

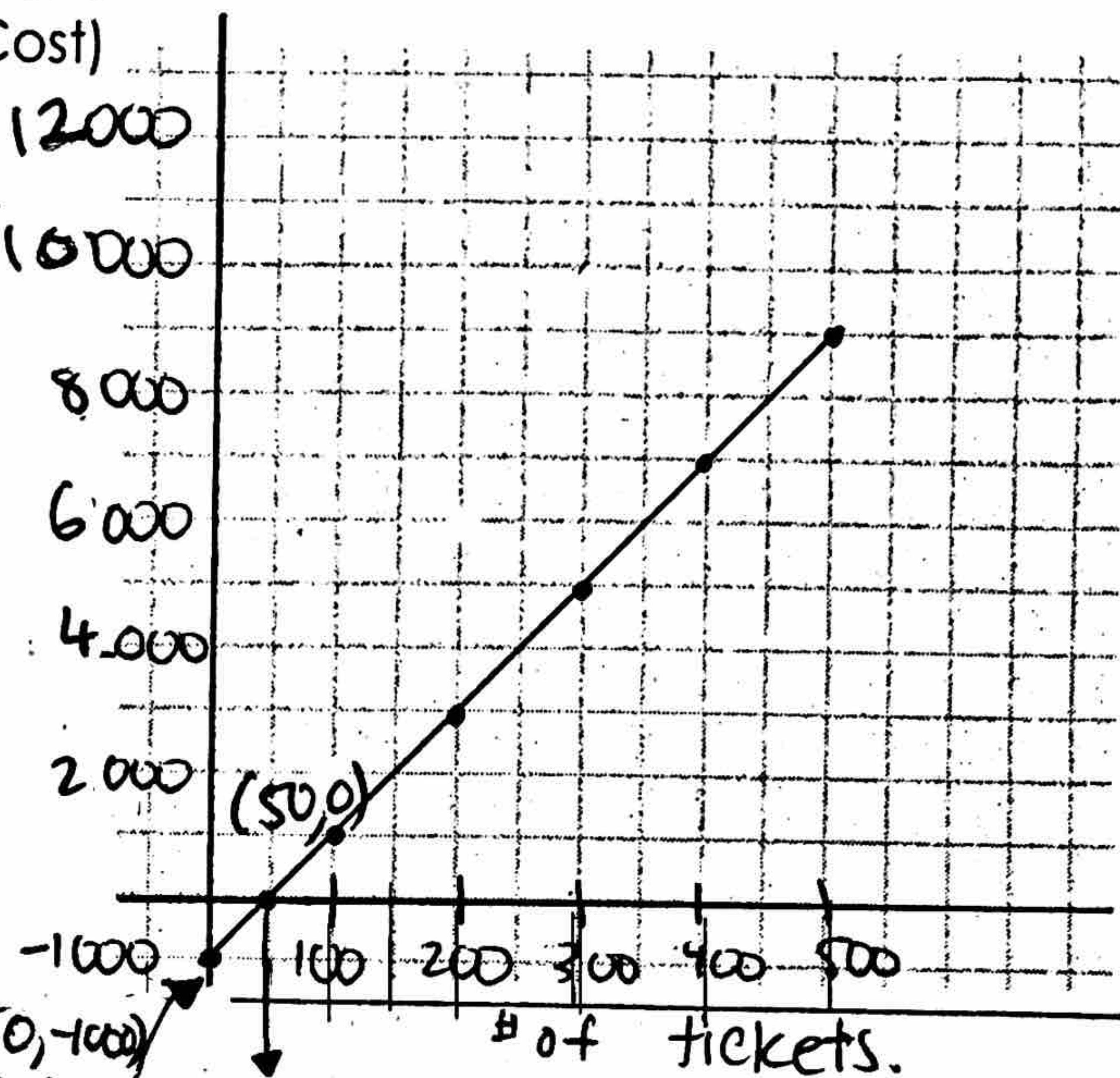
Section 5.7: Interpreting Graphs of Linear Functions

Example 1: Tickets for the Burnaby South Christmas school dance cost \$20 each, but the rental of the school gym, decorations and food costs \$1,000. The gym holds a maximum of 500 people.

- a) Create an equation to relating the number of tickets sold to Profit. (Profit = Revenue - Cost)

Independent variable: _____

Dependent variable: _____



- b) What is the domain and range?

- c) Graph out the equation in part "a".

- d) What is the rate of change in this situation? Interpret your answer.

Equation $\rightarrow P = 20t - 1000$

$t = \text{tickets}$
 $P = \text{profit}$

- * e) Calculate the HORIZONTAL INTERCEPT, also sometimes known as the x-intercept (defined as the point where the graph intersects the x-axis). Also interpret your answer.

$$0 = 20t - 1000$$

$$+ 1000 \quad + 1000$$

$$1000 = 20t$$

$$\frac{1000}{20} = \frac{20t}{20} \rightarrow t = 50$$

It takes 50 ticket sales to break even.

- * f) Calculate the VERTICAL INTERCEPT, also sometimes known as the y-intercept (defined as the point where the graph intersects the y-axis). Also interpret your answer.

$(0, -1000)$ - the point tells us that when we sell 0 tickets, we lose \$1000.

can be skipped, we've already gone over in another note package.

Section 5.7: Interpreting Graphs of Linear Functions

Example 2: The graph below shows the distance away from home as a function of time.

a) Write the coordinates of the points where the graph intersects the axes.

x-intercept

(20, 0)

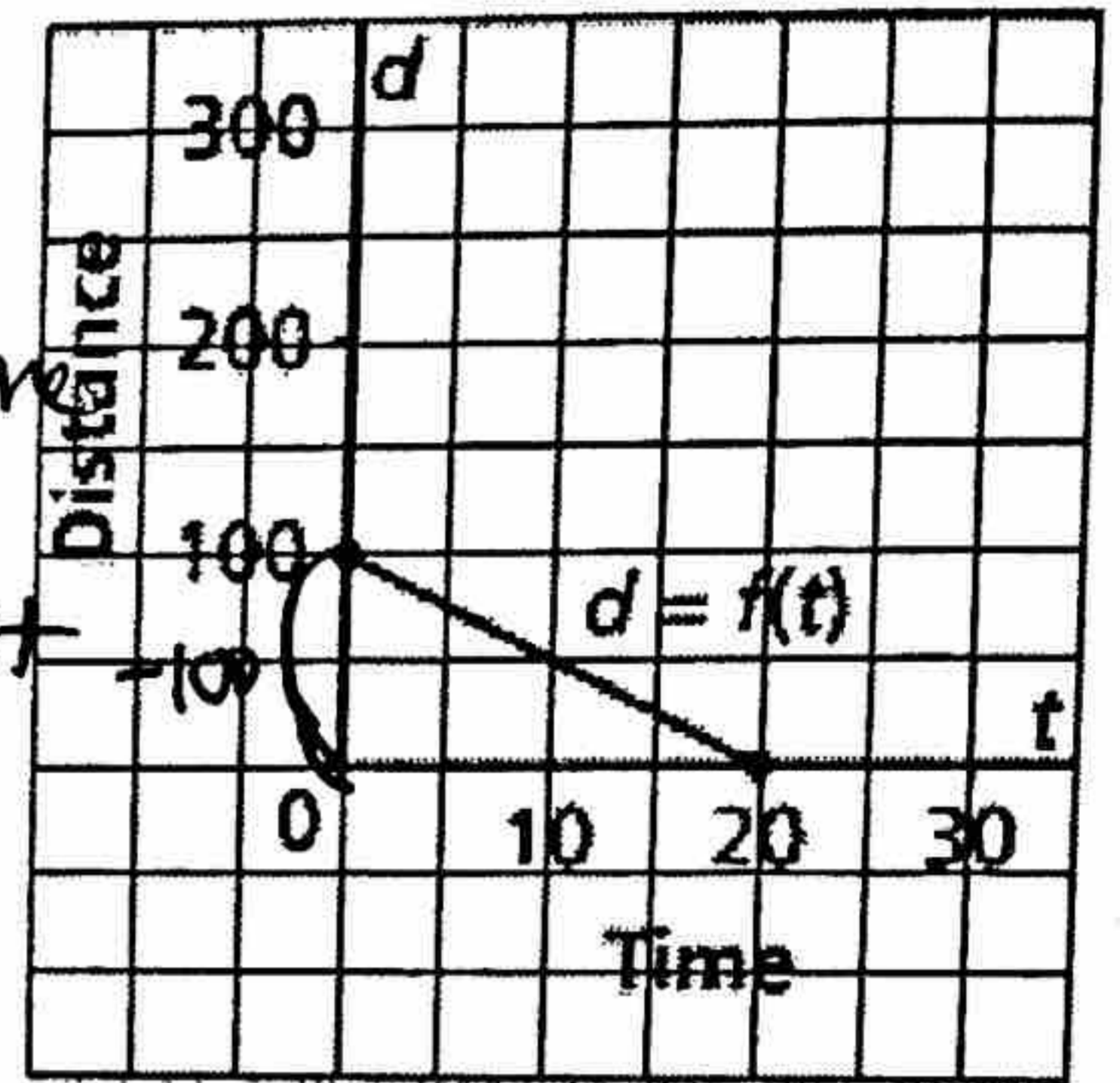
y-intercept

(0, 100)

b) Determine the vertical and horizontal intercepts. Describe what the intercepts represent in words.

① vertical intercept (0, 100), At time 0, the person is 100 m or km away from home (probably m)

② horizontal intercept (20, 0) - 20 seconds to get home.



a) Determine the domain and range.

domain $\{x \mid 0 \leq x \leq 20, x \in \mathbb{R}\}$
[0, 20]

range $\{y \mid 0 \leq y \leq 100, y \in \mathbb{R}\}$
[0, 100]

b) What is the rate of change in this scenario and what does it mean?

