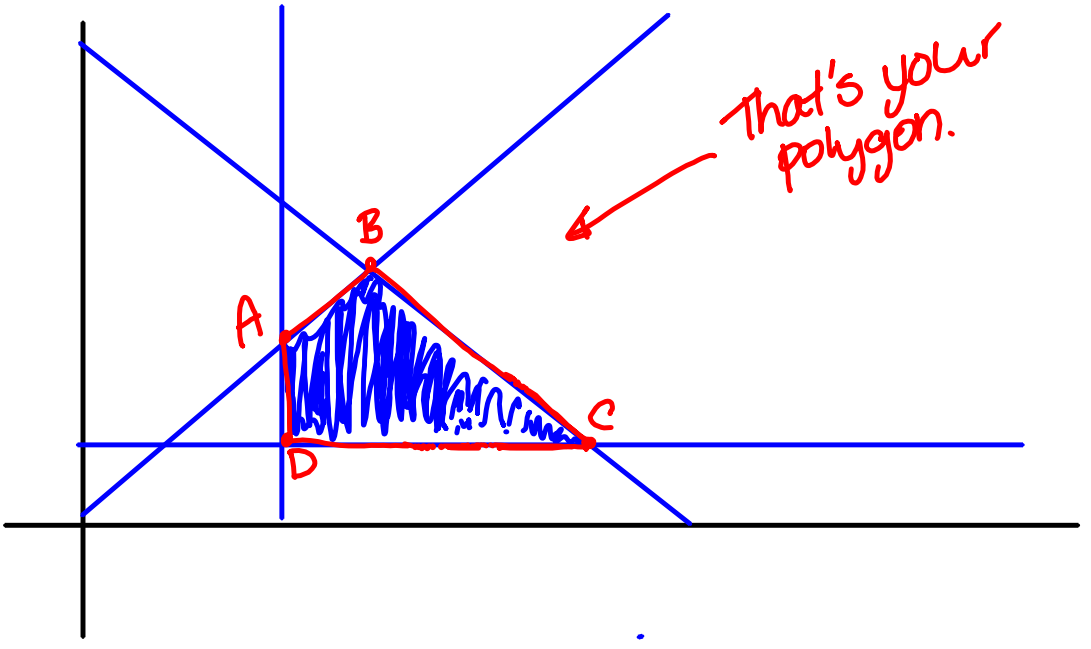
MEMORY AID

OPTIMIZATION : looking for the min. or max. in a given situation.

→ Your optimizing function is the "P" or "R" rule that you're going to plug your coordinates into.

▶ Polygon of constraints = the shape you get after you graph all your inequalities.

JANUARY MEMORY AID



* Rules for shading:

- Look at your y.

$y \geq x+5$ → shade <u>above</u> the line.

$y \leq x+5$ → shade <u>below</u> the line.

- When there is no y, you do the same with the x.

