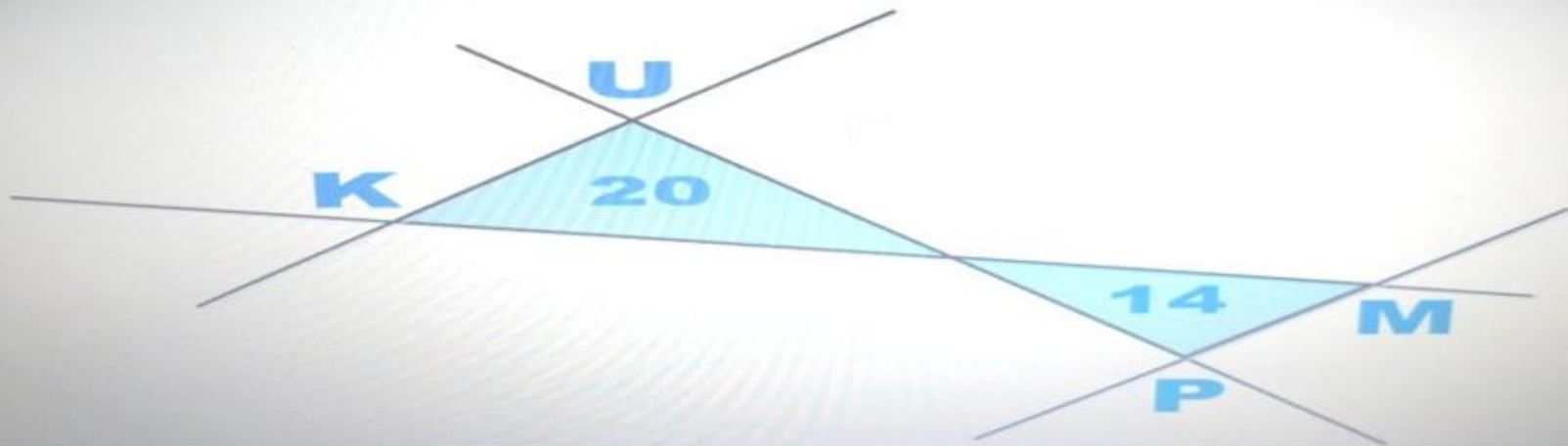
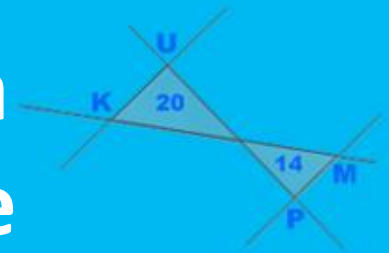
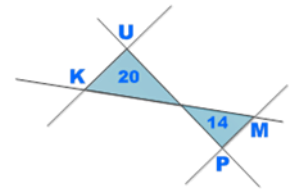


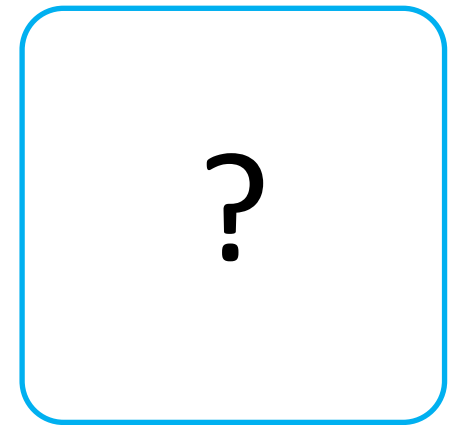
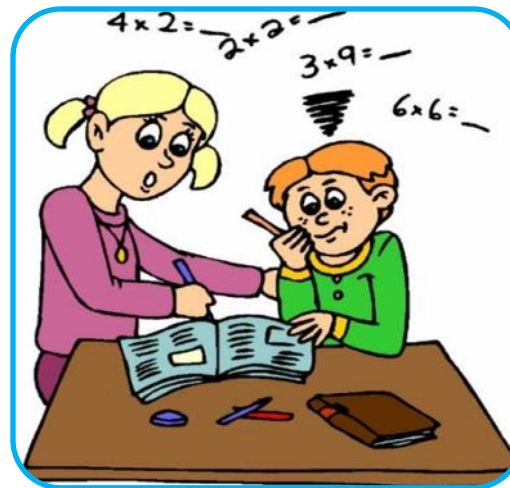
Vpeljava inteligentnega tutorskega sistema za poučevanje matematike



Rozalija Grešak, Nika Hren, Alen Kopic, Ines Medved, Manca Pogladič, Barbara Stopar, Teja Šavs, Manca Zaviršek, Katja Zupančič, Maja Zupančič, Sašo Zupanec, Matej Zapušek, Matej Guid

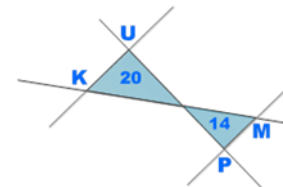


SITUACIJA V RAZREDU





Zavod
Republike
Slovenije
za šolstvo



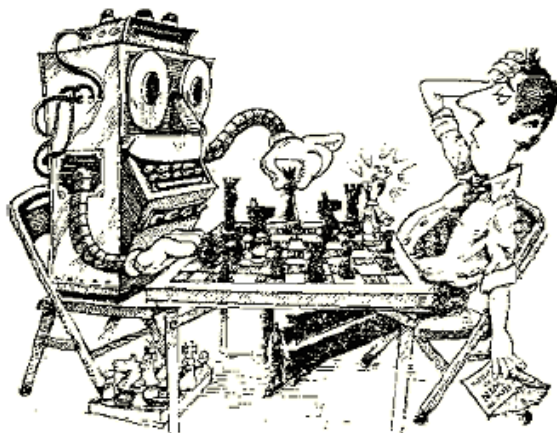
INTELIGENTNI TUTORSKI SISTEM - ITS

EKSPERTNO ZNANJE O DOMENI

model domene

PEDAGOŠKO ZNANJE

model učitelja

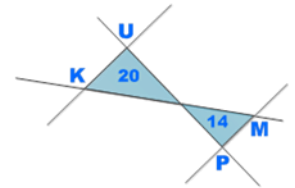


MODELIRANJE UČENCA

model učenca

KOMUNIKACIJSKE VEŠČINE

komunikacijski model



KOGNITIVNI TUTOR CARNEGIE LEARNING

Carnegie Learning Online



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4. Log in

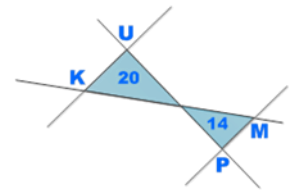
SCHOOL ID:

