Classwork 6. Algebra.

Algebra.

Everybody who was hired on or after 2015 need to pay 4% of their salary to the retirement fund. Is the relationship between the salary and the money paid to the retirement fund proportional? If so, what is the proportionality coefficient?

Let's denote the salary as s and the retirement payments as p. The relationship between these to variables is

$$p = 0.04 \cdot s$$

Fill the table:

s	\$10000	\$30000	\$60000	\$90000	\$100000	\$200000	\$300000
p							

Is the ratio $\frac{p}{s}$ is the same?

6 pumps can pump out the water from the swimming pool in 10 hours. How many pumps are needed to do it in 5 hours? In 15 hours?

In what time 3 such pumps will do the job? 9 pumps?

n	1	3	6	9	12	15	18
t							

Is the relationship between n and t proportional?

Let's denote the volume of the swimming pool as 1 and it's constant. If 6 pumps will pump all water out in 10 hours, one pump will do it in $10 \cdot 6 = 60$ hours. So, in 1 hour 1 pump will pump out $\frac{1}{60}$ part of a pool.

$$\frac{1}{60} \cdot t \cdot n = 1, \qquad \frac{t \cdot n}{60} = 1; \qquad t \cdot n = 60 \; or \qquad t = \frac{60}{n}$$

Write the expression (formula) for relationship and tell is it proportional or inversely proportional:

1. Dependance of a number of identical textbooks (m) on a 90 cm long shelf from the thickness of a textbook (l ($in\ cm.$)).
2. Dependance the gas consumption V (in liters) from the distance driven s if for 1 km the car uses 0.08 liters of gasoline.
3. Dependance of the time t (in minutes) in which 200 pages can be printed on a printer from the printer productivity p of pages in minute.

Problems with proportions:

To praipare 6 big pizzas the cook need to use 2.5 kg of flour. How many flour the cook will nid to prapair 8 pizzas. We can write tios problemas follow:

6 pizzas → 2.5 kg

8 pizzas → x kg

We can create several proportions:

1. How many kilograms of flour are needed to make one pizza:

$$\frac{2.5\ kg.}{6} = \frac{x\ kg.}{8}$$

2. The flour consumption is proportional to number of pizza made, twice more pizzas, twice more flour should be used.

$$\frac{6}{8} = \frac{2.5\ kg.}{x\ kg.}$$

3. Into how many pizzas 1 kilogram of flour goes.

$$\frac{6}{2.5\ kg} = \frac{8}{x\ kg.}$$

For the first proportion:

$$\frac{2.5\ kg.}{6} = \frac{x\ kg.}{8};\quad 8 \cdot 2.5kg = 6 \cdot x\ kg.;\qquad x = \frac{8 \cdot 2.5\ kg.}{6} = \frac{4 \cdot 2.5\ kg}{3} = \frac{10}{3} = 3\frac{1}{3}kg.$$

For the second and third:

$$\frac{6}{8} = \frac{2.5\ kg.}{x\ kg.};\quad 6 \cdot x\ kg = 8 \cdot 2.5kg;\quad x = \frac{8 \cdot 2.5\ kg.}{6} = \frac{4 \cdot 2.5\ kg}{3} = \frac{10}{3} = 3\frac{1}{3}kg$$

$$\frac{6}{2.5\ kg} = \frac{8}{x\ kg.};\ 6 \cdot x\ kg = 8 \cdot 2.5kg;\quad x = \frac{8 \cdot 2.5\ kg.}{6} = \frac{4 \cdot 2.5\ kg}{3} = \frac{10}{3} = 3\frac{1}{3}kg$$

6 pizzas → 2.5 kg

8 pizzas → x kg

Tea was packaged in 30 packs of 150 grams each. How many packs will there be if the same amount of tea is packaged in 250-gram packs? We can write the problem in short as:

150 g. → 30 packs

250 g → x packs

We need to be carful to write a proportion: heavier pack, less packs we will obtain.

$$\frac{250}{150} \neq \frac{x}{30}; \quad \frac{250}{150} = \frac{30}{x};$$

$$\frac{250}{150} = \frac{30}{x}; \qquad 250x = 30 \cdot 150; \qquad x = \frac{30 \cdot 150}{250} = 18\, packs.$$

This problem can be solved without writing the proportion, the number of packs, multiplied by the weight of a pack should be the same:

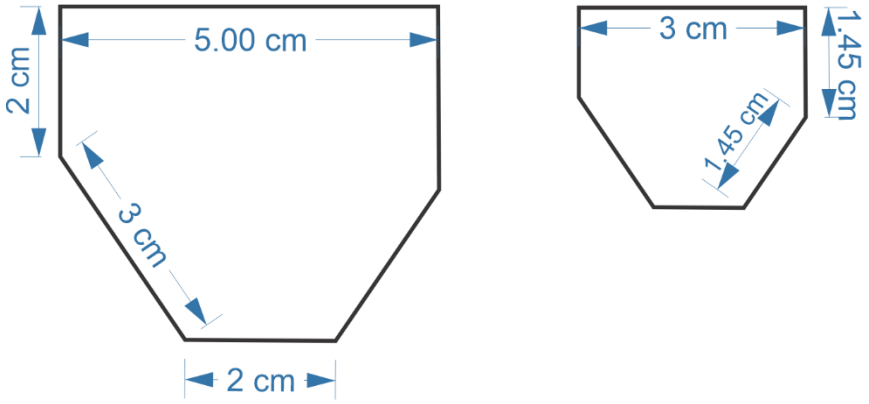
$$250g. \cdot x = 30 \cdot 150\ g.$$

Exercises:

