Direct Variation vs. Partial Variation

Deepti, Krissnavee and Abiramy are planning to hold a huge AP math party at a banquet hall. To keep the cost as low as possible, they compare the cost of two banquet halls.

Hall Vyshna: Charges $50 per person.

Hall Uday: Charges a base fee of $2000 plus $30 per person

a) The dependent variable is cost in dollars (C) and the independent variable is number of people (n)

b) For both situations complete a table showing the cost for 0, 20, 40, and so on up to 100 people.

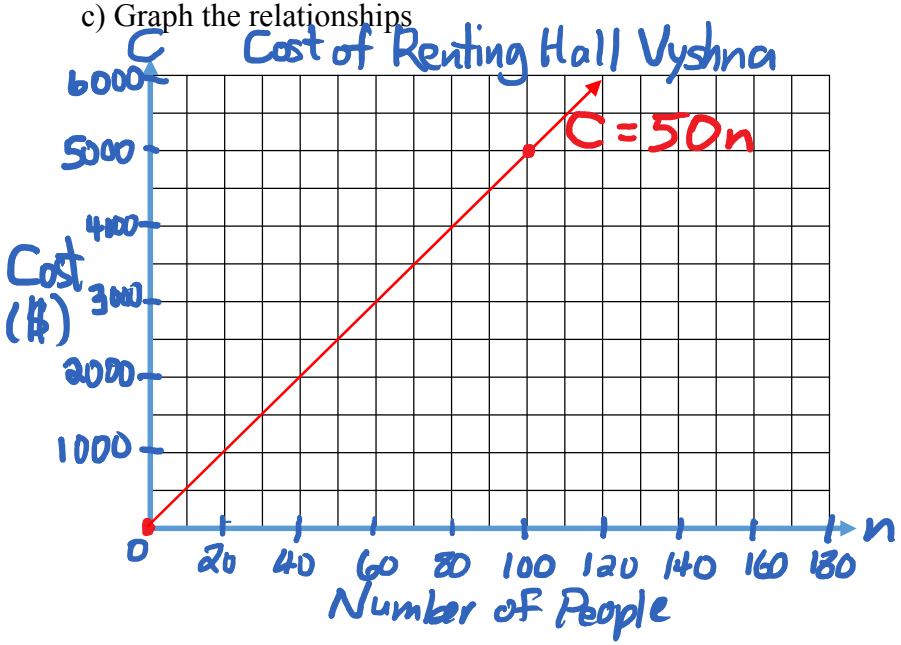
Hall Vyshna

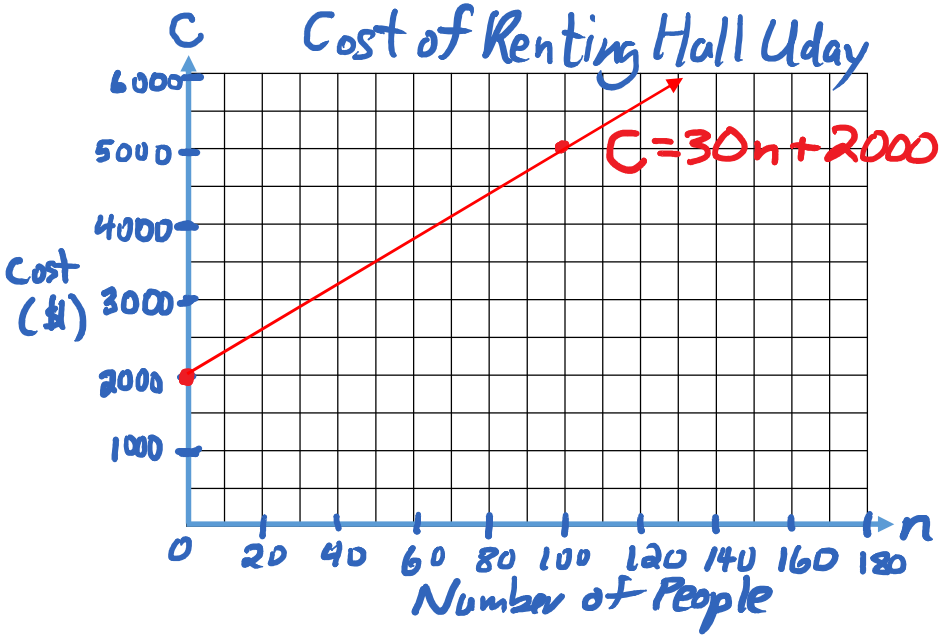
n	C ($)
0	0
20	1000
40	2000
60	3000
80	4000
100	5000

Hall Uday

n	C ($)
0	2000
20	2600
40	3200
60	3800
80	4400
100	5000

c) Graph the relationships





d) For each banquet hall, write an equation that relates the cost, C, in $, for n people attending

Hall Vyshna

$C = 50n$

Hall Uday

$C = 30n + 2000$

e) Use the equations to complete the following:

110 people attending

Hall Vyshna

$C = 50(110) = 5500$

Hall Uday

$C = 30(110) + 2000 = 5300$

220 people attending

Hall Vyshna

$C = 50(220) = 11000$

Hall Uday

$C = 30(220) + 2000 = 8600$

330 people attending

Hall Vyshna

$C = 50(330) = 16500$

Hall Uday

$C = 30(330) + 2000 = 11900$

f) What happened to the cost when the number of people was doubled? What happened when the number of people tripled?

Hall Vyshna

The cost doubled: $2 \times 5500 = 11000$

The cost tripled: $3 \times 5500 = 16500$

e.g. $3(50n) = 150n$ $50(3n) = 150n$

triple cost — triple # of people — equal

Hall Uday

The cost DID NOT double!

The cost DID NOT triple!

e.g. $3(30n + 2000) = 90n + 6000$

$30(3n) + 2000 = 90n + 2000$

triple the cost — NOT equal — triple # of people

g) Study the two graphs carefully.

- What is the same?

  Both graphs are straight lines that go upward to the right

- What is different?

  The graphs "start" at different places. One starts at the origin and the other starts above the origin (i.e. different initial values). The graphs also have different steepnesses (ie. different slopes).