USERNAME:

PASSWORD:

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LOG IN 



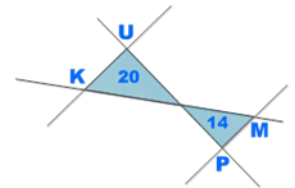
KOGNITIVNI TUTOR CARNEGIE LEARNING

Primer iz algebre:

20 ljudi gre na koncert. Otrok je osem več kot odraslih.

Otroci = ?

Odrasli = ?

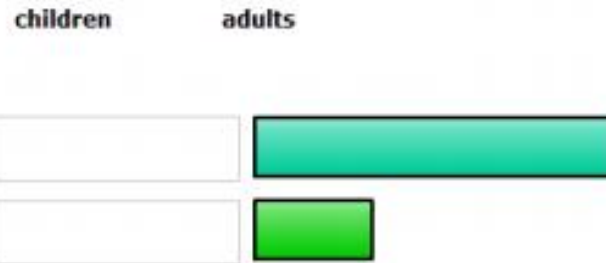


KOGNITIVNI TUTOR CARNEGIE LEARNING

Twenty people are going to a concert. There are eight more children than adults.

Which bar represents the children and which bar represents the adults?
Please drag the names down to the boxes below.

How many children and adults were at the concert?



Number of children =

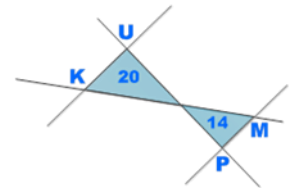
Number of adults =



← Previous
Next →

<input type="checkbox"/>	Find Sum of Parts
<input type="checkbox"/>	Identify Given Values
<input type="checkbox"/>	Identify Unknown Part
<input type="checkbox"/>	Interpret Representations
<input type="checkbox"/>	Set-up Equation
<input type="checkbox"/>	Solve Equation



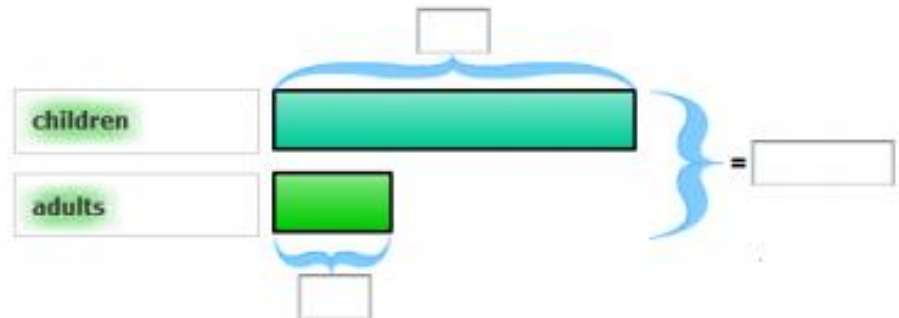


KOGNITIVNI TUTOR CARNEGIE LEARNING

Twenty people are going to a concert. There are eight more children than adults.

How many children and adults were at the concert?

Now which box is for the TOTAL number of people? Please enter the number you find in the introduction text in that box.



Number of children =

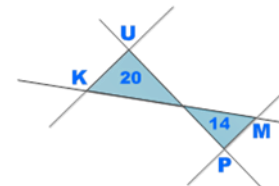
Number of adults =



← Previous
Next →

<input type="checkbox"/>	Find Sum of Parts
<input type="checkbox"/>	Identify Given Values
<input type="checkbox"/>	Identify Unknown Part
<input type="checkbox"/>	Interpret Representations
<input type="checkbox"/>	Set-up Equation
<input type="checkbox"/>	Solve Equation



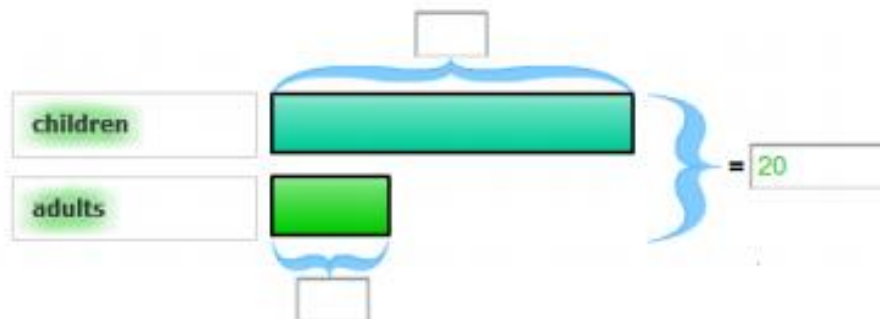


KOGNITIVNI TUTOR CARNEGIE LEARNING

Twenty people are going to a concert. There are eight more children than adults.

How many children and adults were at the concert?

The top bar only shows the total children. Please drag-and-drop a piece from the bottom bar onto the top bar to cut it.