$x \geq 10$

$x \leq 10$

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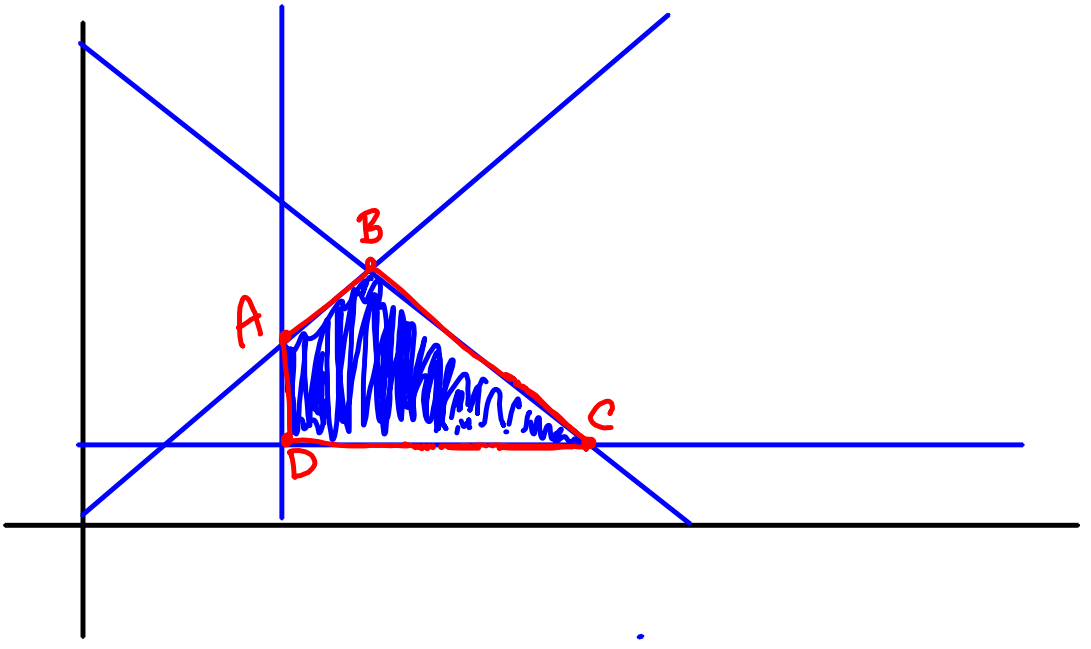
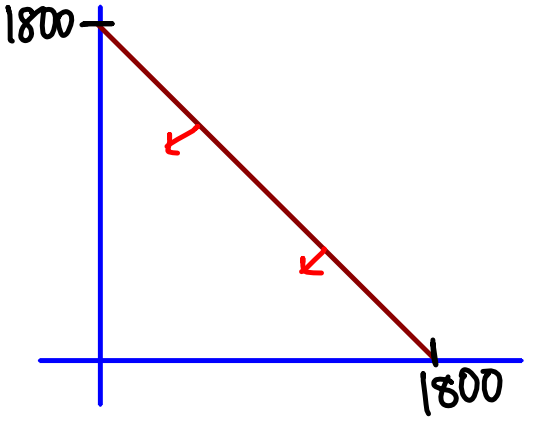


Rules for graphing:

. "He can make a total of 1800 in a day"

$x + y \leq 1800$



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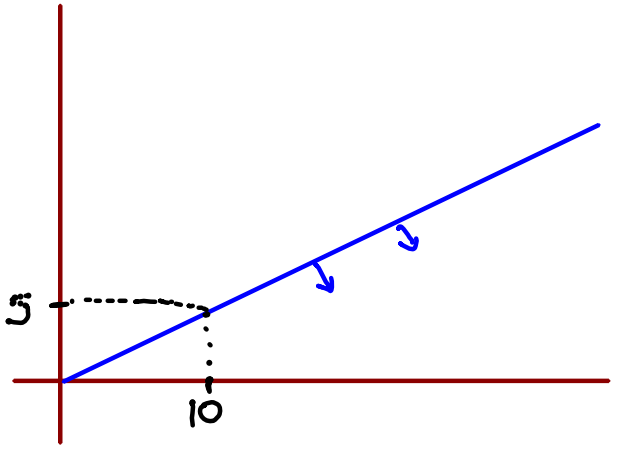
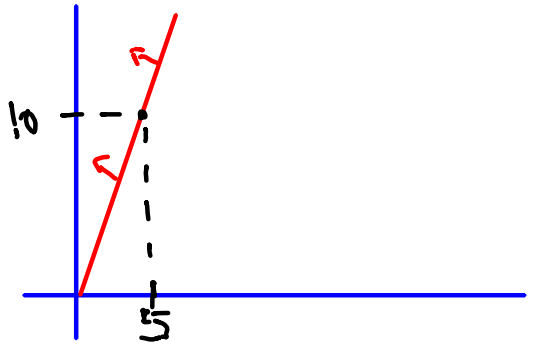
• He has at least twice as many _____ as _____
x y

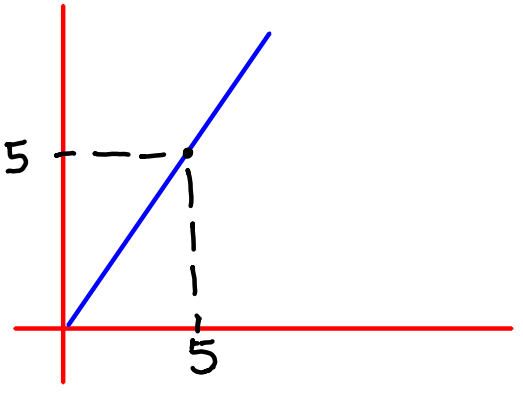
$x \geq 2y$



Note: $y \geq 2x$ would look similar but it is the steeper one:

