**Main Problem #7**

Topic: *Multiples of Unit Fractions*

Problem: Your friend Fab is a world-class fashion designer from France who will be designing all the new dresses for this year’s Paris Fashion Week. He called you over to his studio to help him cut the fabrics for all the dresses. Fab likes his fabrics to be cut at a certain length (in meters), so he gives you a chart for all the lengths according to their fabric type.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| FABRIC | Silk | Linen | Nylon | Polyester | Wool |
| LENGTH | $$\frac{1}{3}$$ | $$\frac{1}{4}$$ | $$\frac{1}{5}$$ | $$\frac{1}{6}$$ | $$\frac{1}{7}$$ |

Q1. How long should each fabric be if Fab needs 5 cuts of each fabric for Monday? Express answers as mixed numbers.

Q2. How long should each fabric be if Fab needs 7 cuts of each fabric for Tuesday? Express answers as mixed numbers.

Q3. How long should each fabric be if Fab needs 9 cuts of each fabric for Wednesday? Express answers as mixed numbers.

Q4. How long should each fabric be if Fab needs 11 cuts of each fabric for Thursday? Express answers as mixed numbers.

Q5. How long should each fabric be if Fab needs 13 cuts of each fabric for Friday? Express answers as mixed numbers.

Q6. What is the total length for each fabric that was cut from Monday to Friday?

\*\*For the following problems, students should use the formula for finding multiples of unit fractions:

$$n⋅\frac{a}{b}=\frac{n⋅a}{b}$$

A1. 5 cuts

Silk: $5⋅\frac{1}{3}=\frac{5}{3}=1\frac{2}{3}$meters

Linen: $5⋅\frac{1}{4}=\frac{5}{4}=1\frac{1}{4}$meters

Nylon: $5⋅\frac{1}{5}=\frac{5}{5}=1$meter

Polyester: $5⋅\frac{1}{6}=\frac{5}{6}$of a meter

Wool: $5⋅\frac{1}{7}=\frac{5}{7}$of a meter

A2. 7 cuts

Silk: $7⋅\frac{1}{3}=\frac{7}{3}=2\frac{1}{3}$meters

Linen: $7⋅\frac{1}{4}=\frac{7}{4}=1\frac{3}{4}$meters

Nylon: $7⋅\frac{1}{5}=\frac{7}{5}=1\frac{2}{5}$meter

Polyester: $7⋅\frac{1}{6}=\frac{7}{6}=1\frac{1}{6}$meters

Wool: $7⋅\frac{1}{7}=\frac{7}{7}=1$meter

A3. 9 cuts

Silk: $9⋅\frac{1}{3}=\frac{9}{3}=3$meters

Linen: $9⋅\frac{1}{4}=\frac{9}{4}=2\frac{1}{4}$meters

Nylon: $9⋅\frac{1}{5}=\frac{9}{5}=1\frac{4}{5}$meter

Polyester: $9⋅\frac{1}{6}=\frac{9}{6}=1\frac{3}{6}$meters

Wool: $9⋅\frac{1}{7}=\frac{9}{7}=1\frac{2}{7}$meters

A4. 11 cuts

Silk: $11⋅\frac{1}{3}=\frac{11}{3}=3\frac{2}{3}$meters

Linen: $11⋅\frac{1}{4}=\frac{11}{4}=2\frac{3}{4}$meters

Nylon: $11⋅\frac{1}{5}=\frac{11}{5}=2\frac{1}{5}$meter

Polyester: $11⋅\frac{1}{6}=\frac{11}{6}=1\frac{5}{6}$meters

Wool: $11⋅\frac{1}{7}=\frac{11}{7}=1\frac{4}{7}$meters

A5. 13 cuts

Silk: $13⋅\frac{1}{3}=\frac{13}{3}=4\frac{1}{3}$meters

Linen: $13⋅\frac{1}{4}=\frac{13}{4}=3\frac{1}{4}$meters

Nylon: $13⋅\frac{1}{5}=\frac{13}{5}=2\frac{3}{5}$meter

Polyester: $13⋅\frac{1}{6}=\frac{13}{6}=2\frac{1}{6}$meters

Wool: $13⋅\frac{1}{7}=\frac{13}{7}=1\frac{6}{7}$meters

Total Length for each Fabric

|  |  |
| --- | --- |
| Silk | $1\frac{2}{3}$+$2\frac{1}{3}$+ 3 + $3\frac{2}{3}$+ $4\frac{1}{3}$= (1+2+3+3+4)+($\frac{2}{3}+\frac{1}{3}+\frac{2}{3}+\frac{1}{3}) = 13+2=15$meters |
| Linen | $1\frac{1}{4}$+ $1\frac{3}{4}$ + $2\frac{1}{4}$+ $2\frac{3}{4}$+ $3\frac{1}{4}$ = (1+1+2+2+3)+$\left(\frac{1}{4}+\frac{3}{4}+\frac{1}{4}+\frac{3}{4}+\frac{1}{4}\right)$= $9+2\frac{1}{4}$=$11\frac{1}{4}$meters |
| Nylon | $1+1\frac{2}{5}$+ $1\frac{4}{5}$+ $2\frac{1}{5}$+ $2\frac{3}{5}$= (1+1+1+2+2)+$\left(\frac{2}{5}+\frac{4}{5}+\frac{1}{5}+\frac{3}{5}\right)$= $7+2=9$meters |
| Polyester | $\frac{5}{6}$+ $1\frac{1}{6}$+ $1\frac{3}{6}$+ $1\frac{5}{6}$+ $2\frac{1}{6}$= (1+1+1+1+2)+($\frac{5}{6}+\frac{1}{6}+\frac{3}{6}+\frac{5}{6}+\frac{1}{6})=6+2\frac{3}{6}=8\frac{3}{6}$meters |
| Wool | $\frac{5}{7}$+ 1 + $1\frac{2}{7}$+ $1\frac{4}{7}$+ $1\frac{6}{7}$= (1+1+1+1)+$\left(\frac{5}{7}+\frac{2}{7}+\frac{4}{7}+\frac{6}{7}\right)=4+2\frac{3}{7}$=$6\frac{3}{7}$meters |