Number of children =

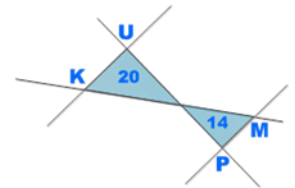
Number of adults =



← Previous Next →

- Find Sum of Parts
- Identify Given Values
- Identify Unknown Part
- Interpret Representations
- Set-up Equation
- Solve Equation



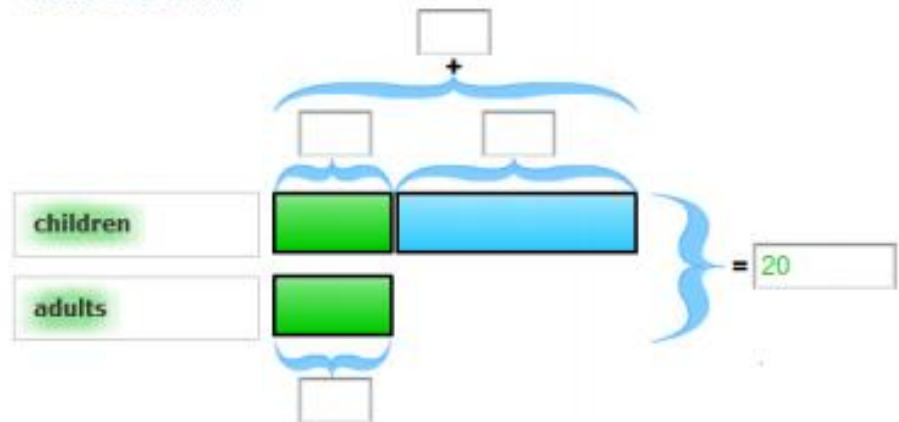


KOGNITIVNI TUTOR CARNEGIE LEARNING

Twenty people are going to a concert. There are eight more children than adults.

How many children and adults were at the concert?

Great! Now find the box for 'how many more children there are than adults' and fill it in.



Number of children =

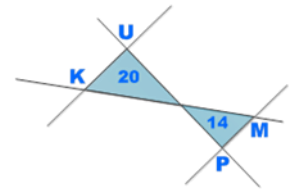
Number of adults =



← Previous
Next →

	Find Sum of Parts
	Identify Given Values
	Identify Unknown Part
	Interpret Representations
	Set-up Equation
	Solve Equation



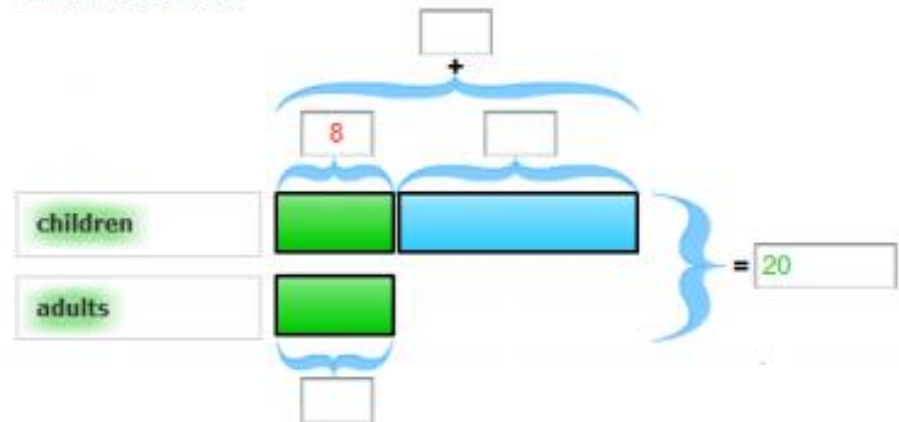


KOGNITIVNI TUTOR CARNEGIE LEARNING

Twenty people are going to a concert. There are eight more children than adults.

How many children and adults were at the concert?

Great! Now find the box for 'how many more children there are than adults' and fill it in.



Number of children =

Number of adults =

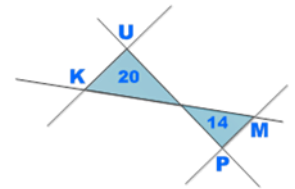
?
Hint
Hint

No, this part is still UNKNOWN. Please enter the known values first.

← Previous Next →

- Find Sum of Parts
- Identify Given Values
- Identify Unknown Part
- Interpret Representations
- Set-up Equation
- Solve Equation

✓
Done
Done

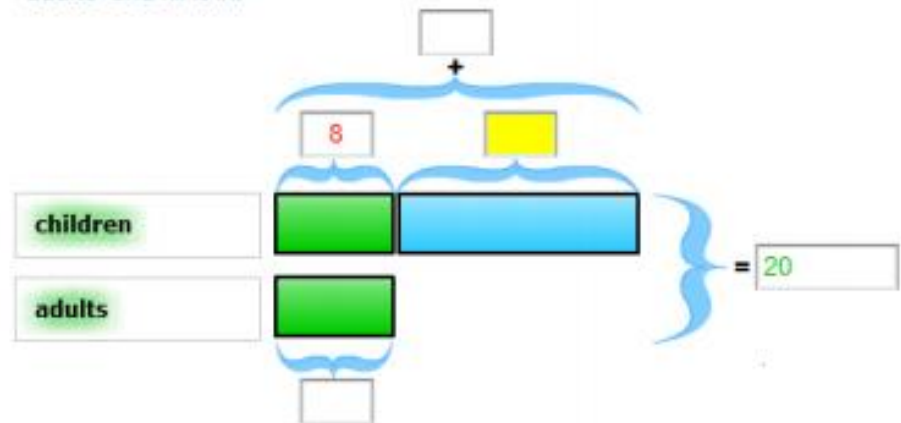


KOGNITIVNI TUTOR CARNEGIE LEARNING

Twenty people are going to a concert. There are eight more children than adults.

How many children and adults were at the concert?

Great! Now find the box for 'how many more children there are than adults' and fill it in.



Number of children =

Number of adults =



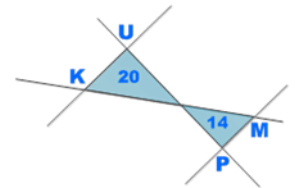
Now that you've cut the upper bar, you need to find how many more children there are than adults.

