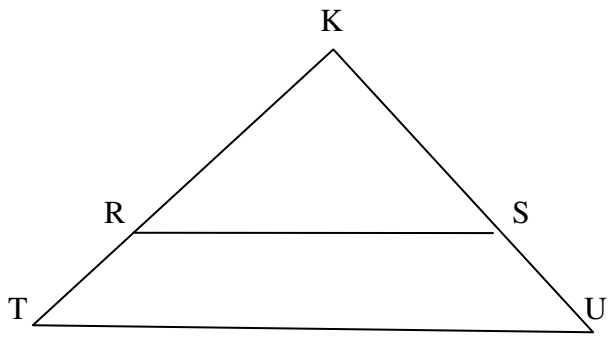
Notes for Lesson 7-2:

For the figure shown, it is given that $\frac{KR}{RT} = \frac{KS}{SU}$. Complete the following table.




| KR | RT | KT | KS | SU | KU |
|---|---|---|---|---|---|
| 8 | 2 | 10 | 12 | 3 | 15 |
| 6 | 2 | 8 | 9 | 3 | 12 |
| 12 | 4 | 16 | 15 | 5 | 20 |
| 20 | 10 | 30 | 28 | 14 | 42 |

Work for row 1:

KT – KR = RT
10 – 8 = RT
2 = RT

$\frac{KR}{RT} = \frac{KS}{SU}$

$\frac{8}{2} = \frac{12}{x}$
$8x = 24$
$X = 3$

KU = KS + SU
KU = 12 + 3
KU = 15

Work for row 2:

SU = KU – KS
SU = 12 – 9
SU = 3

$\frac{x}{2} = \frac{9}{3}$
$3x = 18$
$X = 6$

KT = KR + RT
KT = 6 + 2
KT = 8

Work for row 3:

KT = KR + RT
KT = 12 + 4
KT = 16

$\frac{12}{4} = \frac{20 - x}{x}$
$12x = 80 - 4x$
$16x = 80$
$X = 5 = SU$

KS = 20 - 5
KS = 15

Work for row 4:

SU = KU – KS
SU = 42 – 28
SU = 14

$\frac{30 - x}{x} = \frac{28}{14}$

$28x = 420 - 14x$
$42x = 420$
$X = 10$

KR = 30 - 10
KR = 20

Show that the proportions are equivalent:

$\frac{a + c}{b + d} = \frac{a - c}{b - d}$ and $\frac{a}{b} = \frac{c}{d}$ = ad = cb

(a + c)(b – d) = (a – c)(b + d)
ab – ad + cb – cd = ab + ad – cb - cd
-ab + cd -ab +cd
-ad + cd = ad - cb
+ab +ab
cd = 2ab – cd
+cd +cd
2cd = 2ab
cd = ab This is now equivalent to second proportion that was given

Find the value of x:

1) $\frac{x}{x + 5} = \frac{x - 4}{x}$

$x^2 = (x - 4)(x + 5)$
$x^2 = x^2 + 5x - 4x - 20$
$-x^2 \quad -x^2$
$0 = x - 20$
$X = 20$

2) $\frac{x - 2}{x} = \frac{x}{x + 3}$

$x^2 = (x - 2)(x + 3)$
$x^2 = x^2 + 3x - 2x - 6$
$-x^2 \quad -x^2$
$0 = x - 6$
$x = 6$

Find the values of x and y:

$\frac{x-3}{4} = \frac{y+2}{2}$ $\qquad$ $\frac{x+y-1}{6} = \frac{x-y+1}{5}$

$2(x-3) = 4(y+2)$ $\qquad$ $5(x+y-1) = 6(x-y+1)$

$2x - 6 = 4y + 8$ $\qquad$ $5x + 5x - 5 = 6x - 6y + 6$

$2x - 4y = 14$ $\qquad$ $-x + 11y = 11$

$2x - 4y = 14$

$2(-x + 11y = 11)$

$$\begin{array}{r} 2x - 4y = 14 \\ +\ -2x + 22y = 22 \\ \hline 18y = 36 \end{array}$$

$Y = 2$ $\qquad$ $2x - 4(2) = 14$

$2x - 8 = 14$

$2x = 22$

$X = 11$

Cecelia wanted to find the height of a certain tree for a report in her Biology class. Her method used shadows as shown in the diagram. She measured the shadow of the tree and found it was 5 m long. She measured her shadow and found it was 0.8 m long. If Cecelia is 1.6 m tall, about how tall is the tree?

Tree's shadow $\frac{5}{}$ = Cecilia's shadow $\frac{0.8}{}$

Tree's height x Cecilia's height 1.6

$\frac{5}{X} = \frac{0.8}{1.6}$

$0.8x = 8$

$X = 10m$