Math 1324 - Practice Exam 1 - Spr18

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.. Write your choice in the space provided. No work will be graded. No partial credit.

Use I = Prt for simple interest to find the indicated quantity.

1) P = $13,500; t = 4 months; I = $517.50. Find r. 1) _____

A) 11.7% B) 3.8% C) 7.7% D) 11.5%

Solve the problem. Round to the nearest cent as needed.

2) An actuary for a pension fund need to have $14.6 million grow to $22 million in 6 years. What interest rate compounded annually does he need for this investment to growth as specified. Round your answer to the nearest hundredth of a percent. 2) _____

A) 7% B) 7.07% C) 7.7% D) 0.07%

What is the annual percentage yield (APY) for money invested at the given annual rate? Round results to the nearest hundredth of a percent.

3) 6% compounded quarterly 3) _____

A) 6.18% B) 6.00% C) 6.09% D) 6.14%

Solve the problem. Round to the nearest cent.

4) Larry wants to start an IRA that will have $410,000 in it when he retires in 21 years. How much should he invest semiannually in his IRA to do this if the interest is 6% compounded semiannually? 4) _____

A) $4985.59 B) $14,297.43 C) $3379.81 D) $4998.59

Find the monthly house payment necessary to amortize the following loan.

5) In order to purchase a home, a family borrows $70,000 at 12% for 15 years. What is the monthly payment? 5) _____

A) $700.00 B) $902.99 C) $46.67 D) $840.12

Solve the problem.

6) Daisy has a desk full of quarters and nickels. If she has a total of 23 coins with a total face value of $4.35, how many of the coins are nickels? 6) _____

A) 7 nickels B) 21 nickels C) 9 nickels D) 16 nickels

Perform the indicated row operations on the following matrix.

$$\left[\begin{array}{cc|c} 1 & -5 & 4 \\ 2 & 2 & 5 \end{array}\right]$$

7) $(-2)R_1 + R_2 \rightarrow R_2$ 7) _____

A) $\left[\begin{array}{cc|c} 0 & 12 & -3 \\ 2 & 2 & 5 \end{array}\right]$ B) $\left[\begin{array}{cc|c} 1 & -5 & 4 \\ 0 & 12 & -3 \end{array}\right]$ C) $\left[\begin{array}{cc|c} -2 & 10 & -8 \\ 2 & 12 & -5 \end{array}\right]$ D) $\left[\begin{array}{cc|c} -2 & 10 & -8 \\ 0 & 12 & -3 \end{array}\right]$

State whether the matrix is in reduced form or not in reduced form.

8) $\left[\begin{array}{cccc|c} 1 & -5 & 0 & 0 & 1 \\ 0 & 0 & 1 & 2 & 0 \end{array}\right]$ 8) _____

A) Reduced Form B) Not Reduced Form

Perform the operation, if possible.

9) Let $A = \begin{bmatrix} -1 & 5 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} -6 & -2 & 9 \\ -5 & -7 & -3 \\ 6 & -8 & 2 \end{bmatrix}$. Find AB. 9) _____

A) $\begin{bmatrix} -13 \\ -41 \\ -22 \end{bmatrix}$ B) $\begin{bmatrix} 6 & -10 & 9 \\ 5 & -35 & -3 \\ -6 & -40 & 2 \end{bmatrix}$ C) $\begin{bmatrix} 13 & 41 & 22 \end{bmatrix}$ D) $\begin{bmatrix} -13 & -41 & -22 \end{bmatrix}$

Find the inverse, if it exists, of the given matrix.

10) $A = \begin{bmatrix} 0 & 2 & 2 \\ -1 & 0 & 7 \\ 0 & 3 & 0 \end{bmatrix}$ 10) _____

A) $\begin{bmatrix} -\frac{7}{2} & -1 & -\frac{7}{3} \\ -\frac{1}{3} & 0 & \frac{1}{3} \\ \frac{1}{2} & 0 & 0 \end{bmatrix}$

B) $\begin{bmatrix} \frac{7}{2} & -1 & -\frac{7}{3} \\ 0 & 0 & \frac{1}{3} \\ \frac{1}{2} & 0 & -\frac{1}{3} \end{bmatrix}$

C) Does not exist

D) $\begin{bmatrix} \frac{7}{2} & 0 & \frac{1}{2} \\ -1 & 0 & 0 \\ -\frac{7}{3} & \frac{1}{3} & -\frac{1}{3} \end{bmatrix}$

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question. Write the answer in the space provided. No work will be graded. No partial credit.

Find the periodic payment that will render the sum.

11) FV = $17,000, interest is 8% compounded monthly, payments made at the end of each month for 3 years 11) _____

Use an amortization table to solve the problem. Round to the nearest cent.

12) You have purchased a new house and have a mortgage for $90,000 at 6% compounded monthly. The loan is amortized over 20 years in equal monthly payments of $644.79. Find the total amount paid in interest when the mortgage is paid off. 12) _____

ESSAY. Show all work to justify your answer. Answer with no work or insufficient work will receive no credit. Partial credit may be given.

Solve the problem. Round to the nearest cent as needed.

13) A child receives a $10,000 gift toward a college education from her grandparents on her first birthday. How much money will it be worth in 17 years if it is invested at 8.25% compounded quarterly? Round your answer to the nearest cent.

Solve the problem.

14) At the end of every 3 months, Judy deposits $100 into an account that pays 6% compounded quarterly. After 4 years, she puts the accumulated amount into a certificate of deposit paying 7.5% compounded semiannually for 1 year. When this certificate matures, how much will Judy have accumulated?

Use an amortization table to solve the problem. Round to the nearest cent.

15) A $90,000 home was financed by making a 20% down payment and signing a 30-year mortgage at 6.25% annual interest compounded monthly for the unpaid balance. The first payment is $443.32. How much of the first month's payment will apply towards reducing the principal?

Solve the problem.

16) A Dawn Bakery bakes whole wheat, oat, and rye bread, with mixing, baking, and packaging times, in hours, as shown:

$$A = \begin{array}{c} \begin{matrix} \text{Mix} & \text{Bake} & \text{Package} \end{matrix} \\ \begin{bmatrix} 0.04 & 0.07 & 0.02 \\ 0.03 & 0.05 & 0.02 \\ 0.04 & 0.06 & 0.02 \end{bmatrix} \end{array} \begin{matrix} \\ \text{Whole wheat} \\ \text{Oat} \\ \text{Rye} \end{matrix}$$

An order is received for 400 loaves of whole wheat bread, 200 loaves of oat bread, and 350 loaves of rye bread. Given that the cost of mixing, baking, and packaging is $14, $25, and$2, respectively, per hour, find matrices B and C so that the product BAC will give the total cost (excluding raw materials) of filling this order. Find the total cost.

Find the system of equations to model the problem. DO NOT SOLVE THIS SYSTEM.

17) A $124,000 trust is to be invested in bonds paying 9%, CDs paying 8%, and mortgages paying 10%. The sum of the amount invested in bonds and the amount invested in CDs must equal the mortgage investment. To earn an $11,400 annual income from the investments, how much should the bank invest in each?
Let x represent the amount invested in bonds, y the amount invested in CDs, and z the amount invested in mortgages.