← Previous

Next →

<input type="checkbox"/>	Find Sum of Parts
<input type="checkbox"/>	Identify Given Values
<input type="checkbox"/>	Identify Unknown Part
<input type="checkbox"/>	Interpret Representations
<input type="checkbox"/>	Set-up Equation
<input type="checkbox"/>	Solve Equation

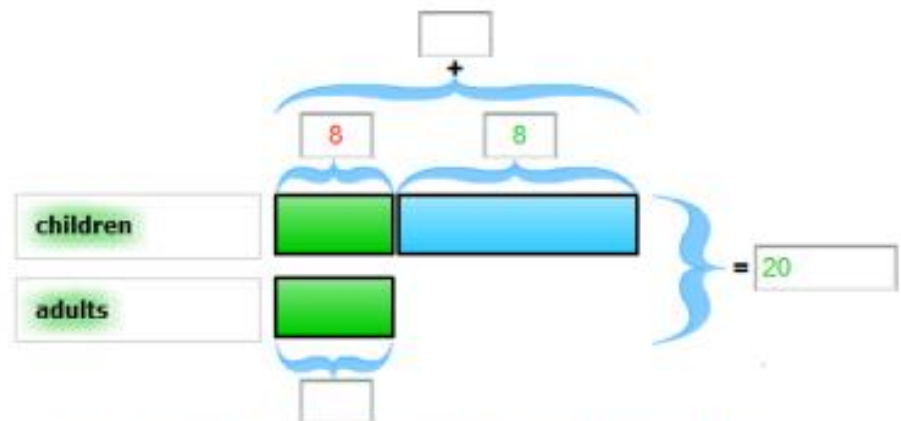




KOGNITIVNI TUTOR CARNEGIE LEARNING

Twenty people are going to a concert. There are eight more children than adults.

How many children and adults were at the concert?



Good. Now to find the unknown part, please drag one of the unknowns to the box below.

Number of children =

Number of adults =

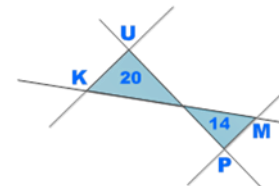
x



← Previous Next →

- Find Sum of Parts
- Identify Given Values
- Identify Unknown Part
- Interpret Representations
- Set-up Equation
- Solve Equation

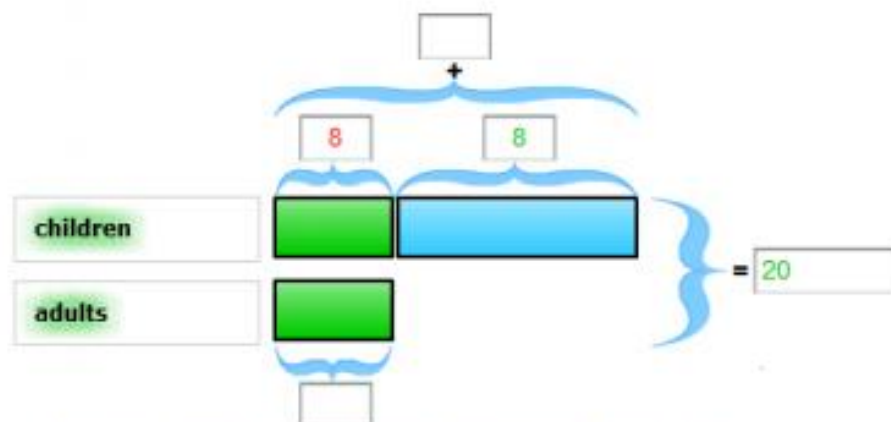




KOGNITIVNI TUTOR CARNEGIE LEARNING

Twenty people are going to a concert. There are eight more children than adults.

How many children and adults were at the concert?



Now for a little calculation: how many people are the two unknown parts together?

Number of children =

Number of adults =

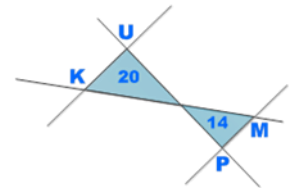
$$2 \times \text{[green box]} = \text{[input box]}$$



← Previous Next →

- Find Sum of Parts
- Identify Given Values
- Identify Unknown Part
- Interpret Representations
- Set-up Equation
- Solve Equation

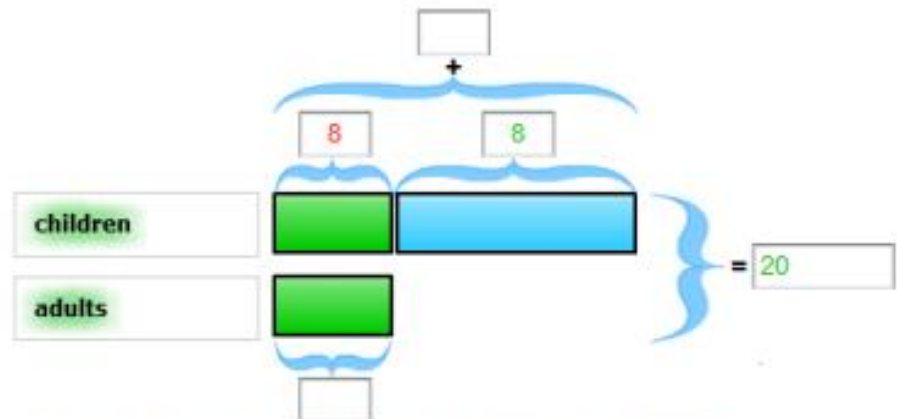




KOGNITIVNI TUTOR CARNEGIE LEARNING

Twenty people are going to a concert. There are eight more children than adults.

How many children and adults were at the concert?



Now for a little calculation: how many people are the two unknown parts together?

