

1.2 Tables and graphs – Practice exercises

1. My grandfather had \$200 in savings bonds that matured in 1962 when he gave them to me. The bonds continue to earn interest at a fixed rate so I have yet to cash them in. The table shows some values. *Story also appears in 4.1 #3 and 5.3 #1*

year	1962	1970	1980	1990	2000	2010
Y	0	8	18	28	38	48
B	200.00	318.77	570.87	1,022.34	1,830.85	3,278.77

- (a) What do Y and B stand for? Include the units and dependence.

Y = time (years since 1962) ~ indep
 B = value of bonds (\$) ~ dep

revised from graph

- (b) What were the savings bonds worth in 1970?

\$318.77

- (c) When were the savings bonds worth \$1,022.34?

1990

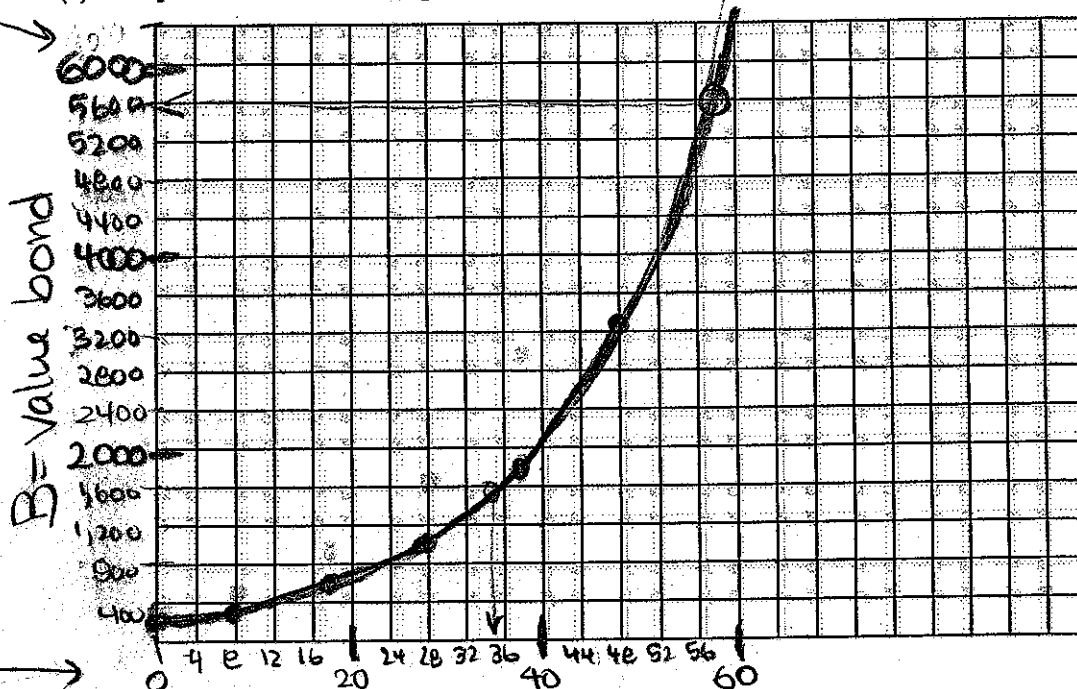
- (d) Approximately when were the savings bonds worth \$1,500?

~~1994~~ 1997

- (e) What do you expect the savings bonds will be worth in 2020?

~~\$6,000?~~
\$5,600

- (f) Graph the function using the information given in the table.



- (g) Use the graph to check your answers to the questions.

Y = years

$$\begin{array}{r} d) Y \approx 35 \\ + 1962 \\ \hline 1997? \end{array}$$

$$\begin{array}{r} e) \frac{2020}{- 1962} \\ \hline Y = 58 \\ B \approx \$5600 \end{array}$$

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2. How cold is it? An air temperature of 10°F is cold but manageable. But add a 30 miles per hour wind and, brrr, it feels like it's -12°F (12 below zero). We say the wind chill of 10°F with a 30 mph wind is -12°F . The table lists the wind chill for various wind speeds at an air temperature of 10°F . Source: National Weather Service

Wind (mph)	0	5	10	15	20	25	30	35	40	45	50	55	60
Wind chill ($^{\circ}\text{F}$)	10	1	-4	-7	-9	-11	-12	-14	-15	-16	-17	-18	-19