1. Mr. Robinson was paid $590 for a job that required 40 hours of work. At this rate, how much should he be paid for a job requiring 60 hours of work?

2. If two pounds of meat will serve 5 people, how many pounds will be needed to serve 13 people?

3. Small shape below is a reduced copy of the big one. Find all missing sides. Find the ratio of the perimeters.

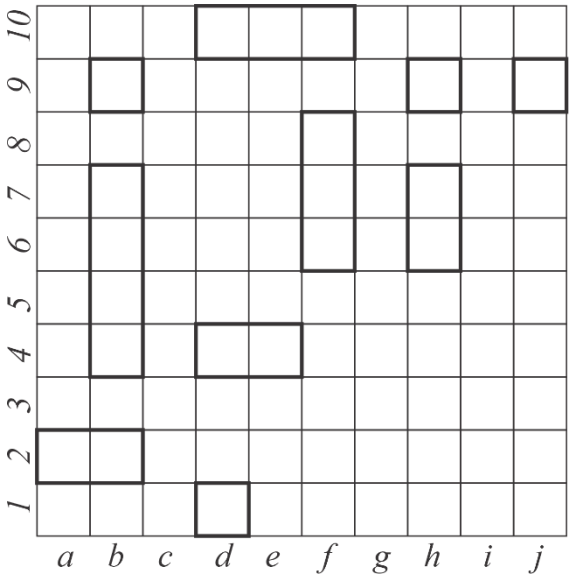


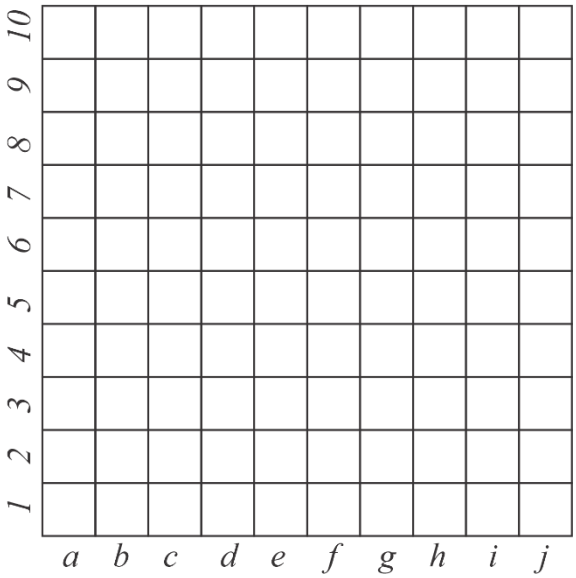
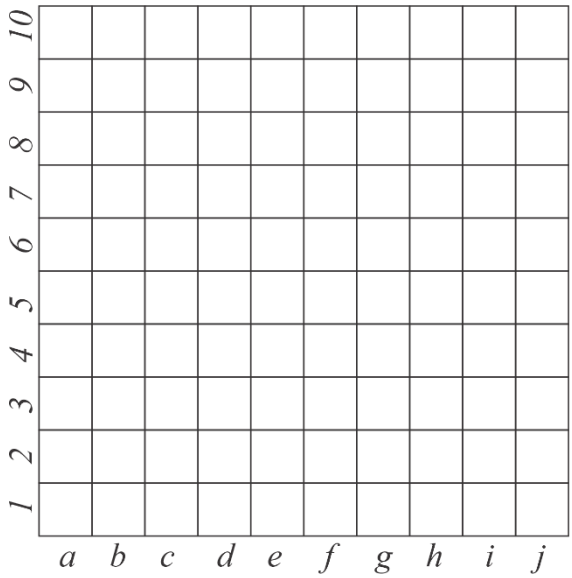
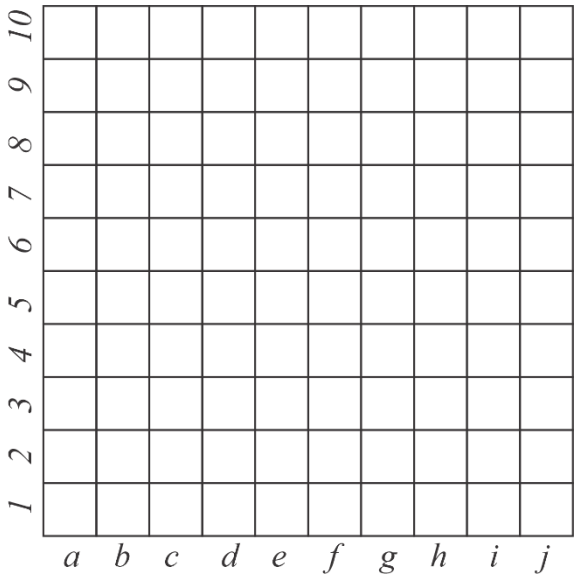
4. 6 oxen or 8 cows can graze a field in 28 days. How long would 9 oxen and 2 cows take to graze the same field?

