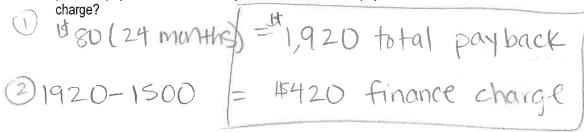Advance Math

Loans Review

Name: ___Key___

Date: _____

1) Charlie needs a loan for $3500. With a credit score of 700 he can get an interest rate of 3.2%. Susie also needs a loan for $3500 but gets an interest rate of 6.1% because her credit score is 525. How much will each of them end up paying back for their loan? of 4 years

Charlie
$$I = Prt$$
$$I = (3500)(.032)(4)$$
$$I = 448$$
$$\boxed{\$ \; 3,948 \; total}$$

Susie
$$I = Prt$$
$$I = (3500)(.061)(4)$$
$$I = 854$$
$$\boxed{\$ \; 4,354 \; total}$$

2) Rachel wants to buy a new pair of leather shoes for $750 but can't afford it right now. The store will let her go on an installment plan if she can pay 15% up front. What will Rachel pay as a down payment?

$$.15(750) = \boxed{\begin{array}{c} \$112.50 \\ down \; payment \end{array}}$$

3) Victor needs a new washer and dryer for his house. Together they cost $1500. He goes on an installment plan and pays $80 a month for 2 years. What is his total payback amount and how much was the finance charge?

① $80 (24 months) = $\boxed{\begin{array}{c} \$1,920 \; total \; payback \\ \$420 \; finance \; charge \end{array}}$

② 1920 - 1500 =

Given the following information, calculate the monthly payments for each.

4) Principal = $10,000
APR = 4.3%   Time = 10 years

$$M = \dfrac{10000 \left(\frac{.043}{12}\right)\left(1 + \frac{.043}{12}\right)^{12(10)}}{\left(1 + \frac{.043}{12}\right)^{12(10)} - 1}$$

$$M = \dfrac{55.64274}{.536076}$$

$$\boxed{M = \$102.68}$$

5) Principal = $22,500
APR = 3.25%   Time = 15 years

$$M = \dfrac{22500 \left(\frac{.0325}{12}\right)\left(1 + \frac{.0325}{12}\right)^{12(15)}}{\left(1 + \frac{.0325}{12}\right)^{12(15)} - 1}$$

$$= \dfrac{99.15555}{.627168}$$

$$\boxed{M = \$158.10}$$

Advance Math
Loans Review

Name: _____

Date: _____

Given the following information, calculate the following:
a) Monthly payments   b) Total pay back for the loan   c) Finance charge (interest) on the loan

7) Principal = $11,600
   APR = 4.0%   Time = 10 years = 120 months

8) Principal = $82,300
   APR = 3.25   Time = 15 years → 180 months

a.)

$$M = \frac{11600\left(\frac{.04}{12}\right)\left(1+\frac{.04}{12}\right)^{12(10)}}{\left(1+\frac{.04}{12}\right)^{12(10)}-1}$$

$$= \frac{57.64553}{.490833}$$

$$M = \$117.44$$

b)

$$(117.44)(120)$$

$$= \$14,092.80 \text{ total}$$

c) 14092.80
$-$ 11600.00

$$= \$2,492.80 = \text{finance}$$

a)

$$M = \frac{82300\left(\frac{.0325}{12}\right)\left(1+\frac{.0325}{12}\right)^{12(15)}}{\left(1+\frac{.0325}{12}\right)^{12(15)}-1}$$

$$M = \frac{362.68895}{.627168}$$

$$M = \$578.30$$

b) $(578.30)(180)$
$$= \$104,094 \text{ total}$$

c) 104,094
$-$ 82,300

$$\$21,794 \text{ finance}$$

Calculate the monthly **payment** for the given loan.

9) Tim wants to buy a boat. He will need a loan in the amount of $8000. If the length of the loan lasts 10 years, what will his monthly payments be if the loan has an interest rate of 3.7%? How much total will he be paying back?

$$M = \frac{8000\left(\frac{.037}{12}\right)\left(1+\frac{.037}{12}\right)^{12(10)}}{\left(1+\frac{.037}{12}\right)^{12(10)}-1}$$

$$= \frac{35.69046}{.44691}$$

$$M = \$79.86$$

10 yrs = 120 months

$$(79.86)(120) = \boxed{\$9,583.20 \text{ total}}$$

10) Jason and Todd want to buy a vacation home on the beach in San Diego. They will need to take out a loan of $310,500. The APR on this loan is 5.0% and will have a length of 30 years. If Jason and Todd can afford $2000 per month, will this loan be suitable for their life styles? If so, how much below their budget is the monthly payment?

$$M = \frac{310500\left(\frac{.05}{12}\right)\left(1+\frac{.05}{12}\right)^{12(30)}}{\left(1+\frac{.05}{12}\right)^{12(30)}-1}$$

$$= \frac{5780.1442}{3.467744}$$

$$M = \$1666.83$$

Yes, this loan works. It is about $333 below their monthly budget.