$\frac{\text{Change in dependent}}{\text{change in independent}}$

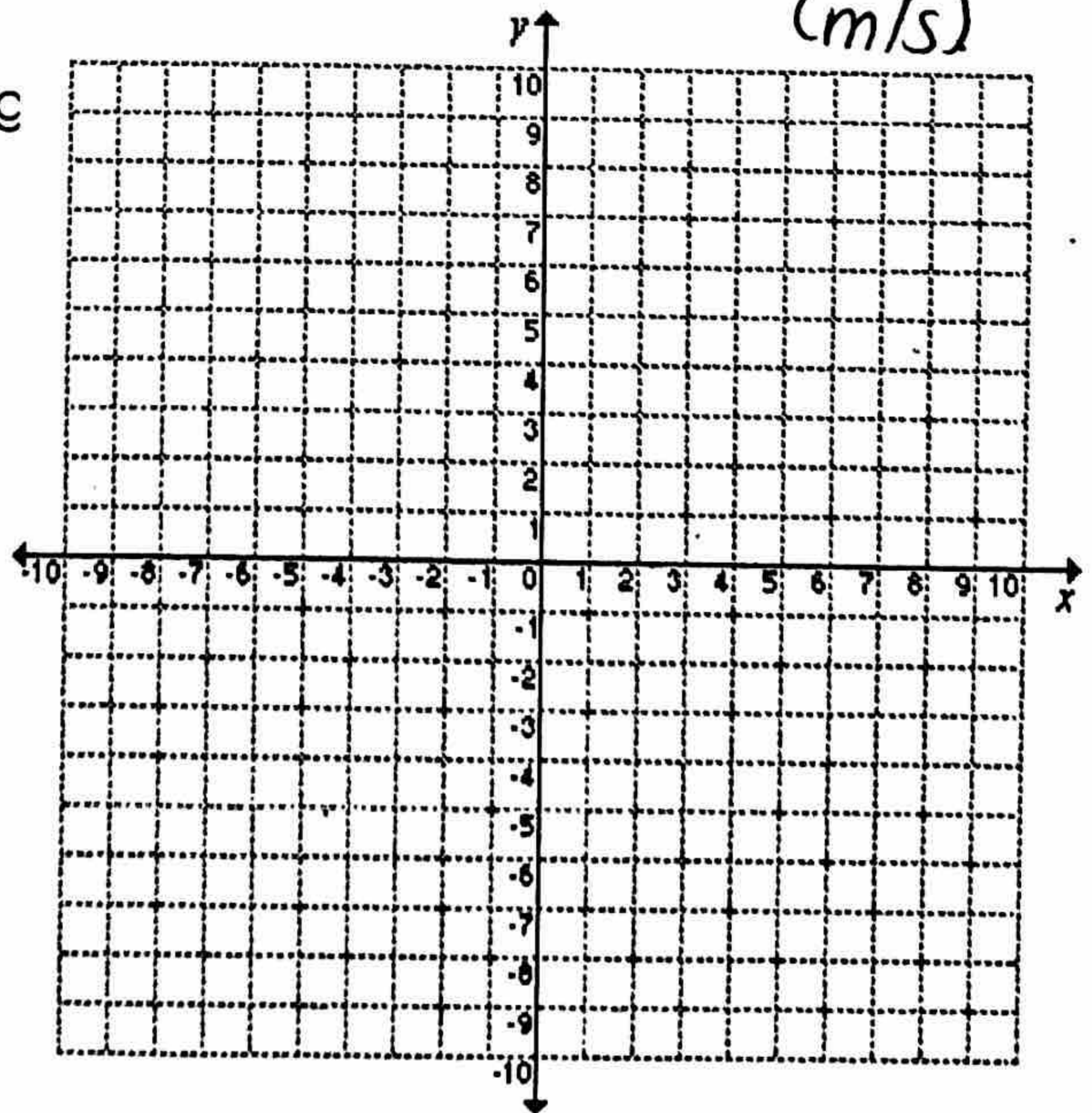
$\rightarrow \frac{-100}{20} = -5$

represents the speed the person is going back home (m/s)

Example 3: Sketch a graph of the following linear functions. Then determine the x-intercept and y-intercept. Also calculate the rate of change.

a) $f(x) = 3x - 4$

b) $g(x) = -\frac{1}{2}x + 3$



Food for Thought:

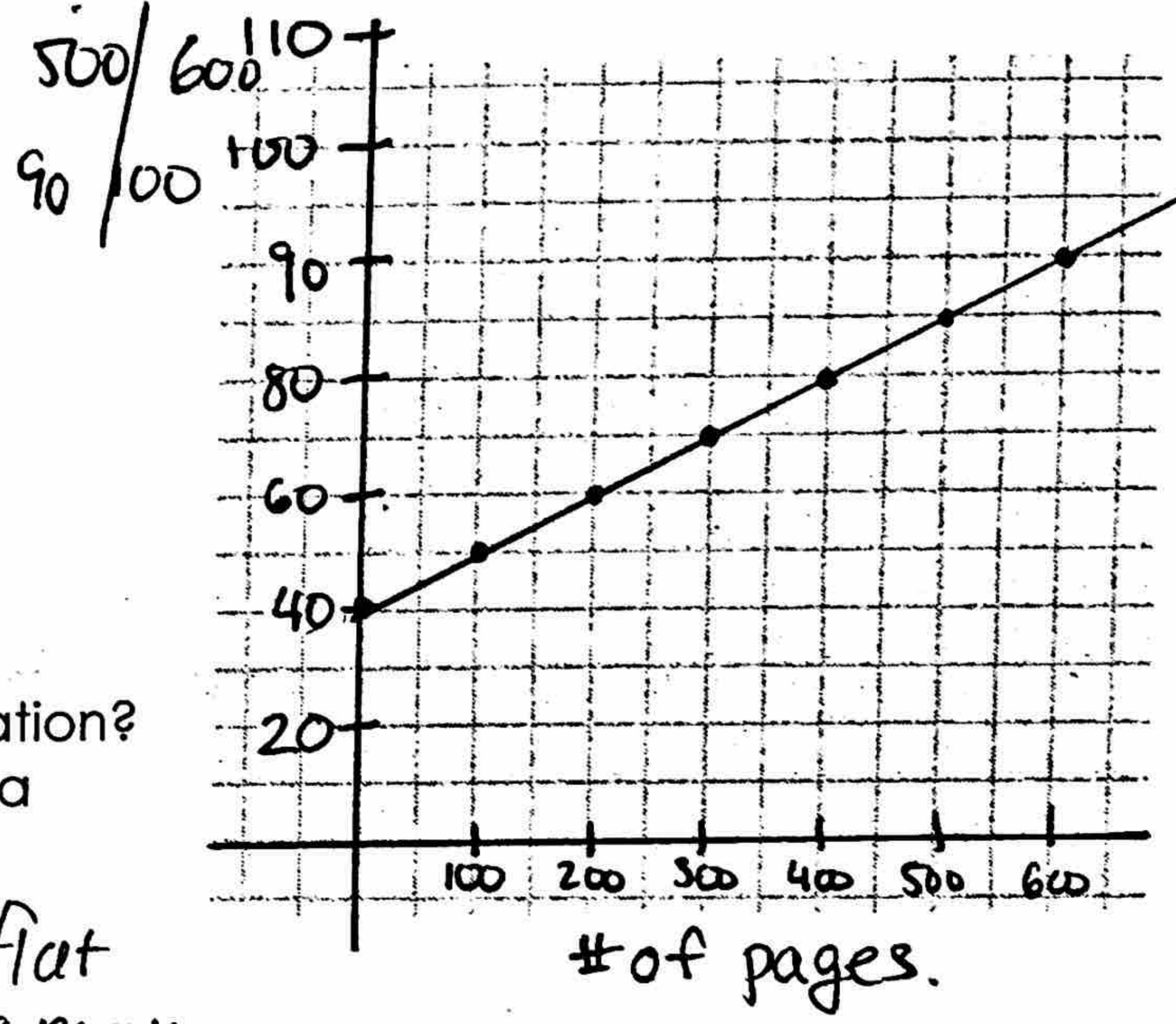
How can you tell from a graph whether a linear function has a positive or negative rate of change?

Section 5.7: Interpreting Graphs of Linear Functions

Example 4: The cost of printing a Math textbook is dependent on the number of pages in the book. Using the following table of costs "C" and pages "P" and/or the grid to graph out the scenario.

| | | | | | |
|-------------|-------|-----|-----|-----|-----|
| Independent | Pages | 100 | 200 | 300 | 400 |
| dependent | Cost | 50 | 60 | 70 | 80 |

+100
+10



a) How much would it cost to print a Math textbook with 625 pages?

\$102.50

$\frac{10}{100}$

b) What is the vertical intercept for this situation? (A.K.A. How much would it cost to print a Math textbook with 0 pages?)

vertical intercept $\rightarrow (0, 40)$ there is a \$40 flat fee for printing a math text book.

c) What is the rate of change in this question? What does it represent?

Cost $\rightarrow \frac{10}{100 \text{ pg}} = \$0.10/\text{pg}$ Represents cost per page.

d) If the budget for publishing one Math textbook is \$124, what is the maximum number of pages that can be printed in one math textbook? Solve this question at least two different ways.