5. 6 typists working 5 hours a day can type the manuscript of a book in 16 days. How many days will 4 typists take to do the same job, each working 6 hours a day?

Stony Brook University
General Information (631) 632-6000
University Police (631) 632-3333
Campus Map
N
Mile
MAIN CAMPUS
SOUTH CAMPUS
STONYBROOK RESEARCH AND DEVELOPMENT PARK
STONYBROOKMEDICINE
ATHLETIC FIELDS
ACADEMIC MALL
North Entrance
South Entrances
Main Entrances
Entrance
Health Sciences Garage
Hospital Parking Garage
Ashley Schiff Preserve
Campus Recreation South Fields
To Stony Brook Village
To Route 347
Circle Road
Stadium Road
Nicolls Road
Chapin Apartments Community
Chapin Commons
Hospital Main Entrance
Emergency Entrance
Point of Woods Bldgs.
Hilton Garden Inn
Administration
Administration Parking Garage
Student Activities Center (SAC)
Frank Melville Jr. Memorial Library
Charles B. Wang Center
Stony Brook Union
Sports Complex
Island Federal Arena
Kenneth P. LaValle Athletic Stadium
Athletic Indoor Practice Facility
Recreation Fields
Recreation Softball
Recreation Tennis Courts
Varsity Tennis Courts
Soccer Practice Field
Lacrosse Practice Field
Track Practice Field
Outdoor Basketball Courts
Softball
Joe Nathan Field
Natural Meadow
Student Health Center
James Hall
Benedict Hall
O'Neill Hall
Irving Hall
Grey Hall
Tubman Hall
Chavez Hall
East Side Dining
Langmuir Hall
Sports Court
Ammann Hall
Mendelsohn Community
Kelly Community
Schomburg Apartments Community
Roosevelt Community
Roth Community
Mount Hall
Gershwin Hall
Hendrix Hall
Whitman Hall
Roth Cafe
Cardozo Hall
Wagner Hall
Lauterbur Hall
Nobel Halls
Yang Hall
Stimson Hall
Keller Hall
Greeley Hall
Dewey Hall
West Side Dining
Hamilton Hall
Eisenhower Hall
Schick Hall
Baruch Hall
Toscanini Hall
Tabler Center
Hand Hall
Senger Hall
Tabler Community
Douglass Hall
Dreiser Hall
Sports Court
Nassau Hall
Putnam Hall
Dutchess Hall
Suffolk Hall
University Police
Dana Hall
Marine and Atmospheric Sciences
Challenger Hall
Endeavour Hall
Discovery Hall
Rockland Hall
Westchester Hall
Sullivan Hall
Dental Clinics
Carol M. Baldwin Breast Care Center
Imaging Center
Ambulatory Surgery Center
Pain Management Center
Basic Sciences Tower
Health Sciences Tower
Hospital
Hospital Pavilion
Children's Hospital
MART Cancer Center
L.I. High Technology Incubator
L.I. State Veterans Home
Physics
Chemistry
Frey Hall
Harriman Hall
Math Tower
Simons Center
Earth and Space Sciences (ESS)
Psychology B
Humanities
Social and Behavioral Sciences (SBS)
Javits Lecture Center (under construction)
Educational Communications Center (ECC)
Light Engineering
Engineering
New Computer Science
Computer Science
Computing Center
Heavy Engineering
Bioengineering
IACS
Laufer Center
Life Sciences
Centers for Molecular Medicine (CMM)
SCAN Center
Van de Graaff Accelerator
Stoller Center for the Arts
Central Stores (Warehouse)
Central Services (Receiving)
CoGen Plant
Service Group
Walter J. Hawers Campus Recreation Center
Grey Hall
Ammann Hall
Mendelsohn Community
Irving Hall
Stadium Road
Circle Road
Nicolls Road
Chapin Road
Main Street
Health Sciences Drive
Hospital Drive
Edmund D. Hawkins Road
Patriots Road
Marburger Drive
Engineering Drive
Campus Drive
Roosevelt Drive
Toscanini Drive
Wind Drive
Kelly Drive
Circle Road
Loop Road
Underpass
Research and Support Services (RSS)
Child Care Center
South P Lot
AERTC
CEWIT
Innovation and Discovery Center (under construction)
IEDM (under construction)
Innovation Road
Development Drive
Stony Brook Road
South Drive
Nicolls Road
Health Sciences Drive
L.I.R.R.
L.I.R.R. Station
L.I.R.R. Lot
25A

Example:





Fields: