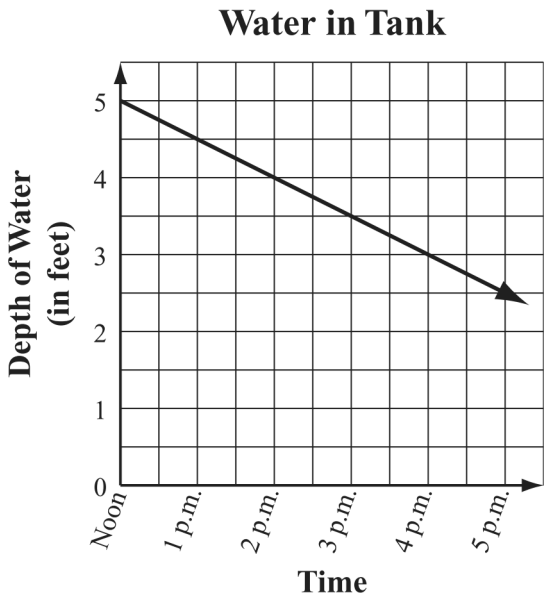
Name: _____ **Date:** _____

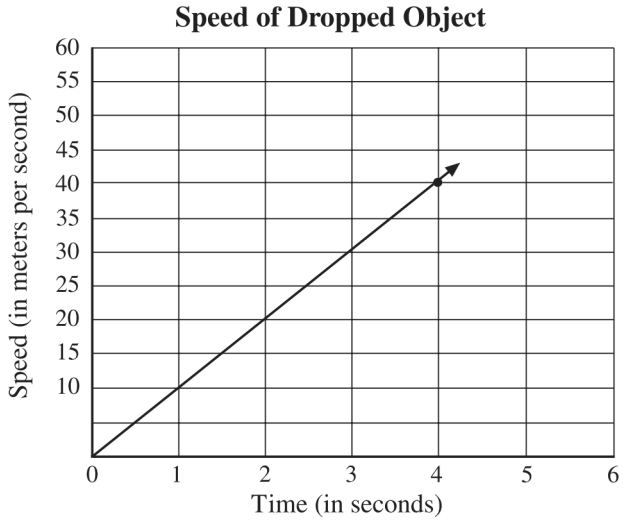
1. The depth of the water in a tank was 5 feet. At noon, Haley started draining water out of the tank at a steady rate, as shown by the graph below.



Based on the rate shown by the graph, at what time will the depth of the water in the tank be 2 feet?

A. 2 pm B. 4 pm C. 6 pm D. 8 pm

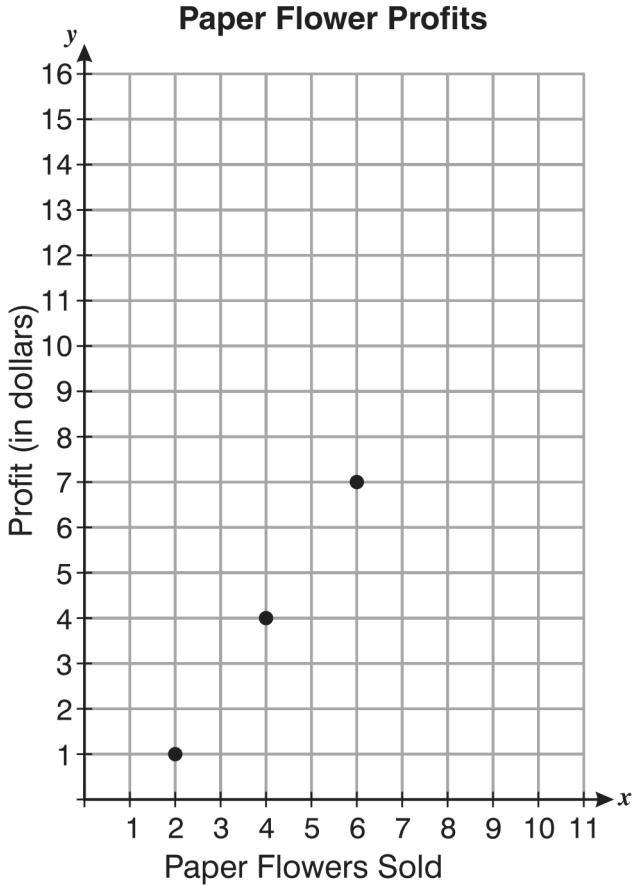
2. The graph below shows the speed of a dropped object over time.



