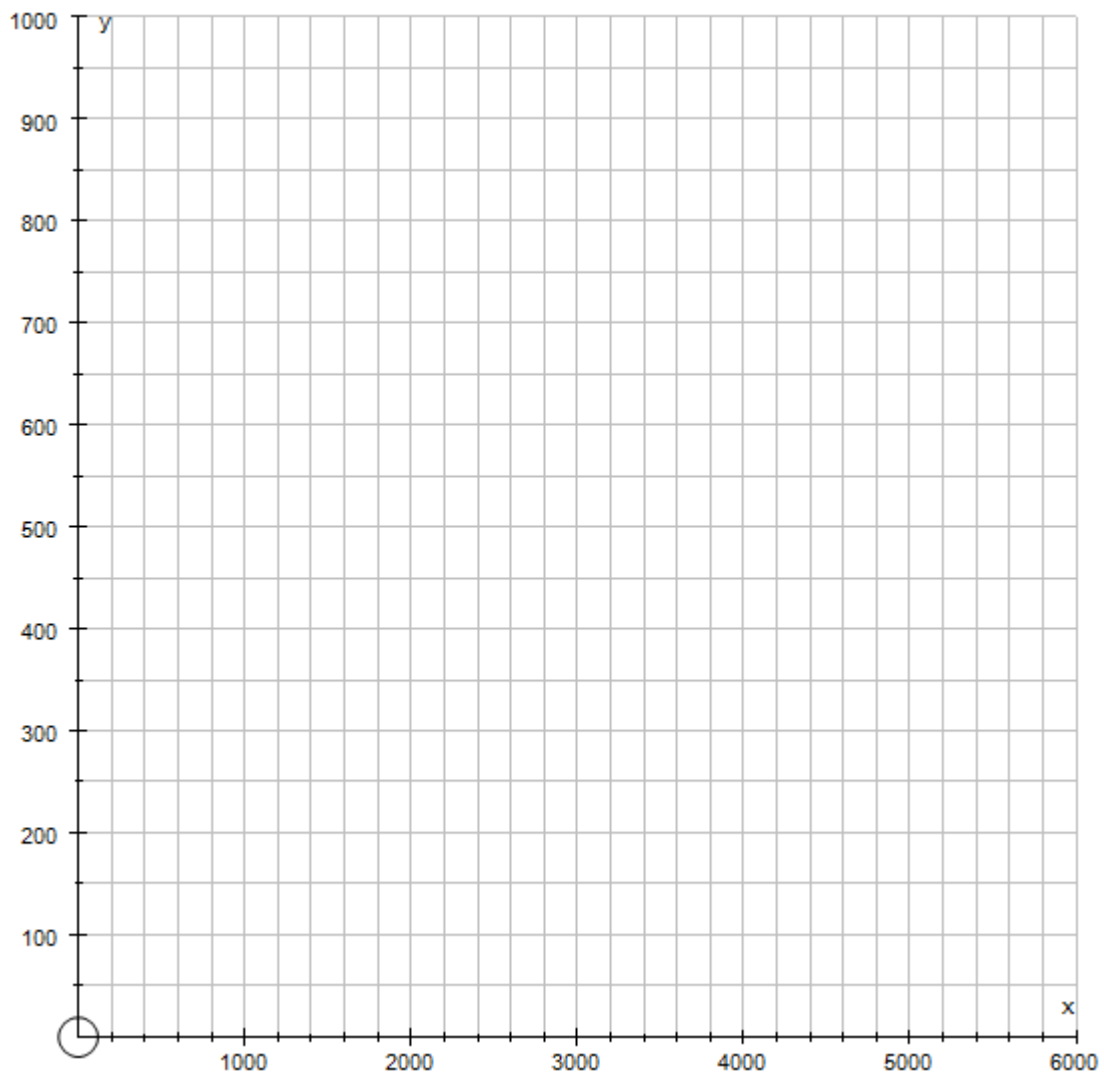


## Trial Linear Algebra #1

Roberto is looking at buying a printer for his firm.

- A laser printer costs \$200 and 2 cents a page.
- An ink-jet costs \$80 and 12 cents a page.
- A colour laser printer costs \$500 and 5 cents a page.

- Write equations for the different pay schemes.
- How much would it cost to buy each of the printers and then print 1,000 pages on them?
- How much would it cost for the first 5,000 pages?
- How many pages does Roberto need to print before the laser printer become cheaper than the inkjet?



- How much per page would the colour laser printer have to cost so that it would be cheaper to print 4000 copies in colour than by the inkjet?

## Answers: Trial Linear Algebra #1

Roberto is looking at buying a printer for his firm.

- A laser printer costs \$200 and 2 cents a page.
- An ink-jet costs \$80 and \$12 a page.
- A colour laser printer costs \$500 and 5 cents a page.

a) Write equations for the different pay schemes for how much they cost for a number of pages.

$$\text{Laser : } C = 200 + 0.02 p$$

$$\text{Inkjet: } C = 80 + 0.12 p$$

$$\text{Colour: } C = 500 + 0.05 p$$

Where  $C$  is the cost, in dollars, and  $p$  is the number of pages printed

b) How much would it cost to buy each of the printers and then print 1,000 pages on them?

$$\text{Laser : Cost} = 200 + 0.02 \times 1000 = \$220$$

$$\text{Inkjet: Cost} = 80 + 0.12 \times 1000 = \$200$$

$$\text{Colour: Cost} = 500 + 0.05 \times 1000 = \$550$$

c) How much would it cost for the first 5,000 pages?

$$\text{Laser : Cost} = 200 + 0.02 \times 5000 = \$300$$

$$\text{Inkjet: Cost} = 80 + 0.12 \times 5000 = \$680$$

$$\text{Colour: Cost} = 500 + 0.05 \times 5000 = \$750$$

d) How many pages does Roberto need to print before the laser printer become cheaper than the inkjet?

