

SOLUTIONS

3)

Practice Exam 1B

Try taking this version of the practice exam under testing conditions: no book, no notes, no classmate's help, no electronics (computer, cell phone, television). Give yourself one hour to work and wait until you have tried your best on all of the problems before checking any answers.

1. The amount of money spent on nursing home care for seniors has continued to rise. The table shows the values for select years. Here S is the spending, measured in billions of dollars and Y is the year, measured in years since 1960.

	1960	1970	1985	2000	2012
Y	0	10	25	40	52
S	1.0	3.3	33.7	96.6	170.3

- (a) According to the table, what was the spending in 1970?

\$3.3 billion

- (b) According to the table, what was the spending in 1985?

\$33.7 billion

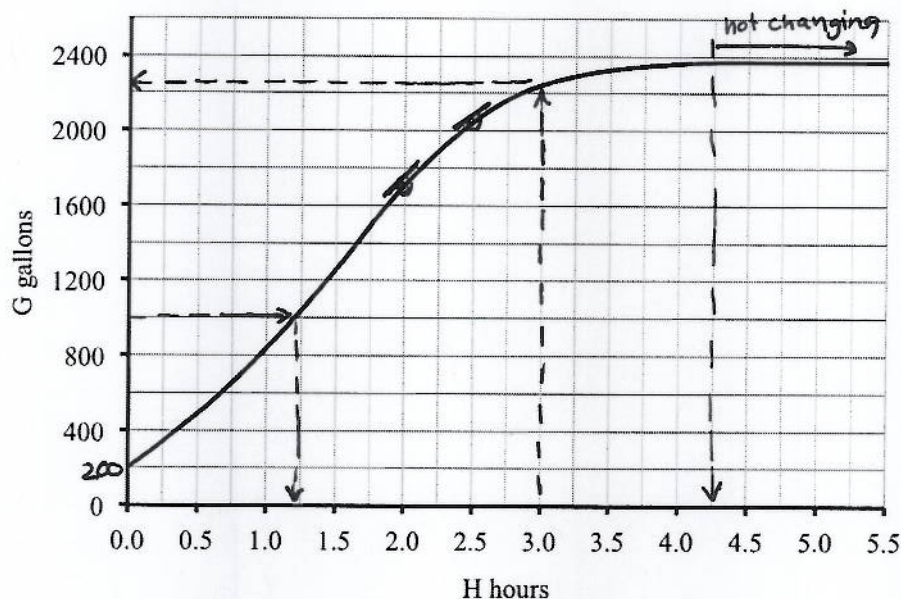
- (c) Calculate the rate of change of spending over the period 1970 to 1985. Don't forget to state the units.

$$\text{roc} = \frac{33.7 - 3.3 \text{ bil}}{1985 - 1970} = \frac{(33.7 - 3.3)}{(1985 - 1970)} = 2.0266 \dots \approx \$2.03 \text{ billion/year}$$

- (d) In approximately what year did spending first pass \$50 billion?

guess ≈ 1990

2. Trish is filling a swimming pool with water. The graph below shows how many gallons of water (G) are in the pool after H hours. Use the graph to answer the following questions.



- (a) How much water was in the swimming pool already when Trish began?

200 gallons

- (b) How much water was in the swimming pool after 3 hours?

≈ 2250 gallons

- (c) After how many hours were there 1,000 gallons of water in the swimming pool?

≈ 1.2 hours

- (d) Was Trish filling the pool faster at 2 hours or at 2.5 hours? Explain how you see that on the graph.

graph is steeper at 2 hours than at 2.5 hours

- (e) After (about) how many hours did Trish stop filling the swimming pool? Explain how you see that on the graph.

≈ 4.25 hours

graph is essentially flat

3. In 1990 the Lefèvre's property tax was \$450 but it doubled every year thereafter.

(a) Name the variables, including units.

