

1. (4 points) $15x + 30y = 120$

a. Find the x and y intercepts. Show your work! Write each intercept in the form of an ordered pair (x, y)

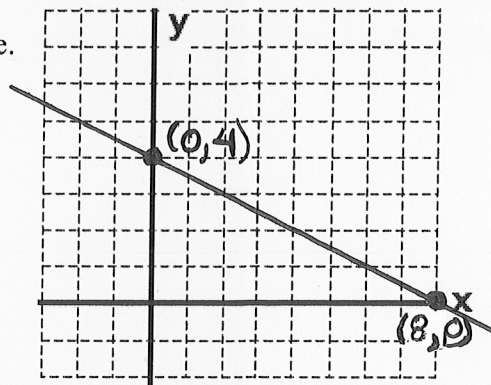
$$\begin{aligned} \text{x intercept: } y &= 0 \\ 15x + 30(0) &= 120 \\ 15x &= 120 \\ x &= 8 \\ \text{Answer: Ordered Pair } (8, 0) \end{aligned}$$

$$\begin{aligned} \text{y intercept: } x &= 0 \\ 15(0) + 30y &= 120 \\ 30y &= 120 \\ y &= 4 \\ \text{Answer: Ordered Pair } (0, 4) \end{aligned}$$

b. Use both the x and y intercepts to graph this line.

Draw the graph accurately

Scale: 1 box = 1 unit.



2. (4 points) A company produces electric drills.

It costs \$44,000 to make 1000 drills and it costs \$30,000 to make 600 drills.

x = number of drills y = cost in dollars

Find the linear cost function that expresses cost (y) in terms of the number of drills produced (x)

Show work.

X drills	y (\$)
1000	44000
600	30000

$$m = \frac{30000 - 44000}{600 - 1000} = \frac{-14000}{-400} = 35$$

$$\text{OR } m = \frac{44000 - 30000}{1000 - 600} = \frac{14000}{400} = 35$$

$$\begin{aligned} y - 44000 &= 35(x - 1000) \\ \text{OR} \\ y - 30000 &= 35(x - 600) \\ \text{both simplify to} \end{aligned}$$

$$y = C(x) = 9000 + 35x$$

3. (4 points) A company producing cell phone charging cables has a fixed cost of \$7500 and a variable cost of \$5 per cable. $C(x) = 7500 + 5x$. The cables sell at a price of \$8 each.

Let x = number of charging cables. y represents cost or revenue in dollars.

Find the break even point (both number of charging cables and the cost and revenue) Show work.

Break Even: Cost = Revenue

$$C(x) = R(x)$$

$$7500 + 5x = 8x$$

$$7500 = 3x$$

$$x = 2500 \text{ cables} = \text{break even quantity}$$

$$y = 8(2500) = \$20000 \text{ Revenue}$$

$$y = 7500 + 5(2500) = \$20000 \text{ Cost}$$

Answer:

Break Even Quantity = 2500 cables Cost = \$ 20,000 Revenue = \$ 20,000

KEY

Form B

4. (3 points)

Gifts n Things sells holiday gift baskets. x = price in dollars y = quantity (number of baskets)
They have found that customers will buy 750 gift baskets if the price is \$35 but will buy 80 fewer baskets for every \$4 increase in price.
Find the linear DEMAND function that gives y = number of baskets that consumers are willing to buy in terms of x = price. Show work.

$$(x_1, y_1) = (\$35, 750 \text{ baskets})$$

$$m = \frac{\Delta y}{\Delta x} = \frac{\text{change in \# of baskets}}{\text{change in price}} = \frac{-80}{+4} = -20 \text{ baskets per dollar increase in price}$$

$$y - 750 = -20(x - 35)$$

$$\text{simplifies to } \boxed{y = D(x) = 1450 - 35x}$$

5. (5 points) A business needs to print training booklets for some employees who need to learn to use a new type of equipment. They get bids for the print jobs from two print shops.

Fast Print charges \$2 per training booklet and \$350 to set up the print job.

Good Press charges \$5 per training booklet and \$200 to set up the print job.

a. Find the cost functions for y = cost to print training booklets of x = number of booklets printed

$$\text{Fast Print } y = f(x) = 2x + 350$$

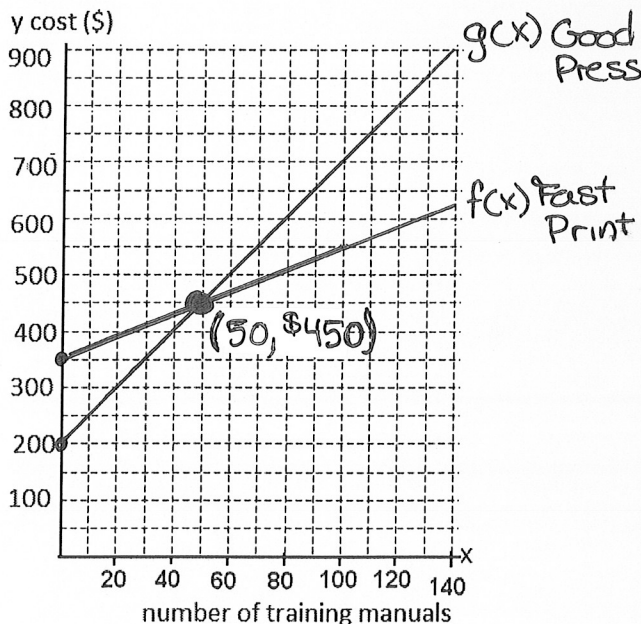
$$\text{Good Press } y = g(x) = 5x + 200$$

b. Find the number of booklets for which the companies have equal costs, and also find the total cost. Show algebra work to solve this.

$$\begin{aligned} 2x + 350 &= 5x + 200 \\ 150 &= 3x \\ 50 &= x \end{aligned}$$

$$\begin{aligned} y &= f(50) = 2(50) + 350 = \$450 \\ y &= g(50) = 5(50) + 200 = \$450 \\ & (50 \text{ booklets}, \$450) \end{aligned}$$

c. Accurately and completely graph the cost functions and clearly label which line is which function.



d. For what numbers of booklets (interval of numbers) is Fast Print less expensive?

For what numbers of booklets (interval of numbers) is Good Press less expensive?

Write your answer clearly using complete sentences.

Fast print is less expensive if more than 50 booklets are being printed

Good Press is less expensive if less than 50 booklets are being printed