$$C = 0.1p + 40$$

$p = \# \text{ of pages}$

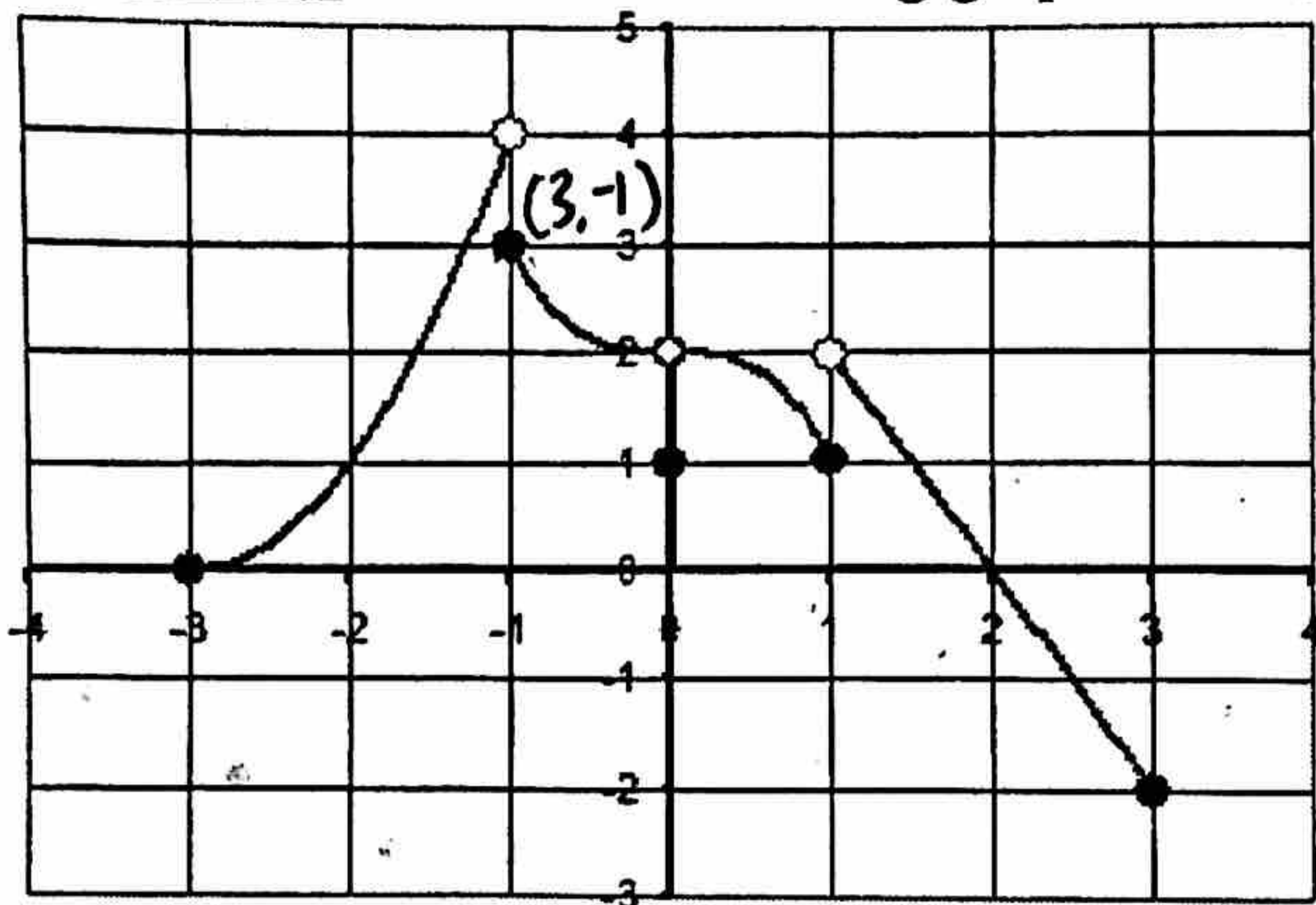
$C = \text{cost}$

$$\begin{array}{r} 124 = 0.1p + 40 \\ -40 \quad -40 \\ \hline 84 = 0.1p \end{array}$$

$$\begin{array}{r} 84 = 0.1p \\ p = 840 \text{ pages.} \end{array}$$

Section 5.5: Graphs of Relations & Functions

Example 7: Given the following graph below,



remember that empty ~~dots~~ points represent "not equal to".

i) determine the domain value when the range value is 3

Ans -1

ii) determine the range value when the domain value is 5

N/A

iii) $f(0) \stackrel{\text{domain}}{=} 1$

iv) find 'x' if $f(x) = 1$. ^{range} - 4 points where $f(x) = 1$
 $x = -2, 0, 1, 1.5$

v) $f(-1) \stackrel{x=-1}{=} 3$

vi) find 'x' if $f(x) = 0$. ^{range or y}

$x = -3, 2$