Exam 1 Review Questions

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

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

1) P = $3000; t = 90 days; I = $105. Find r. (Use 360 days in a year.)   1) _____
    A) 14.2%   B) 14.0%   C) 3.5%   D) 9.7%

Find the amount that will be accumulated in the account under the given conditions.

2) The principal $15,400 is accumulated with simple interest of 16% for 5 years.   2) _____
    A) $15,892.80   B) $27,720   C) $20,212.50   D) $12,320

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

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

4) Cara knows that she will need to buy a new car in 3 years. The car will cost $15,000 by then. How   4) _____
much should she invest now at 12%, compounded quarterly, so that she will have enough to buy a
new car?
    A) $10,520.70   B) $11,957.91   C) $12.594.29   D) $9532.77

Find the periodic payment that will render the sum.

5) FV = $17,000, interest is 8% compounded monthly, payments made at the end of each month for 3   5) _____
years
    A) $5032.62   B) $895.82   C) $419.38   D) $1365.47

Solve the problem. Round to the nearest cent.

6) Larry wants to start an IRA that will have $500,000 in it when he retires in 23 years. How much   6) _____
should he invest semiannually in his IRA to do this if the interest is 8% compounded
semiannually?
    A) $13,654.53   B) $3941.02   C) $3928.02   D) $3509.13

Solve the problem.

7) Sammy borrowed $10,000 to purchase a new car at an annual interest rate of 11%. She is to pay it   7) _____
back in equal monthly payments over a 5–year period. How much total interest will be paid over
the period of the loan? Round to the nearest dollar.
    A) $3630   B) $1435   C) $92   D) $3045

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

8) The monthly payments on a $79,000 loan at 14% annual interest are $982.76. How much of the first   8) _____
monthly payment will go toward interest?
    A) $137.59   B) $1106.00   C) $921.67   D) $845.17

Solve the problem.

9) Sam and Chad are ticket–sellers at their class play. Sam is selling student tickets for $2.00 each, and Chad selling adult tickets for $5.50 each. If their total income for 24 tickets was $83.00, how many tickets did Sam sell?

    A) 14 tickets   B) 15 tickets   C) 10 tickets   D) 16 tickets

9) _____

Perform the indicated row operations on the following matrix.

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

10) $(-2)R_1 + R_2 \rightarrow R_2$

10) _____

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

Identify the row operation that produces the resulting matrix.

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

11) _____

A) $\left(-\dfrac{1}{2}\right)R_1 + \left(-\dfrac{1}{2}\right)R_2 \rightarrow R_1$ B) $\left(\dfrac{1}{2}\right)R_1 + \left(\dfrac{1}{2}\right)R_2 \rightarrow R_2$

C) $R_1 + R_2 \rightarrow R_2$ D) $\left(\dfrac{1}{2}\right)R_2 \rightarrow R_1$

The matrix is the final matrix form for a system of two linear equations in variables x_1 and x_2. Write the Solution of the system.

12) $\left[\begin{array}{cc|c} 1 & -4 & 10 \\ 0 & 0 & 0 \end{array}\right]$

12) _____

A) $x_1 = t - 4$
    $x_2 = t$ for any real number t   B) No solution

C) $x_1 = t$ for any real number t
    $x_2 = 10$ D) $x_1 = 4t + 10$
    $x_2 = t$ for any real number t

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

13) $\left[\begin{array}{ccc|c} 1 & 0 & -1 & 5 \\ 0 & 4 & 1 & 1 \\ 0 & 0 & 1 & 1 \end{array}\right]$

13) _____

    A) Reduced Form   B) Not Reduced Form

User row operations to change the matrix to reduced form.

14) $\left[\begin{array}{ccc|c} 1 & -1 & 0 & 1 \\ 0 & 4 & 8 & 4 \\ 0 & 0 & 0 & 0 \end{array}\right]$

14) _____

A) $\left[\begin{array}{ccc|c} 1 & 0 & 2 & 2 \\ 0 & 1 & 2 & 0 \\ 0 & 0 & 0 & 0 \end{array}\right]$ B) $\left[\begin{array}{ccc|c} 1 & 0 & 2 & 2 \\ 0 & 1 & 2 & 1 \\ 0 & 0 & 0 & 0 \end{array}\right]$ C) $\left[\begin{array}{ccc|c} 1 & 0 & 2 & 0 \\ 0 & 1 & 2 & 1 \\ 0 & 0 & 0 & 0 \end{array}\right]$ D) $\left[\begin{array}{ccc|c} 1 & -1 & 0 & 1 \\ 0 & 1 & 2 & 1 \\ 0 & 0 & 0 & 0 \end{array}\right]$

2

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

15) 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.