Story also appears in 2.1 Exercises and 4.1 #3

- (a) At an air temperature of 10°F with a 20 mph wind, what's the wind chill? -9°F

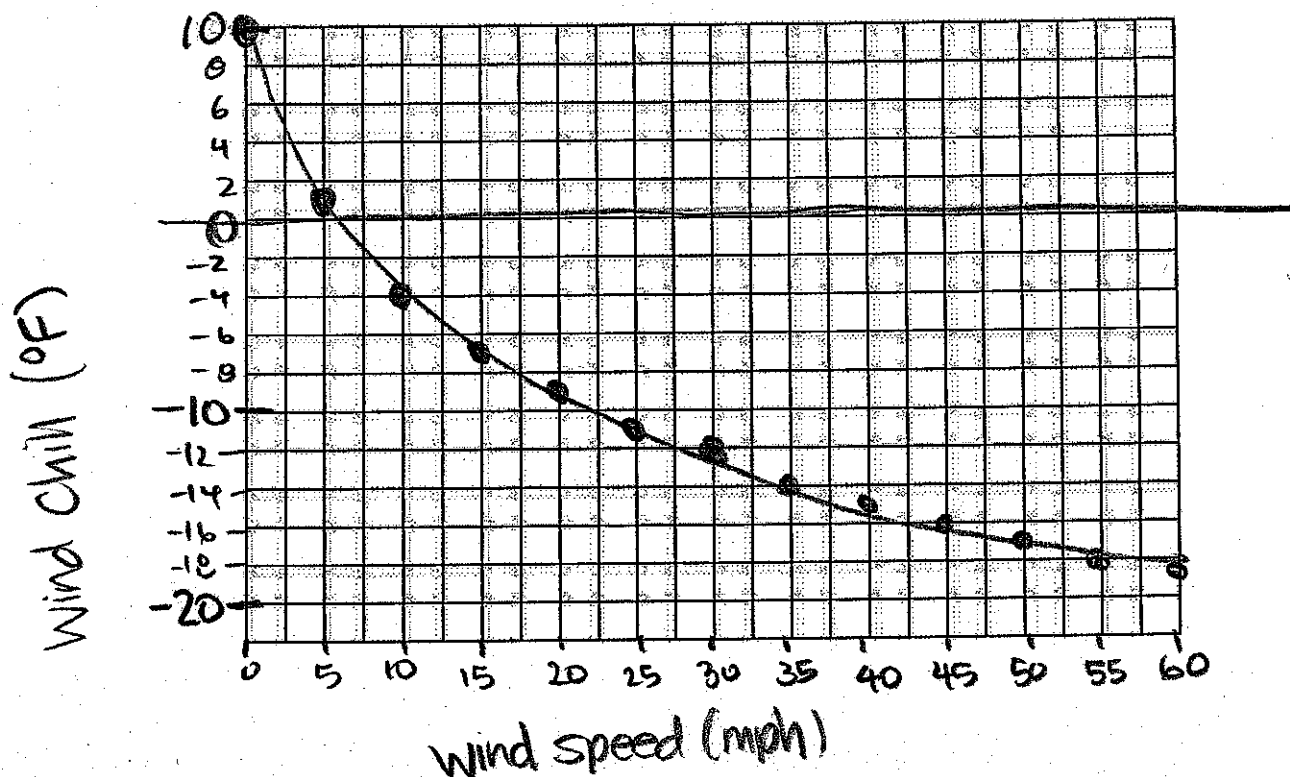
- (b) A "cold advisory" is issued whenever the wind chill falls below 0°F . How fast does the wind need to be at an air temperature of 10°F to issue a cold advisory?

$\approx 6\text{ mph}$

- (c) Between a wind chill of 0°F and -15°F , schools in our district are open but kids can't go outside for recess. What's the corresponding range of wind speeds at an air temperature of 10°F ?

$6\text{ mph} \leq \text{wind} \leq 40\text{ mph}$

- (d) Draw a graph showing how wind chill depends on wind speed and use it to check your answers. Extend the vertical axis both above and below the horizontal axis so you can scale for the negative numbers.