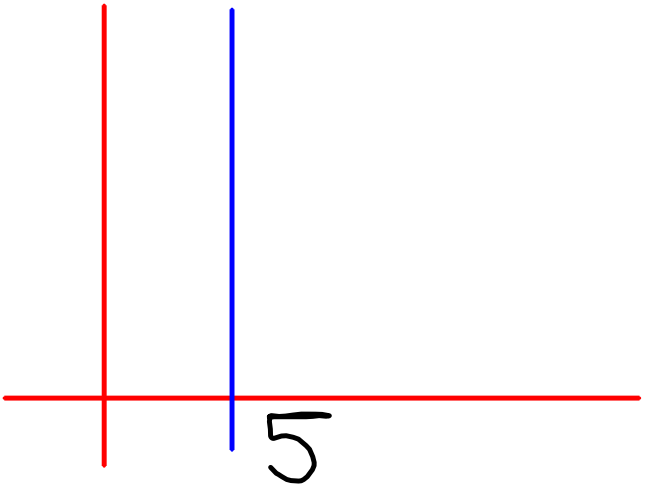


$x \geq y$ would be straight up the middle:

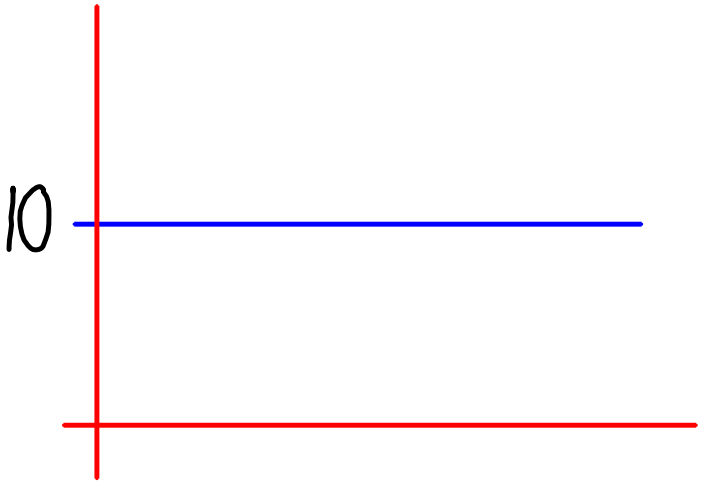


- When you get one that has just one variable, you just have a straight line:

$x = 5$



$y = 10$



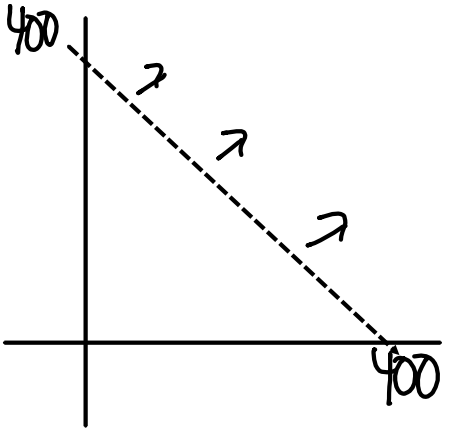
Multiple Choice/Shortcuts Tricks for Optimization:

- Make sure the figures they give you are inside the polygon of constraints.
  - ↳ A dotted line means that those points are excluded:

"there are more than 400 people here"

gives you $x+y > 400$

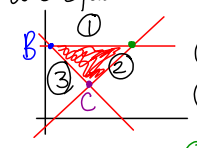
Notice how there is no line underneath, that means it's more than 400, so 400 is excluded.



When you have more than one min or max from your question, you need to count all the real points on that line.

JANUARY MEMORY AID

Solving for where 2 points are equal:



① $y=10$

② $y=x-2$

③ $3x+5y=60$

A•: Make lines ① and ② equal and solve:

$10=x-2$

$+2 \quad +2$

$12=x$

B• Make lines ① and ③ equal.

Options:

1 → do the same as above but you need to isolate y in line ③:

$3x+5y=60$

$-3x \quad -3x$

$\frac{5y}{5}=\frac{-3x+60}{5}$

$y=\frac{-3}{5}x+12$

→ OR to make the math easier/fraction-free, you can substitute your y:

