***Solution Section* 4.2 – Matrix operations and Their Applications**

***Exercise***

Find values for the variables so that the matrices are equal. 

***Solution***





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***Solution***





***Exercise***

Find values for the variables so that the matrices are equal.



***Solution***





***Exercise***

 

***Solution***











***Exercise***

Given   Find 3*F* + 2*A*

***Solution***











***Exercise***

Evaluate 

***Solution***



***Exercise***

Evaluate 

***Solution***



*It is* ***impossible****;*  and  are not the same size.

***Exercise***

Evaluate 

***Solution***





***Exercise***

Evaluate 

***Solution***





***Exercise***

Evaluate 

***Solution***





***Exercise***

Evaluate 

***Solution***



***Exercise***

Evaluate 

***Solution***





***Exercise***

Evaluate 

***Solution***





***Exercise***

Evaluate 

***Solution***





***Exercise***

Evaluate 

***Solution***





***Exercise***

Evaluate 

***Solution***





***Exercise***

Evaluate 

***Solution***



***Exercise***

Evaluate 

***Solution***



***Exercise***

Given. Find *AB* and *BA*.

***Solution***







***Exercise***

Given  . Find *AB* and *BA*.

***Solution***









***Exercise***

Given . Find *AB* and *BA*.

***Solution***









***Exercise***

Given . Find *AB* and *BA*.

***Solution***









***Exercise***

Given . Find *AB* and *BA*.

***Solution***









***Exercise***

Given . Find *AB* and *BA*.

***Solution***









***Exercise***

Given . Find *AB* and *BA*.

***Solution***









***Exercise***

Given . Find *AB* and *BA*.

***Solution***









***Exercise***

Given . Find *AB* and *BA*.

***Solution***









***Exercise***

Given . Find *AB* and *BA*.

***Solution***









***Exercise***

Given . Find *AB* and *BA*.

***Solution***









***Exercise***

Given , Find

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |

***Solution***

1. 



1. 



1. 



1. 



1. 





1.  (not a square matrix)
2.   the inner not equal
3.   the inner not equal

***Exercise***

Given , Find

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |

***Solution***

1. 



1. 



1. 



1. 



1. 





1.  (not a square matrix)
2.   the inner not equal
3.   the inner not equal

***Exercise***

Given , Find

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |

***Solution***

1. 



1. 



1. 



1. 



1. 





1. 





1. 





1. 





***Exercise***

Given , Find

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |

***Solution***

1. 



1. 



1. 



1. 



1. 





1. 





1. 





1. 





***Exercise***

Given  , Find

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |

***Solution***

1. 





1. 

They are not the same order.

1. 





1. 





1. 



1. 



1. 



1. 





1.  



1.  

*C* and *B* are not the same order.

1.  





1.  





***Exercise***

Given  , Find

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |

***Solution***

1. 





1. 

They are not the same order.

1. 





1. 





1. 



1. 



1. 



1. 





1.  



1.  

*C* and *B* are not the same order.

1. 



1. 





***Exercise***

A contractor builds three kinds of houses, models *A, B*, and *C*, with a choice of two styles, Spanish and contemporary. Matrix *P* shows the number of each kind of house planned for a new 100-home subdivision. The amounts for each of the exterior materials depend primarily on the style of the house. These amounts are shown in matrix *Q*. (concrete is in cubic yards, lumber in units of 1000 board feet, brick in 1000s, and shingles in units of 100 *ft*2.) Matrix *R* gives the cost in dollars for each kind of material.

1. What is the total cost of these materials for each model?
2. How much of each of four kinds of material must be ordered
3. What is the total cost for exterior materials?

***Solution***







1. What is the total cost of these materials for each model?









The total cost of materials is $72,900 for model *A*, $54,700 for model *B*, $60,800 for model *C*.

1. How much of each of four kinds of material must be ordered





 of concrete, 130,000 board feet of lumber, 1,400,000 bricks, and 20,000 *ft*2 of shingles are needed.

1. What is the total cost for exterior materials?





The total cost for exterior materials is $188,400.

***Exercise***

Mitchell Fabricators manufactures three styles of bicycle frames in its two plants. The following table shows the number of each style produced at each plant

|  |  |  |  |
| --- | --- | --- | --- |
|  | ***Mountain Bike*** | ***Racing Bike*** | ***Touring Bike*** |
| ***North Plant*** | 150 | 120 | 100 |
| ***South Plant*** | 180 | 90 | 130 |

1. Write a 2 *x* 3 matrix ***A*** that represents the information in the table
2. The manufacturer increased production of each style by 20%. Find a Matrix ***M*** that represents the increased production figures.
3. Find the matrix ***A + M*** and tell what it represents

***Solution***

1. 
2. The 20% production will represent

***A*** + 20%( ***A***)

→ ***A*** + .2 ***A*** = 1.2***A***





1. 



The matrix *A* + *M* represents the total production of each style at each plant for the time period (2 months)

***Exercise***

Sal's Shoes and Fred's Footwear both have outlets in California and Arizona. Sal's sells shoes for $80, sandals for $40, and boots for $120. Fred's prices are $60, $30, and $150 for shoes, sandals and boots, respectively. Half of all sales in California stores are shoes, 1/4 are *sandals*, and 1/4 are *boots*. In Arizona the fractions are 1/5 *shoes*, 1/5 are *sandals*, and 3/5 are *boots*.

1. Write a 2 x 3 matrix called P representing prices for the two stores and three types of footwear.
2. Write a 2 x 3 matrix called F representing fraction of each type of footwear sold in each state.
3. Only one of the two products *PF* and *FP* is meaningful. Determine which one it is, calculate the product, and describe what the entries represent.

***Solution***

1. Write a 2 x 3 matrix called *P* representing prices for the two stores and three types of footwear.



1. Write a 2 *x* 3 matrix called F representing fraction of each type of footwear sold in each state.



1. 



