \$423.30$ average daily balance

$423.30 * .0175 = \$7.41$

Aug 31 add interest $= 648.44 + 7.41 = \$ 655.85$

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VI

16. What is the sum of consecutive integers starting with 1 and ending with 19? (5 points)

$$\frac{19(20)}{2} = 19 \times 10 = 190$$

$$FV = P(1+R)^N$$
$$I = P(1+R)^N - P$$

$$PV = \frac{FV}{(1+R)^N}$$