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3. Anthony and Christina are trying to decide where to hold their wedding reception. The Metropolitan Club costs \$1,300 for the space and \$92 per person.

Story also appears in 1.3 #2 and 3.2 #3

- (a) Identify and name the variables, including units.

M = cost of Metro Club (\$) ~ dep

G = number of guests (people) ~ indep

- (b) Explain the dependence using a sentence of the form " M is a function of G "

- (c) Make a table of showing the cost for 20, 50, 75, 100, or 150 people.

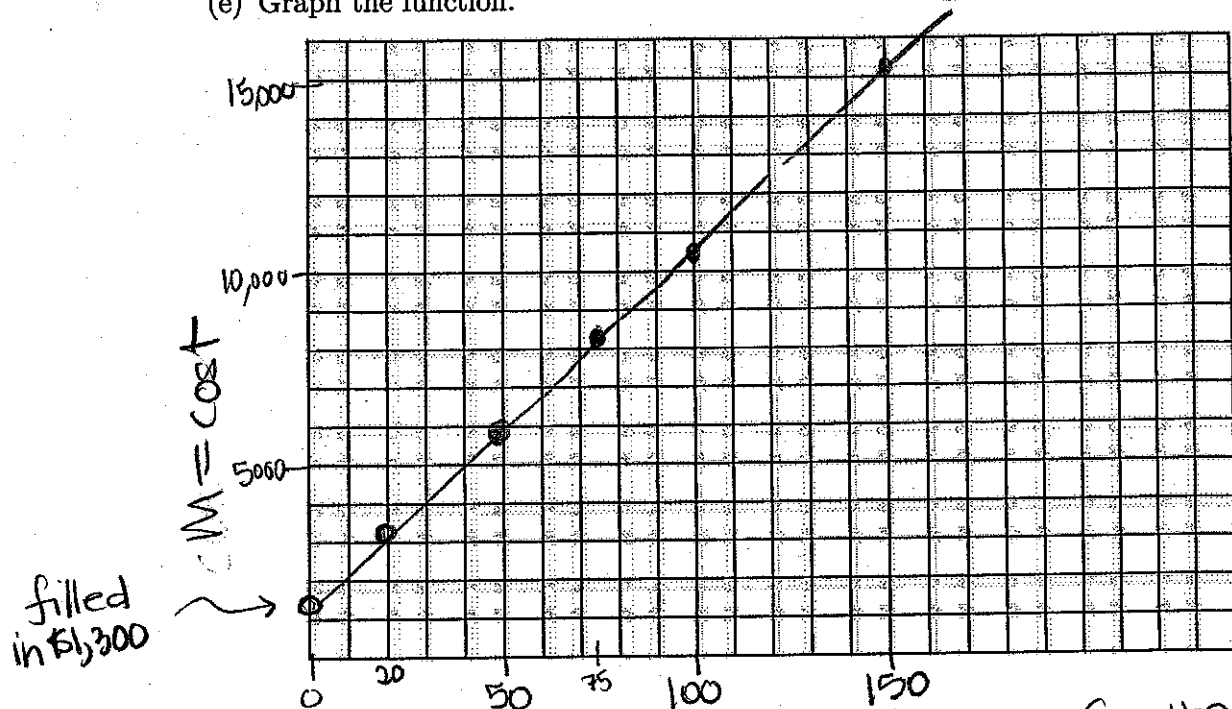
$\$1,300 + 20 \times \$92 =$

G	20	50	75	100	150
M	\$3,140	\$5,900	\$8,200	\$10,500	\$15,100

- (d) If Tony and Tina's budget is \$8,000, how many people can they invite to their wedding reception? Give a rough estimate from your table.

maybe 70 guests?

- (e) Graph the function.



- (f) Does your estimate agree with your graph? If not, revise.

- (g) Can you figure out from the story exactly how many guests Tony and Tina can invite to their wedding reception and stay within their \$8,000 budget?

$$\begin{array}{r} \$8,000 \text{ budget} \\ - \$1,300 \text{ space} \\ \hline \$6,700 \end{array}$$

$$\begin{array}{r} \$6,700 \\ \$92/\text{guest} \end{array} = 6700 \div 92 = 72.82 \dots$$

$$\approx 73 \text{ guests}$$

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4. A mug of coffee costs \$3.45 at Juan's favorite cafe.