Number of children =

Number of adults =

$$2 \times \text{[green box]} = 2 \cdot 8$$

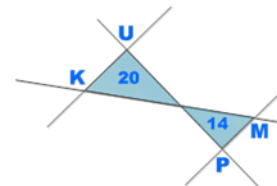


You know the total number of people: 20. You know the difference between children and adults (the blue piece): 8. How many are left for the two green pieces?

← Previous Next →

- Find Sum of Parts
- Identify Given Values
- Identify Unknown Part
- Interpret Representations
- Set-up Equation
- Solve Equation

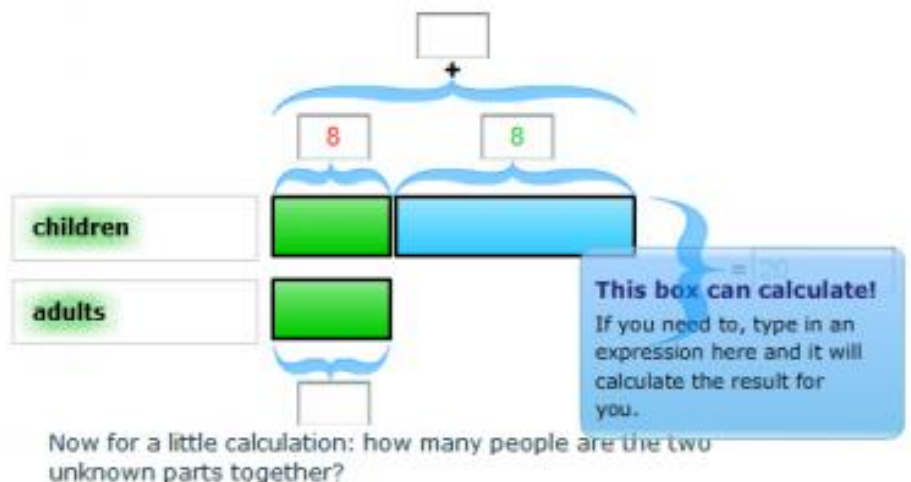




KOGNITIVNI TUTOR CARNEGIE LEARNING

Twenty people are going to a concert. There are eight more children than adults.

How many children and adults were at the concert?



Number of children =

Number of adults =

$$2 \times \text{[green box]} = 20 - 8$$



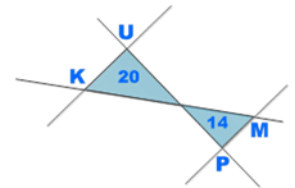
You know the total number of people: 20. You know the difference between children and adults (the blue piece): 8. How many are left for the two green pieces?

← Previous

Next →

- Find Sum of Parts
- Identify Given Values
- Identify Unknown Part
- Interpret Representations
- Set-up Equation
- Solve Equation

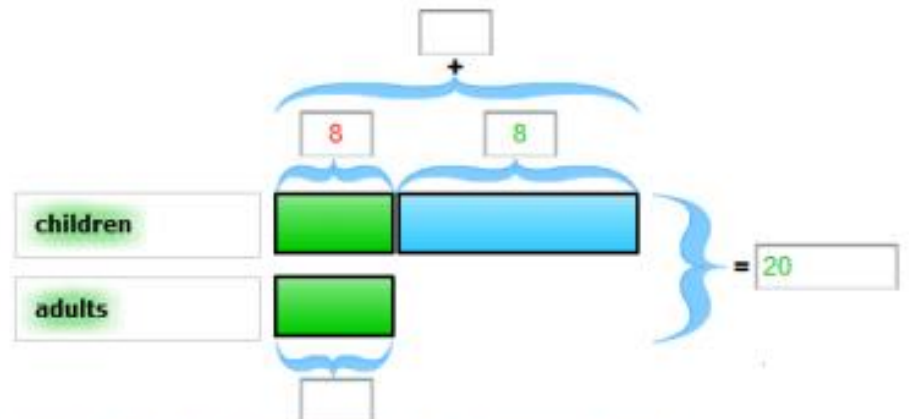




KOGNITIVNI TUTOR CARNEGIE LEARNING

Twenty people are going to a concert. There are eight more children than adults.

How many children and adults were at the concert?



Yes, indeed! So how many people is ONE unknown part?

Number of children =

Number of adults =

$$2 \times \text{[green box]} = \text{[12]}$$

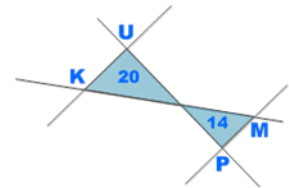
$$1 \times \text{[green box]} = \text{[12/2]}$$



← Previous Next →

	Find Sum of Parts
	Identify Given Values
	Identify Unknown Part
	Interpret Representations
	Set-up Equation
	Solve Equation



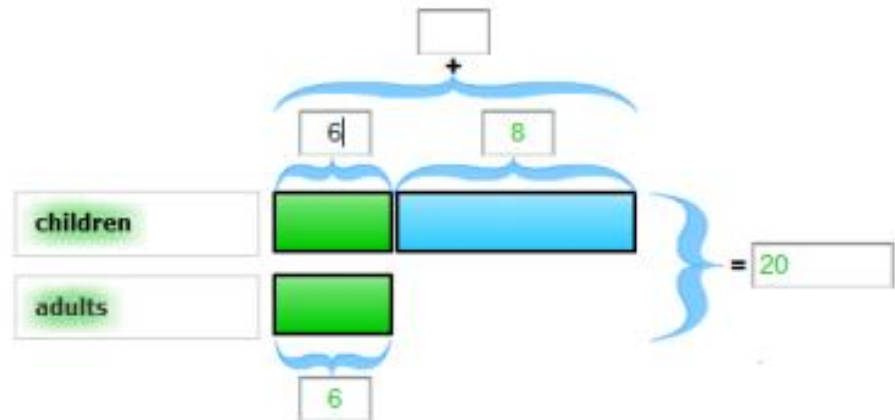


KOGNITIVNI TUTOR CARNEGIE LEARNING

Twenty people are going to a concert. There are eight more children than adults.

