Solutions Chapter Basic Matrix Math

1. `A=matrix(1:4,4,3)`
2. `A[1:2,1:2]`
3. `A=matrix(1:12,4,3, byrow=TRUE)`
4. ```
   #end up with a vector
   A[3,]
   #end up with a matrix
   A[3,,drop=FALSE]
   ```
5. ```
   B=matrix(1,4,3)
   B[2,3]=2
   ```
6. `t(B)`
7. `diag(1:4)`
8. `B=diag(1,5)`
9. `diag(B)=2`
10. ```
    diag(1,4)+1
    #or
    B=matrix(1,4,4)
    diag(B)=2
    B
    ```
11. ```
    solve(B)
    #or this but only works because B is symmetric
    chol2inv(chol(B))
    ```
12. ```
    B=matrix(letters[1:9],3,3)
    B
    ```
13. `diag(B)="cat"`
14. ```
    A=matrix(1,4,3)
    B=matrix(2,3,4)
    A%*%B
    #or
    B%*%A
    ```

15.
```
# A%*%A #throws an error
A%*%t(A) #works
```

16.
```
#this is an example where you use B to select values in A
A=matrix(1:9,3,3)
B=matrix(0,3,3)
B[1,1]=1
B[2,3]=1
B[3,2]=1
C=A%*%B
diag(C)
```

17.
```
#this shows one of the uses of diagonal matrices
B=diag(2,3)
C=A%*%B
C
```

18.
```
#this shows how to use a column vector (matrix with 1 col)
#to compute row sums
B=matrix(1,3,1)
C=A%*%B
C
```

19.
```
#this shows how to use a row vector (matrix with one row)
#to compute column sums
B=matrix(1,1,3)
C=B%*%A
C
```

20.
```
A=diag(1,3)+1
C=matrix(3,3,1)
#AB=C
#B=inv(A)%*%C
B=solve(A)%*%C
B
```