Story also appears in 2.1 #4 and 4.2 #2

- (a) Juan buys coffee on the way to work every day. How much does Juan spend on coffee in a month? Let's say that's 22 workdays.

$$22 \times \$3.45 = \$75.90$$

- (b) If Juan pays \$10 for a discount card, then coffee costs \$2.90/mug instead. How much (total) would Juan spend on coffee in a month if he buys the discount card first? Still use 22 workdays. Include the \$10.

$$\$10 + 22 \times \$2.90 = \$73.80$$

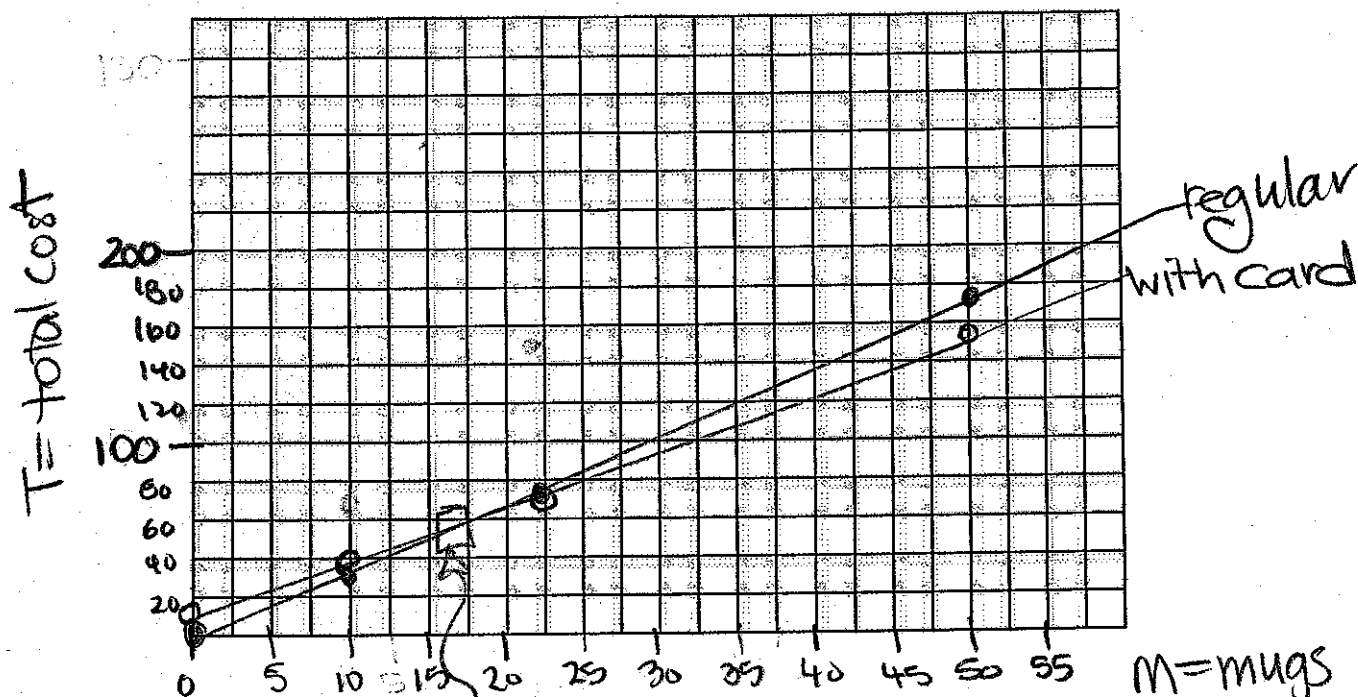
- (c) Does the card pay for itself within the month? That means, is the total with the card (including the \$10 for the card) less than the total without the card?

yes!

- (d) Complete the table, where M is the number of mugs of coffee Juan buys and T is the total cost, in dollars.

M	0	10	22	50
T (regular)	0	34.50	75.90	172.50
T (with card)	10	39.00	73.80	155.00

- (e) Draw a graph illustrating both functions.



- (f) What does the point where the two lines cross mean in terms of the story?

The 2 options cost the same \$ there.
It's the point where it's worth buying the discount card