Advance Math   Name: _____

Loans Review   Date: _____

11) Grayson wants to by an RV so that he can travel with his circus. The RV he wants is going to cost him $23,750. Unlike his rich boss, Grayson cannot afford this so will need to take out a loan. His bank is offering three different types of loans. The loans are the following:

     * Loan A: 0% down payment, 6% APR, for 10 years
     * Loan B: 16% down payment, 5.25% APR, for 10 years
     ~~* Loan C: 20% down payment, 8% APR, for 15 years~~

Which loan has the lower monthly payments? Which loan will have the *least amount* of interest?

A

$$M = \frac{23750\left(\frac{.06}{12}\right)\left(1+\frac{.06}{12}\right)^{12(10)}}{\left(1+\frac{.06}{12}\right)^{12(10)}-1}$$

$$= \frac{216.05336}{.819397}$$

$$M = \$263.67 \quad \times 120 = \$7,890.40 \text{ in interest}$$

B   .20(23,750) = $4750 down

$19,000 remaining

$$M = \frac{19000\left(\frac{.0525}{12}\right)\left(1+\frac{.0525}{12}\right)^{12(10)}}{\left(1+\frac{.0525}{12}\right)^{12(10)}}$$

$$= \frac{140.35857}{.688524}$$

$$M = \$203.85 \quad \times 120 = \$5,462 \text{ in interest}$$

Loan B has less interest AND lower monthly payments

Given the following information, calculate the loan length for each. Round time to the nearest year.

12) Principal = $47,600   APR = 3.3%   Monthly Payment = $400

$$t = \frac{\ln\left(\frac{400}{47600}\right)-\left[\ln\left(\frac{400}{47600}-\frac{.033}{12}\right)\right]}{12\cdot\ln\left(1+\frac{.033}{12}\right)} = \frac{.39638}{.03295} = 12.02$$

12 years

13) Principal = $19,600   APR = 6.75%   Monthly Payment = $225

$$t = \frac{\ln\left(\frac{225}{19600}\right)-\left[\ln\left(\frac{225}{19600}-\frac{.0675}{12}\right)\right]}{12\cdot\ln\left(1+\frac{.0675}{12}\right)} = \frac{.67334}{.06731} = 10.00$$
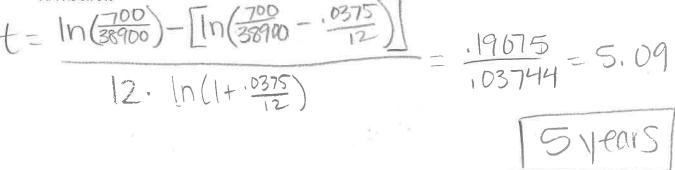
10 years

14) Principal = $248,000   APR = 3.25%   Monthly Payment = $1080

$$t = \frac{\ln\left(\frac{1080}{248000}\right)-\left[\ln\left(\frac{1080}{248000}-\frac{.0325}{12}\right)\right]}{12\cdot\ln\left(1+\frac{.0325}{12}\right)} = \frac{.97263}{.03246} = 29.9$$

30 years

15) Emma wants to take out a student loan for $30,000 but knows she can only afford $250 per month. If she gets offered a loan for that amount at 8% interest, about how long will it take Emma to pay off the loan?

$$t = \frac{\ln\left(\frac{250}{30000}\right) - \left[\ln\left(\frac{250}{30000} - \frac{.08}{12}\right)\right]}{12 \cdot \ln\left(1 + \frac{.08}{12}\right)} = \frac{1.60944}{.07973} = 20.18$$

20 years

16) Henry is in need of buying a new car. The car will cost him $38,900. After taking into account all of his expenses, he knows he can afford $700 per month on car payments. How long would his loan be if the APR is 3.75%

$$t = \frac{\ln\left(\frac{700}{38900}\right) - \left[\ln\left(\frac{700}{38900} - \frac{.0375}{12}\right)\right]}{12 \cdot \ln\left(1 + \frac{.0375}{12}\right)} = \frac{.19075}{.03744} = 5.09$$

5 years

17) Oliver wants to renovate the kitchen of his house. He needs to take out a loan in the amount of $70,000. If he is willing to pay $825 per month with an interest rate of 7.4%, how long will it take him to finish paying off the loan?

$$t = \frac{\ln\left(\frac{825}{70000}\right) - \left[\ln\left(\frac{825}{70000} - \frac{.074}{12}\right)\right]}{12 \cdot \ln\left(1 + \frac{.074}{12}\right)}$$

$$= \frac{.74073}{.07377} = 10.04$$

10 years