How many children and adults were at the concert?

Please fill in the remaining textboxes with what you just found out.



Number of children =

Number of adults =

x =

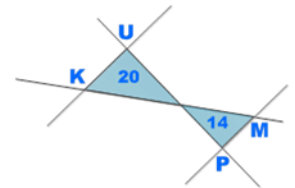
1 x =



← Previous Next →

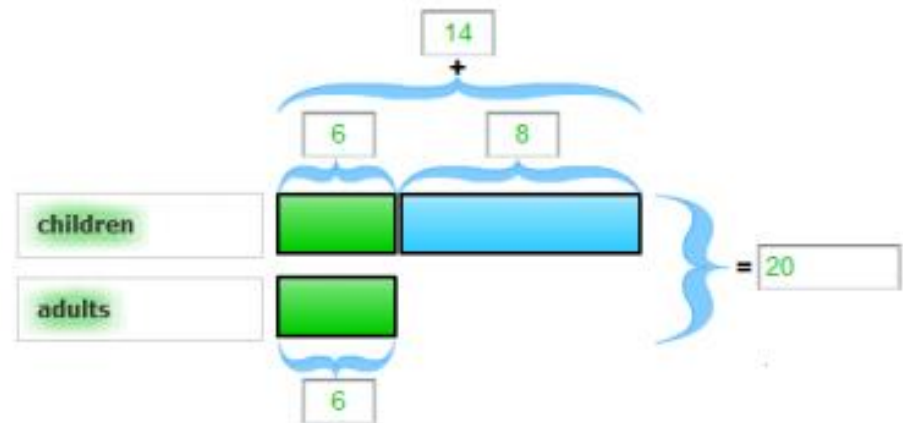
- Find Sum of Parts
- Identify Given Values
- Identify Unknown Part
- Interpret Representations
- Set-up Equation
- Solve Equation





KOGNITIVNI TUTOR CARNEGIE LEARNING

Twenty people are going to a concert. There are eight more children than adults.



How many children and adults were at the concert?

Number of children =

Number of adults =

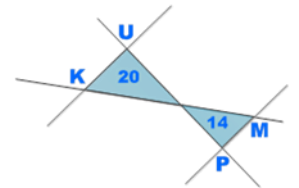
$$\begin{array}{r}
 2 \times \text{[green box]} = \text{[input 12]} \\
 1 \times \text{[green box]} = \text{[input 6]}
 \end{array}$$



← Previous Next →

- Find Sum of Parts
- Identify Given Values
- Identify Unknown Part
- Interpret Representations
- Set-up Equation
- Solve Equation





KOGNITIVNI TUTOR CARNEGIE LEARNING

Twenty people are going to a concert. There are eight more children than adults.

How many children and adults were at the concert?

Number of children = 14
Number of adults = 6

1 x

Find Sum of Parts
Identify Given Values
Identify Unknown Part
Interpret Representations
Set-up Equation
Solve Equation

Done Done

← Previous Next →

?

Hint

Please wait while the tutor loads the next problem.

14
+
6 8
= 20

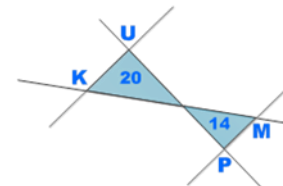
children

adults

20

12

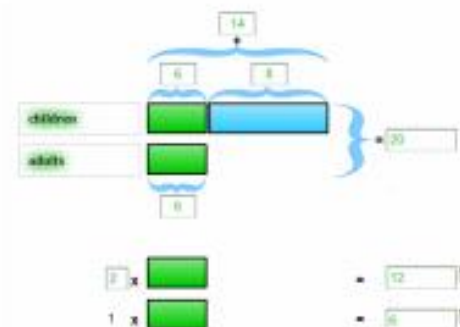
6



KOGNITIVNI TUTOR CARNEGIE LEARNING

20 ljudi gre na koncert. Otrok je osem več kot odraslih.

otroci = ?
odrasli = ?



$$\begin{aligned} \text{otroci} &= x + 8 = 6 + 8 = \underline{14} \\ \text{odrasli} &= x = \underline{6} \end{aligned}$$

$$\text{otroci} + \text{odrasli} = 20$$

$$\begin{aligned} x + 8 + x &= 20 \\ 2x &= 20 - 8 \\ 2x &= 12 \\ x &= 6 \end{aligned}$$

LASTNOSTI TUTORJA (1)

Lesson: Relations and Functions

Represent a Relation

A **relation** is any correspondence between the members of all its inputs and the members of all its outputs. For instance, if a vendor sells hot dogs at baseball games, there exists a correspondence between the game (input) and the number of hot dogs sold (output).

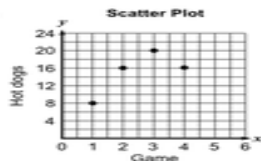
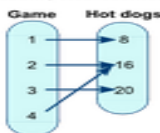
A relation can be represented using a table, ordered pairs, a graph, or set representation. Consider again the example of the vendor selling hot dogs at baseball games. Suppose that during game 1, the vendor sells 8 hot dogs, during game 2 he sells 16 hot dogs, during game 3 he sells 20 hot dogs, and during game 4 he sells 16 hot dogs. Below are four different representations of this same relation.

Table

Game	Hot dogs
1	8
2	16
3	20
4	16

Ordered Pairs
(Game, Hot dogs)
(1, 8)
(2, 16)
(3, 20)
(4, 16)

Mapping Representation



Example:

The table below shows the correspondence between the number of tickets sold in a movie theater in a day and the number of tubs of popcorn sold in the theater on that same day. Represent this relation using (a) ordered pairs, (b) a graph, and (c) set representation.