① $y=10$

③ $3x+5y=60$

↳ $3x+5(10)=60$

$3x+50=60$

$-50 \quad -50$

$\frac{3x}{3}=\frac{10}{3}$

$x=3.33$

$3(3.33)+5y=60$

$10+5y=60$

$-10 \quad -10$

$\frac{5y}{5}=\frac{50}{5}$

$y=10$

•C: same as above but with ② and ③

$y=x-2$ and $3x+5y=60$

↳ $3x+5(x-2)=60$

$3x+5x-10=60$

$8x-10=60$

$+10 \quad +10$

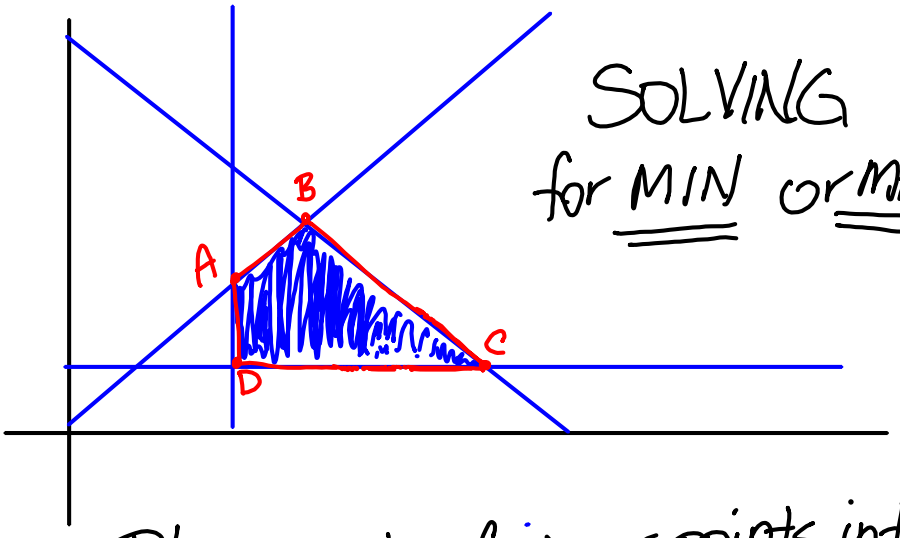
$\frac{8x}{8}=\frac{70}{8}$

$x=8.75$

$y=x-2$

$y=8.75-2$

$y=6.75$



SOLVING for MIN or MAX

→ Plug each of your points into your optimizing function.

↳ Usually about profit or rev.

EX: $6.00 for t-shirts (x)
$9.00 for sweat shirts (y)

$P = 6.00x + 9.00y$

		P
A(10,10)	6.00(10)+9.00(10) =	150
B(30,30)	6.00(30)+9.00(30) =	450
C(6,54)	6.00(6)+9.00(54) =	522
D(6,10)	6.00(6)+9.00(10) =	126

* The max is at point C and the min is at D.

- Most long ans. questions for optimization will add a new constraint and make you re-evaluate your max or compare options like in the practice exam and review package. Use examples you need

TOPIC 2: GRAPH THEORY

edges: the lines/relationships

vertices: points

order: number of points in the whole graph.

degree: number of lines coming out of a point

EX:

