**Regulation: Compute the NFL’s classic passer rating**

1. Get the offense table.
2. Start by selecting only “QB” in the “position” column. Also, we’re only interested in quarterbacks who’ve made at least one pass attempt in a game, so on the “passAtt” column, deselect the value “0”.

Now we’re going to begin to construct the function that calculates the NFL passer rating. NFL’s passer rating equation is complicated, and has four different parts that are combined to calculate a single rating. Here are the four parts:

* 1. (passComp / passAtt -.3) \* 5
  2. (passYds / passAtt - .3) \* 0.25
  3. (passTDs / passAtt) \* 20
  4. 2.375 – (passINT / passAtt \* 25)

And these terms are combined in a formula:

passerRating = ((a + b + c + d) / 6) \* 100

…where every “part” can be no less than 0, nor greater than 2.375. In this way, the maximum passer rating for a quarterback in the NFL is: (2.375 \* 4) / 6 \* 100 = 158.333

In the next step, we’re going to add some columns to correspond to the four parts that should help us calculate passer ratings.

1. Scroll to the right, until you get to column X, which should be just beyond the table that was retrieved from the pigskin database.
2. In cell X1, type “partA” and press Tab to go to the next column.

*Note: when you press “Tab,” Excel should automatically format that column as if it were included in the table from the database. That’s okay.*

1. In cell Y1, type “partB” and press Tab.
2. In cell Z1, type “partC” and press Tab.
3. In cell AA1, type “partD” and press Tab.
4. In cell AB1, type “passerRating”

In the next step, we’re going to start writing the equations for the four parts.

1. Go to cell X2, press the equals sign (=) on your keyboard and type a left parenthesis “(“, then click on cell K2, then press the “/” button on your keyboard, then click on cell J2, then type -.3 ) \* 5. Press enter. You’ve just written the formula =([@passComp]/[@passAtt] -.3) \* 5, and it’s automatically filled the table with these values.
2. Now go to cell Y2, and try to calculate the term for yards per attempt in a similar way. Do the same with partC and partD.

Now it gets tricky. We need to rewrite these equations so that if anyone got less than 0, the value will be 0, and if anyone got more than 2.375, the value will be 2.375.

1. We’ll start by making sure that the value in column X is no more than 2.375. An easy way to do that is to take the minimum of the term and the value 2.375. If the term is greater than 2.375, it’ll just return the value 2.375. So in X2, type: =min(([@passComp]/[@passAtt]-0.3)\*5,2.375)
2. The next step is to make sure that the value is no less than zero. An easy way to do this is to take the maximum of the term, and the value 0. If the term is less than 0, it’ll just return 0. So let’s build our equation in X2 to be: =max(0,min(([@passComp]/[@passAtt]-0.3)\*5,2.375))
3. Now try to do the same thing with partB, partC, and partD.

Now we just need to wrap it all up in a passerRating equation. Remember that passer rating is  
((a + b + c + d) / 6) \* 100 . Can you figure out the equation that should go in cell AB2?

|  |  |  |
| --- | --- | --- |
| **Conference** | **Division** | **Team** |
| AFC | AFC East | BUF |
| NE |
| MIA |
| NYJ |
| AFC North | CIN |
| BAL |
| PIT |
| CLE |
| AFC South | HOU |
| IND |
| TEN |
| JAX |
| AFC West | DEN |
| SD |
| KC |
| OAK |
| NFC | NFC East | PHI |
| DAL |
| NYG |
| WSH |
| NFC North | DET |
| CHI |
| MIN |
| GB |
| NFC South | CAR |
| ATL |
| NO |
| TB |
| NFC West | ARI |
| SEA |
| SF |
| STL |

**Overtime: Grouping in a PivotTable**

1. On the right, you can see how NFL teams are grouped into the different conferences, and into the different division.
2. Create a PivotTable out of the offense table after you’ve made the passerRating variable.
3. Put “team” in the row labels, and CTRL-click the teams that are in the AFC conference. Once you’ve got all 16 teams selected, right-click on one of the selected teams, and in the menu, click “Group…” CTRL-click the remaining teams and group these as well.

Note: After you press “Group…” you’ll notice that Excel has created a new variable in row labels, “team2”—which is the variable that contains your new grouping.

1. Rename the variables “Group 1” and “Group 2” as AFC and NFC.

**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

After having made the passerRating column….

1. Sort by your new column, passerRating.  
   How many quarterbacks have earned a   
   perfect passer rating in a single game since 2006? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Among these players with perfect passer ratings,  
   who got the most fantasy points in a game  
   where they earned a perfect passer rating? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. For the player you identified in the previous  
   question, how many fantasy points did he earn in that game? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. Now find the 2 quarterbacks, irrespective of passer  
   rating, who earned the most fantasy points in a single  
   game since 2006. Who were they? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. Briefly explain why these players' exceptional fantasy performances did not earn perfect passer ratings:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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And after having grouped the teams into different divisions…

1. Which conference has the highest   
   average passer rating? (circle the correct answer) AFC NFC