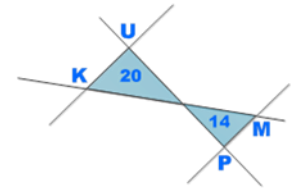
Number of tickets sold	Number of tubs of popcorn sold
520	230
680	301
1000	550
1140	575
600	250

Preizkušeno
v praksi

650.000
učencev v OŠ
in SŠ

150.000
učencev na
fakultetah

Teoretična
podlaga



LASTNOSTI TUTORJA (2)

Scenario

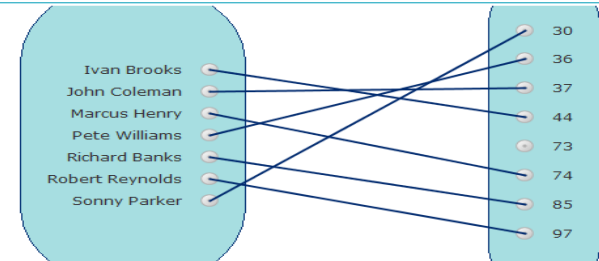
Lisa and her brother are running a lemonade stand. Lisa's brother takes the first shift, and he sells \$27 worth of lemonade. After Lisa takes over, every minute, she sells a glass of lemonade for \$1 (it's a really hot day today!).

1. What will the income be after Lisa has been selling 10 minutes?
2. How long will Lisa have to sell in order to have \$50 total income?
3. Lisa runs out of lemonade after an hour. How much money did she make?

Table Representation

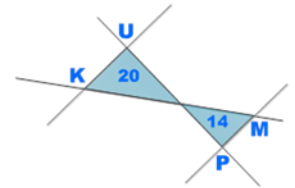
Player	Jersey Number
Ivan Brooks	44
Pete Williams	36
Sonny Parker	30
Robert Reynolds	97
Richard Banks	85
John Coleman	37
Marcus Henry	74

Mapping Representation



Naloge iz
življenjski situacij

Različne
predstavitve



LASTNOSTI TUTORJA (3)

Scenario

The mapping shows information about students and their favorite subject in school.

Represent the information using a table. Then answer the questions using the given information, and determine whether the relationship is a relation and a function.

Does any student have more than one favorite subject? Choose yes or no.

Yes No

The relationship between students and favorite subjects is

Does more than one student have the same favorite subject? Choose yes or no.

Yes No


The relationship between favorite subjects and students is

Hint

Table Representation

Student	Favorite Subject

Hint (1 of 3) ⋮ ✕

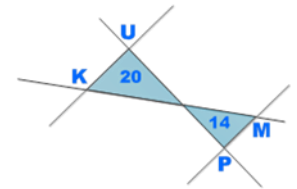


The given mapping shows the relationship between students and favorite subjects. Enter any student that is connected to a favorite subject.

◀ Previous
Next ▶

Razdrobitev
problema

Namigi



LASTNOSTI TUTORJA (4)

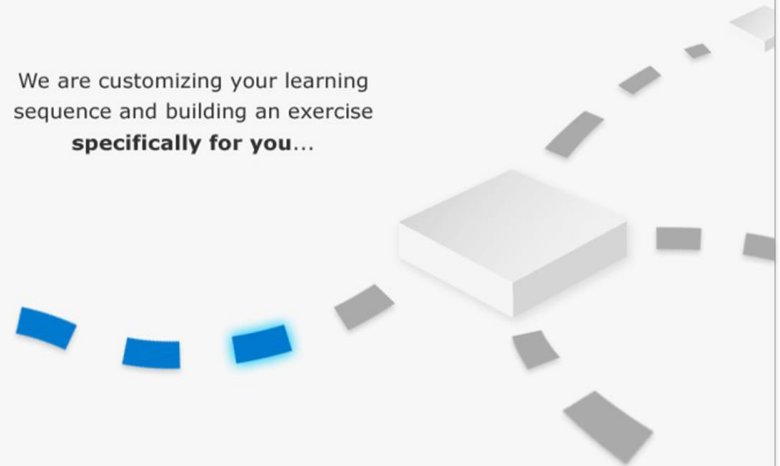
MODULE: 1 UNIT: 1 - Relations and Functions SECTION: 1

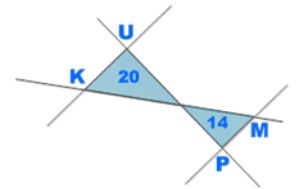


Skillometer

Kognitivni model
učenca

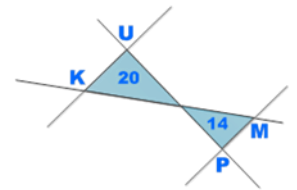
We are customizing your learning
sequence and building an exercise
specifically for you...





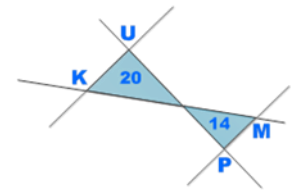
IMPLEMENTACIJA TUTORJA V ZDA

- Uporaba pri pouku
Učbenik + računalnik (3:2)
- Poletna šola (NMS)
45 učnih ur
- “pull-out” program
Dodatna pomoč učencem s težavami



REZULTATI

- Izboljšan uspeh na zaključnih testiranjih
- Izboljšan uspeh na testih TIMSS
- Spodbuja k razmišljanju in reševanju kompleksnih matematičnih problemov