EULER

each edge
one

- path = 2 odd degree
- circuit = all even

HAMILTON

each point
one

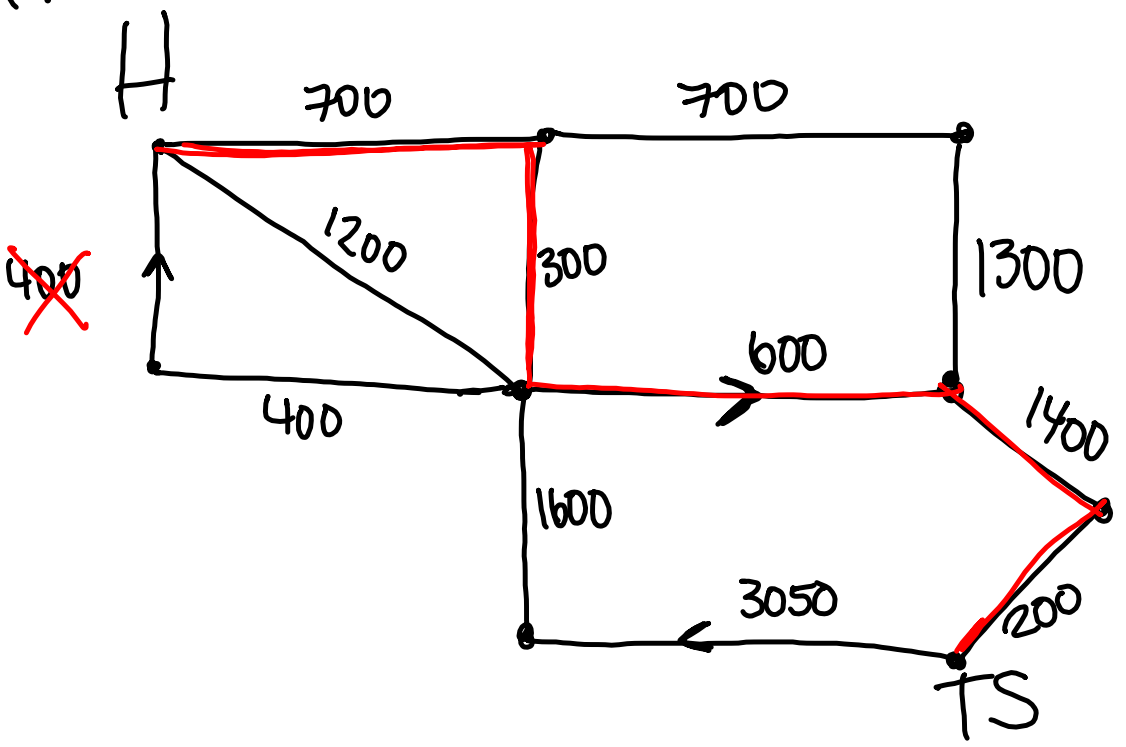
NO RULES :(

DIRECTED GRAPHS:

- Sometimes you have arrows in your graph. This is like a one-way street... you have to obey the arrows, even if the path is shorter

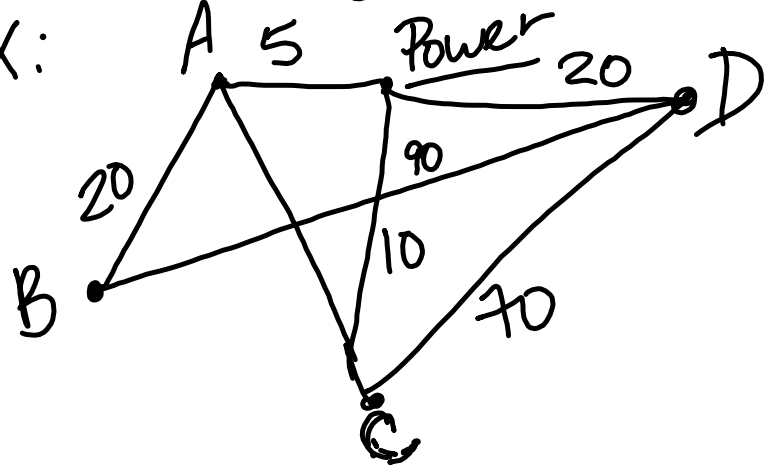
JANUARY MEMORY AID

EX:



- Questions involving plumbing / electricity / something like that you just need to find a tree connecting them so that they're all touching

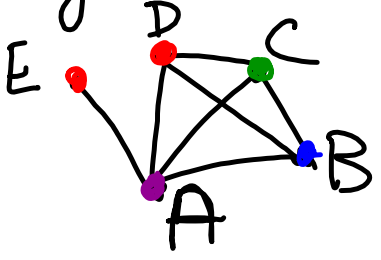
EX:



- When the question involves travelling, you need to follow an actual path and if you go over the same line twice you need to count it again. #9 from your practice exam is a good example for this.

Recap: Chromatic Number is the minimum number of colours needed for something like a map.

EX:

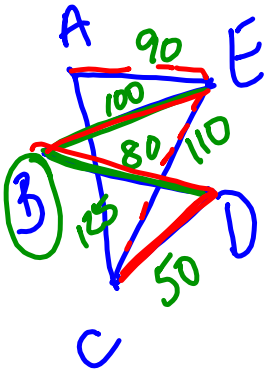


Chromatic Number = 4

SAMPLE TRAVEL QUESTION

Boat	Cost
AE	100
BD	80
BE	140
CD	50
CE	110

Plane	Cost
AC	125
AE	90
BE	100



*Begin and end at B.

100 + 80 + 50 + 125 Min cost?
+90

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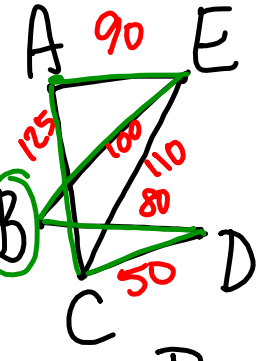
Boat	Cost
AE	100
BD	80
BE	140
CD	50
CE	110

Plane	Cost
AC	125
AE	90
BE	100



*Begin and end at B.

Min cost?

BEACDB

445

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