By reading the graph (next page) we can see it is 1200 pages.

Solving by equations, rather than the graph, is a Merit skill :

$$\text{Laser : Cost} = 200 + 0.02 p \qquad \text{Inkjet: Cost} = 80 + 0.12 p$$

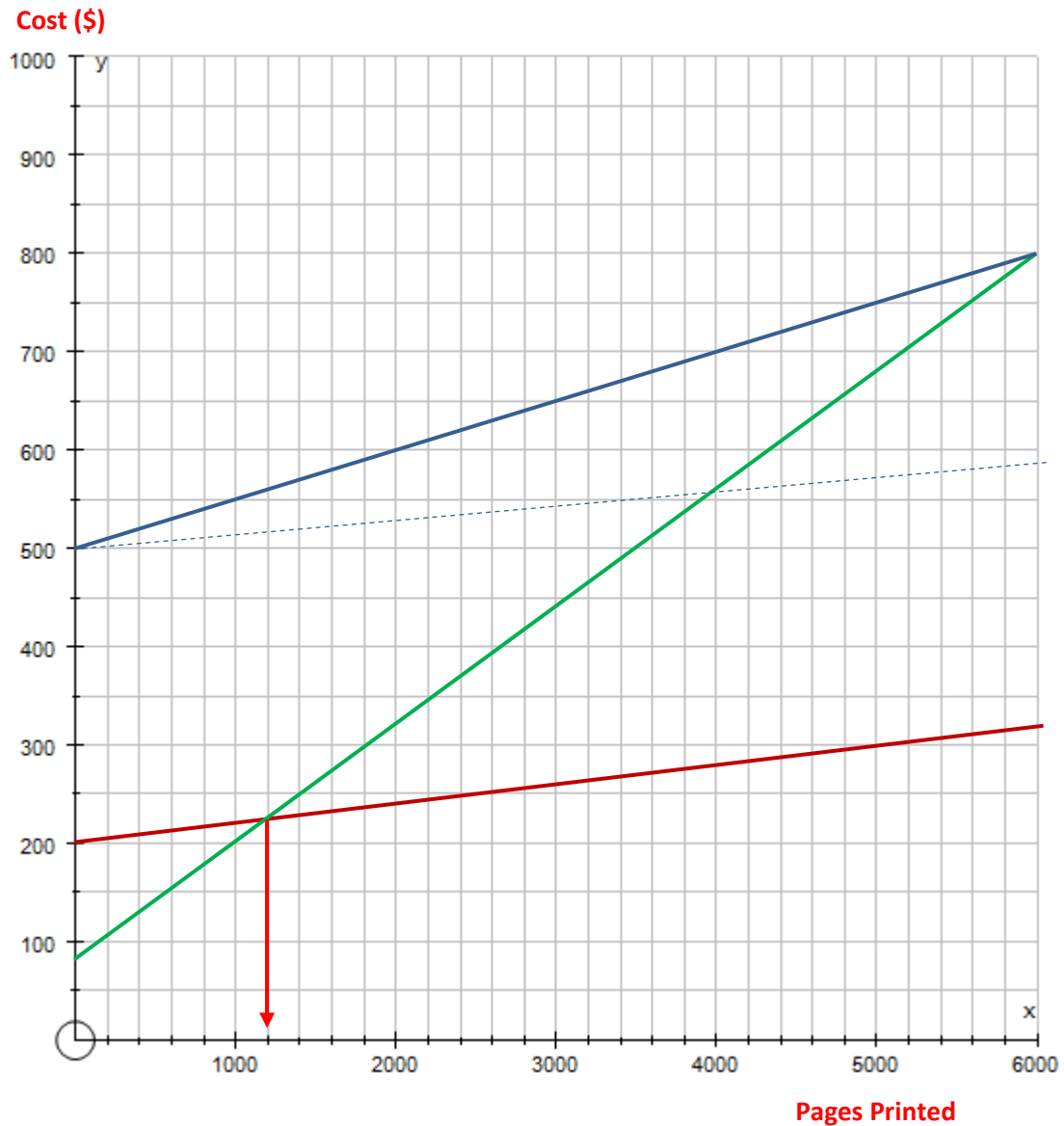
$$200 + 0.02 p = 80 + 0.12 p$$

$$200 = 80 + 0.1 p$$

$$120 = 0.1 p$$

$$p = 1200$$

So at 1200 pages the laser become better.



- e) How much per page would the colour laser printer have to cost so that it would be cheaper to print 4000 copies in colour than by the inkjet?

**By reading the dotted line on the graph and calculating the slope required approximately 1.5 cents per page.**

Merit, by calculation

4000 inkjet copies cost  $80 + 0.12 \times 4000 = 560$ .

So 4000 pages must cost under \$60 for the colour printer (after the \$500 cost of printer).

Which gives  $60 \div 4000 = 0.015$ , which is 1.5 cents per page.