SKLADNOST TUTORJA Z UN

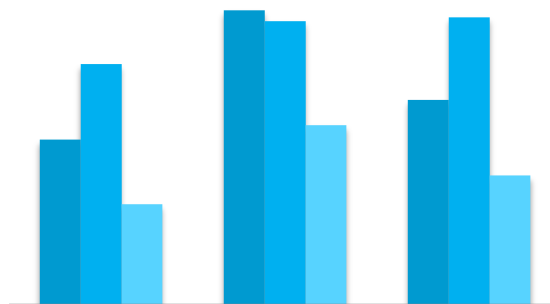
Učni modul
MATHIA

Učni modul
COGNITIVE TUTOR

Manjša odstopanja

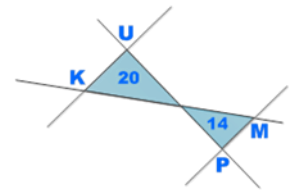
Skoraj popolno ujemanje

- geometrija in merjenje
- aritmetika in algebra
- druge vsebine



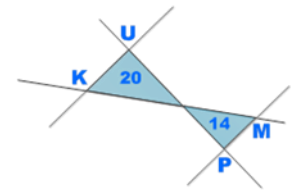
6. razred 7. razred 8. razred

9. razred in gimnazija



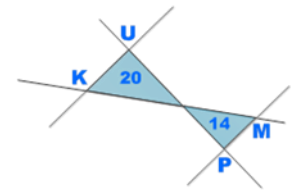
POPOLNO UJEMANJE TEM

- 6. razred
 - Transformacije
- 7. razred
 - Transformacije
 - Računske operacije in njihove lastnosti
 - Odstotni račun ter premo in obratno sorazmerje
 - Enačbe in neenačbe
 - Merila za sredino in razpršenost
- 8. razred
 - Računske operacije in njihove lastnosti
 - Potence
 - Merila za sredino in razpršenost

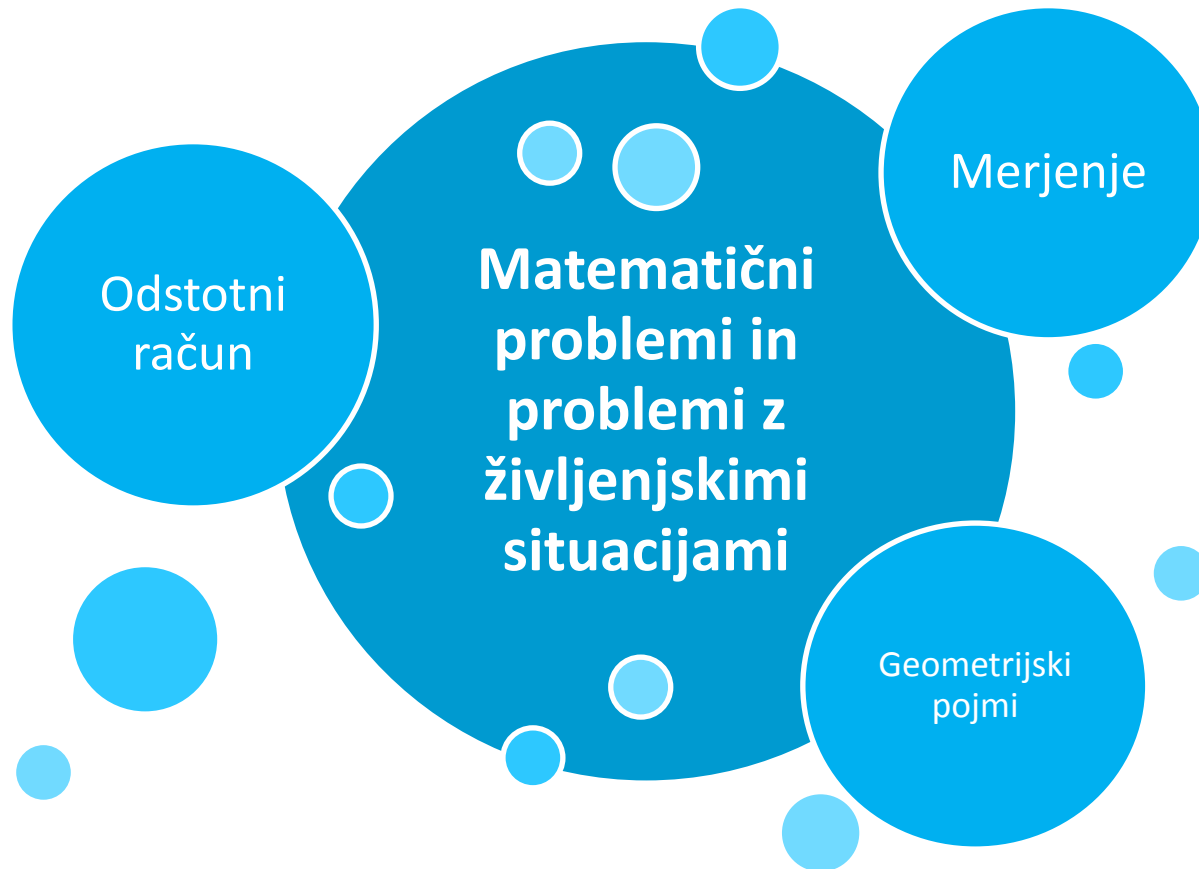


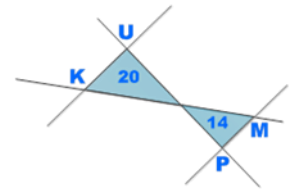
NAČINI VPELJAVE





ZAHTEVNEJŠE TEME



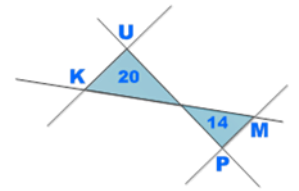


Učenje ena na ena
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Angleški jezik

Stroški

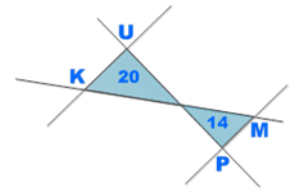
Zahteva po računalniku in
internetu



Z vami smo bile:

- Katja Zupančič
- Barbara Stopar
- Ines Medved

Vprašanja

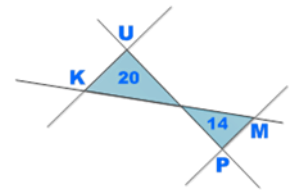


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Hvala za pozornost.