15) _____

A) x + y − z = 11,400
   x − y + 9z = 22
   8x + y + z = 124,000

B) x + y − z = 0
   x + y + z = 124,000
   9x + 8y + z = 11,400

C) x + y − z = 0
   x + y + z = 124,000
   0.09x + 0.08y + 0.1z = 11,400

D) x + y + z = 0
   x + y − 9z = 124,000
   0.1x + 0.08y − 0.09z = 11,400

Perform the operation, if possible.

16) 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.

16) _____

A) $\begin{bmatrix} 13 & 41 & 22 \end{bmatrix}$

B) $\begin{bmatrix} -13 & -41 & -22 \end{bmatrix}$

C) $\begin{bmatrix} 6 & -10 & 9 \\ 5 & -35 & -3 \\ -6 & -40 & 2 \end{bmatrix}$

D) $\begin{bmatrix} -13 \\ -41 \\ -22 \end{bmatrix}$

Find the values of a, b, c, and d that make the matrix equation true.

17) $\begin{bmatrix} a & b \\ c & d \end{bmatrix} + \begin{bmatrix} 0 & 5 \\ -4 & 7 \end{bmatrix} = \begin{bmatrix} 3 & 7 \\ 2 & -1 \end{bmatrix}$

17) _____

A) $\begin{bmatrix} -3 & -2 \\ -6 & 8 \end{bmatrix}$

B) $\begin{bmatrix} 3 & 2 \\ 6 & -8 \end{bmatrix}$

C) $\begin{bmatrix} 3 & 12 \\ -2 & 6 \end{bmatrix}$

D) $\begin{bmatrix} 0 & 2 \\ 6 & 8 \end{bmatrix}$

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

18) $\begin{bmatrix} 5 & 12 \\ 2 & 5 \end{bmatrix}$

18) _____

A) $\begin{bmatrix} -5 & -12 \\ -2 & -5 \end{bmatrix}$

B) $\begin{bmatrix} 5 & -12 \\ -2 & 5 \end{bmatrix}$

C) $\begin{bmatrix} 5 & 2 \\ 12 & 5 \end{bmatrix}$

D) $\begin{bmatrix} -5 & 2 \\ 12 & -5 \end{bmatrix}$

Use the given encoding matrix A to solve the problem.

19) A message has been encoded and the matrix which the receiver gets is shown below.   19) _____

$$\begin{bmatrix} 3 & 11 \\ 90 & 70 \\ 45 & 65 \\ 54 & 60 \\ 66 & 82 \\ 21 & 17 \\ 60 & 30 \\ 6 & 4 \\ 15 & 29 \\ 120 & 78 \end{bmatrix}$$

The encoding matrix A which was used to encode the message is:

$$A = \begin{bmatrix} 0 & 2 \\ 3 & 1 \end{bmatrix}$$

Find the decoding matrix A^{-1}, and use it to decode the message.
Assume that the numerical assignment used was a = 1, b = 2, ..., z = 26, space = 30, period = 40, and apostrophe = 60.

A) EAT YOUR VEGETABLES   B) DRINK ENOUGH MILK
C) EAT YOUR BROCCOLI   D) DRINK ENOUGH COKE

Provide an appropriate response.

20) Determine which of the following matrix equations represents the solution to the system: 20) _____

$2x_1 + x_2 = 2$
$5x_1 + 3x_2 = 13$.

A)
$$\begin{bmatrix} x_1 \\ x_2 \end{bmatrix} = \begin{bmatrix} 2 \\ 13 \end{bmatrix}\begin{bmatrix} -2 & -1 \\ -5 & -3 \end{bmatrix}$$

B)
$$\begin{bmatrix} x_1 \\ x_2 \end{bmatrix} = \begin{bmatrix} 3 & -1 \\ -5 & 2 \end{bmatrix}\begin{bmatrix} 2 \\ 13 \end{bmatrix}$$

C)
$$\begin{bmatrix} x_1 \\ x_2 \end{bmatrix} = \begin{bmatrix} 2 & 1 \\ 5 & 3 \end{bmatrix}\begin{bmatrix} 2 \\ 13 \end{bmatrix}$$

D)
$$\begin{bmatrix} x_1 \\ x_2 \end{bmatrix} = \begin{bmatrix} 2 \\ 16 \end{bmatrix}\begin{bmatrix} 3 & -1 \\ -5 & 2 \end{bmatrix}$$