

This is an explanation of how you can figure out how much yarn you need for a sweater using math BUT YOU CAN USE THIS FOR ANYTHING, slippers, scarf, jacket, coat, blanket, etc...

First you need to decide what you are going to knit and this example we will do a Sweater, but you can do this for anything that you want to knit like hats, gloves, scarves, etc... Also, I am a knitter who would rather have too much yarn than not enough.

Step 1: Decide what to knit

I am going to knit a drop down, tapered sleeve, that is a pullover sweater with a shawl collar. So, I will have 2 (two) sleeves, a front, a back and a shawl collar for a total of 5 garment pieces.

Step 2: Make a test swatch, weigh it and get your gauge

Knit a test swatch. I use 50 stitches and 50 rows because I do not like wasting a lot of yarn and then double it if you want because it is easy to multiply by 100, but you can make it as large or as small as you want. I will do my calculations on 50 rows and 50 stitches. If you do 100 x 100 just substitute 100 for my 50.

You also need to knit it in the same stitch that you are going to knit your garment in, same gauge and same yarn, otherwise it will come out different. So, if it is a skip or weave stitch with DK yarn at a tension of 5 on a mid gauge machine, that is also what your swatch is.

Once you knit your swatch, you get a scale that shows how much it weighs in grams, since most yarn is sold in grams and not ounces.

50 rows by 50 stitches weighs 28.5 grams

You can buy one of these scales just about anywhere for about \$15, that is what I paid for mine. It is the kind they weight gold or jewelry weight on, or for a lab, it is rather small and will need to be calibrated when you get it, easy to do. I guess you could also use the type of scale that is used to weigh food for dieters, but these are more expensive and quite large.

Then, you also need to know your gauge, so you figured out that the gauge to your swatch is

6 stitches and 8 rows equals 1 inch.

SIDE NOTE: If you are going to do cables, I would add an additional 15% of yarn for every two cables you knit, but you can add that at the end. It was harder for me to do a test swatch with cables.

Step 3: Get the total Number of Stitches in the Swatch

To get the total number of stitches in any swatch you multiply rows times stitches. When you knitted the test swatch you knew that you had 50 rows and 50 stitches.

50 rows x 50 stitches = 2,500 total stitches at 28.5 grams

**Review: You know that your gauge is 6 stitches by 8 rows per inch
You know that 2,500 stitches weighs 28.5 grams**

Step 4: Calculations for your garment

You now take the measurements from your garment and do a little math to find the "total area" in stitches. You need this number in order to find out how many stitches it takes to make the item. Any time you want to calculate an "area" it is length times width (length x width).

SIDE NOTE: When calculating an area that is not square or oblong you need to know Calculus, like if you want to know the area of a swimming pool that is shaped like a peanut. I do not know about you but I have long forgotten my College Calculus courses. If you make a hat or slippers, the pattern is not these shapes so eyeball it into a square, oblong or other shape that has 2 sides. Always use the widest and longest points.

I am assuming you already had a pattern anyway, or charted a pattern, and in the directions it tells you what the dimensions are of each piece, or you have decided dimensions based on a person's own measurements. Any pattern should tell you this, even if you generate one from a software program. But, the program can also probably tell you how much yarn to buy or how many stitches there are.

Back to the issue at hand....

- You have a back that is 28" tall and 18" wide. Use this for your front also since a little extra yarn is usually needed anyway in case of a mistake or whatever.

BACK is 28" tall x 8 rows per inch = 224 rows
18" wide x 6 stitches per inch = 108 stitches

- You have a sleeve, that has the underarm area measurement of 10" and is 18" tall. Always use the width at the underarm even if it is tapered or its widest point if it is another shape, like a bell sleeve.

10 x 6 stitches = 60 stitches
18 x 8 rows = 144 rows

You shawl collar is 8" deep and 20" long, now you do this one.

Step 5: Calculate how many Stitches in each piece

To calculate how many stitches are in each piece, you take the length in stitches and times it by height in rows...

BACK: 224 rows x 108 stitches = 24,192 stitches
SLEEVE: 60 stitches x 144 rows = 8,640 stitches

You do the shawl collar, I will give you the answer at the end.

STEP 6: Calculate how much yarn in stitches you need

You then take total number of stitches and divide it by the number of stitches you have per your swatch calculation, which was 2,500 stitches weighs 28.5 grams.

BACK: 24,192 stitches ÷ 2,500 = 9.67 or 9.7
SLEEVE: 8,640 stitches ÷ 2,500 = 3.45 or 3.5

- a. This means that 2,500 can go into 24,192: 9.7 times.
- b. You know that 2,500 stitches weigh 28.5 grams
- c. You take 28.5 grams and times by the 9.7 = 276.45 grams of yarn
- d. Since there is also a front, you double it to 552.90 grams

Do the same calculation for the Sleeve and remember to double it as you have two sleeves.

STEP 7: Add up all the weight in grams:

Back & Front	552.90
2 Sleeves	199.50
(Collar	87.52)

TOTAL: 839.92 grams of yarn is needed to make this garment, or 840 grams.

STEP 8: Figure out how many balls of yarn you will need

Since the yarn you are buying is sold on balls that weigh 50 grams, you take the total weight of grams needed for the sweater and divide it by the weight of 1 (one) ball of yarn, which is 50 grams (usually sold in 50 or 100 gram units).

840 ÷ 50 (gram balls) = 16.8 balls of yarn

You will need 17 balls of this yarn to make this sweater in this size. 17 balls to knit a sweater is about what I use

depending on size, so it looks good to me. If the number seems off, make sure you used the right numbers in the right places.

This can be done for any item that you want to knit, for any pattern you find that does not tell you how much yarn to get.

REMEMBER: If you change size, or weight of the yarn which in turn changes gauge, you will need to do this all over again to get to your number of balls. Also, add 15% for every 2 cables that you do, which is another 2.5 balls, or I should say 3, in case you were wondering, for a total of 20 balls. If your yarn weighs 100 grams, then divide by 100 instead of 50.

$$16.8 \text{ balls} \times 15\% = 2.52 \text{ or } 3 \text{ extra balls for cables}$$

OR

$$16.8 \times .15 \text{ (same as } 15\%) = 2.52$$

OR.....

If your pattern tells you how many stitches there are at the widest point and how many rows are at the tallest point, you can use those numbers, just plug them in the correct spots. Pattern generating software can tell you all this information or at least most of it. The software that I use is Cochenille, and it actually tells me total stitches in the area of any garment piece, so most of this is already done for me.

SIDE NOTE: Shawl Collar calculations...

- 8" deep x 6 stitches = 48 stitches wide
- 20" tall x 8 rows = 160 rows
- 48 x 160 = 7,680 stitches total
- $7,680 \div 2,500 = 3.072$
- $3.072 \times 28.5 = 87.52$
- $87.52 \div 50 = 1.7$ or 2 balls as you always round up

OR

- width" x stitches = A
- height" x rows = B
- total stitches in swatch = S
- total weight of swatch = W
- $B \times A = C$
- $C \div S = F$
- $F \times W = Z$
- $Z \div \text{your yarn ball weight} = Y$ (solution, how many balls you need)