P = property tax (\$) ~ dep

Y = year (years since 1990) ~ indep

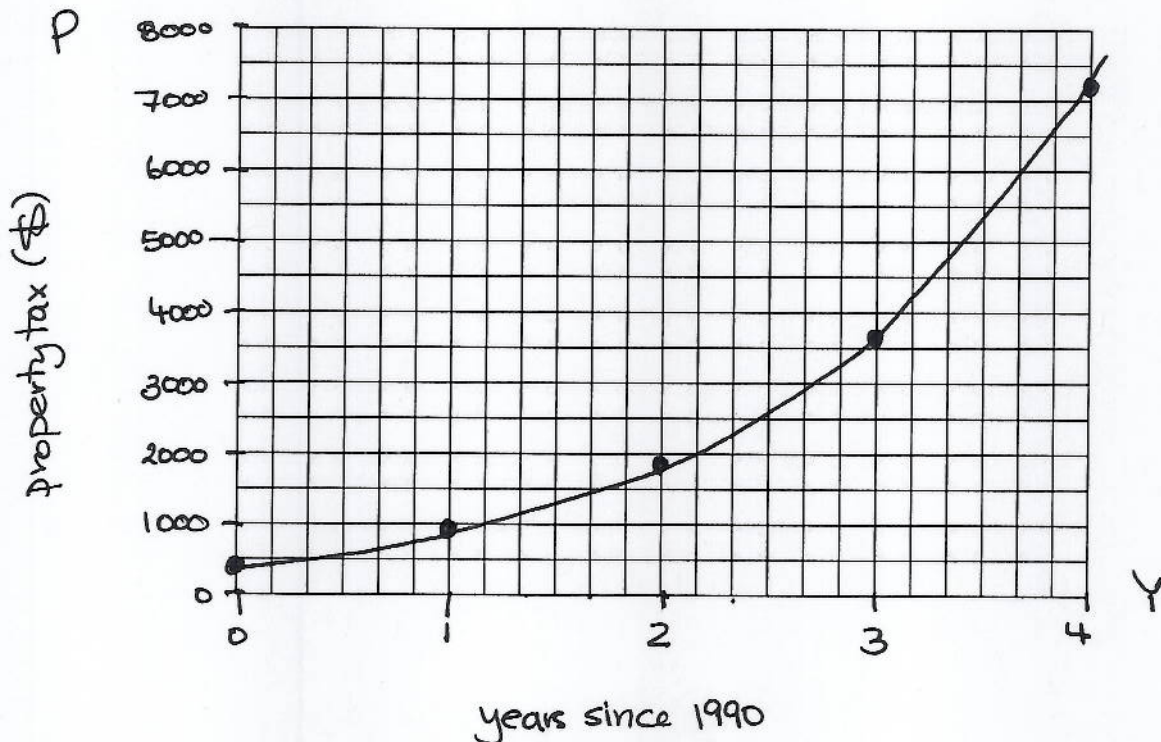
(b) Which is the independent variable and which is the dependent variable?

$\underbrace{\hspace{10em}}_Y$
 $\underbrace{\hspace{10em}}_P$

(c) Make a table showing the property tax each year from 1990 to 1994.

year	1990	1991	1992	1993	1994
Y	0	1	2	3	4
P	450	900	1,800	3,600	7,200

(d) Draw a graph illustrating the dependence.



4. The distance from the Earth to the Moon is approximately 384,000,000 meters.

(a) Express this distance in scientific notation.

↑ 8 places ↑

$$\boxed{3.84 \times 10^8 \text{ meters}}$$

(b) Express this distance in kilometers (km), using 1 km = 1,000 meters.

$$3.84 \times 10^8 \cancel{\text{m}} \times \frac{1 \text{ km}}{1000 \cancel{\text{m}}} = 3.84 \times 10^8 \div 1000 = \boxed{384,000 \text{ km}}$$

(c) Express this distance in miles, using the conversion 1 mile \approx 1.609 km.

$$384,000 \cancel{\text{km}} \times \frac{1 \text{ mile}}{1.609 \cancel{\text{km}}} = 384,000 \div 1.609 = 238,657.55$$

$$\boxed{\approx 239,000 \text{ miles}}$$

(d) If you could drive to the moon at 55 mph, how long would it take to get there?
Express your answer in terms of months, using 1 month \approx 30 days.

$$238,657.55 \cancel{\text{miles}} \times \frac{1 \text{ hour}}{55 \cancel{\text{miles}}} = 4,339.2... \text{ hours}$$

$$4,339.2... \cancel{\text{hours}} \times \frac{1 \cancel{\text{day}}}{24 \cancel{\text{hours}}} \times \frac{1 \text{ month}}{30 \cancel{\text{days}}} = \text{ANS} \div 24 \div 30 =$$

$$= 6.026...$$

$$\boxed{\approx 6 \text{ months}}$$