Based on the graph, what will be the approximate speed of the dropped object after 5 seconds?

A. 5 meters per second B. 25 meters per second C. 50 meters per second D. 75 meters per second

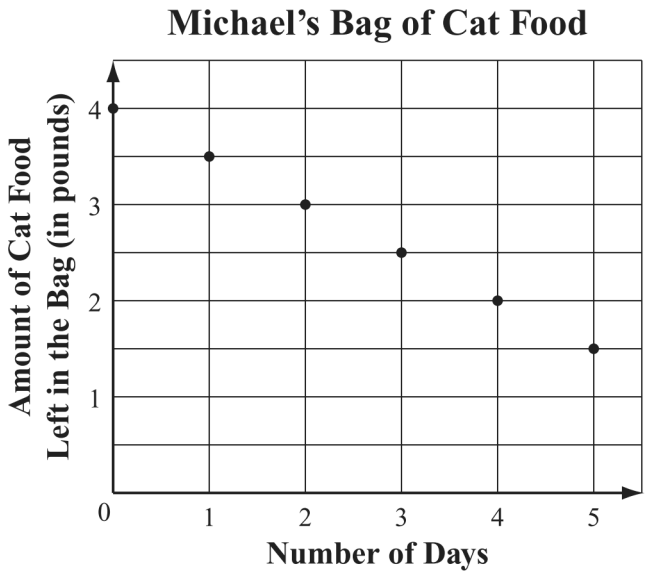
3. A local charity group made paper flowers for a craft fair. The graph below shows their profit based on the number of flowers sold.



If the relationship shown by the graph continues, what would the profit be if the group sold 10 flowers?

A. $13 B. $14 C. $15 D. $16

4. Michael bought a 4-pound bag of cat food. He fed his cat the same amount of food from the bag each day, as shown in the graph below.



What amount of food from the bag did Michael feed his cat each day?

A. $\frac{1}{4}$ pound B. $\frac{1}{2}$ pound C. 1 pound D. 2 pounds

5. Which of the following situations describes a linear relationship?

A. Jeri invested $2,000 in a savings account that earns 6% interest compounded quarterly.

B. The population of a town decreased from 12,000 to 11,000 in one year and is expected to decrease by 3.5% each year for the next ten years.

C. A ball bounces to one-half its previous height on each bounce.

D. The pathway from the entrance of a cave to the bottom descends at a 5%-grade.

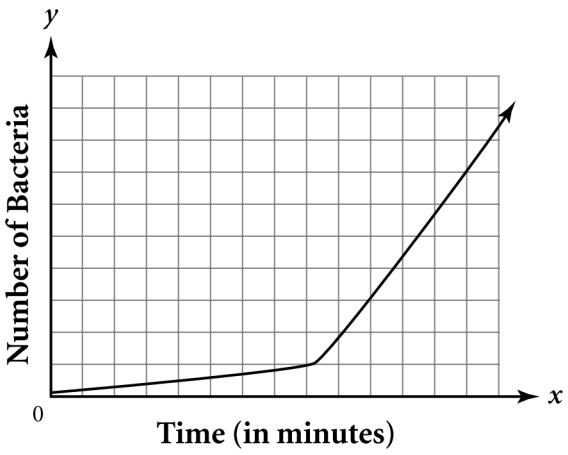
6. The table shows the number of bacteria present at 30 minute intervals during a science experiment.

Number of Bacteria Over Time

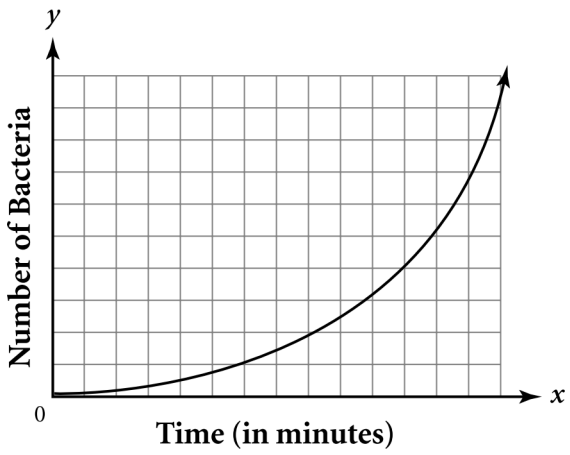
Time (in minutes)	Number of Bacteria
0	3
30	6
60	12
90	24
120	48
150	96
180	192
210	384

Which of these graphs best shows the relationship between time and the number of bacteria present?

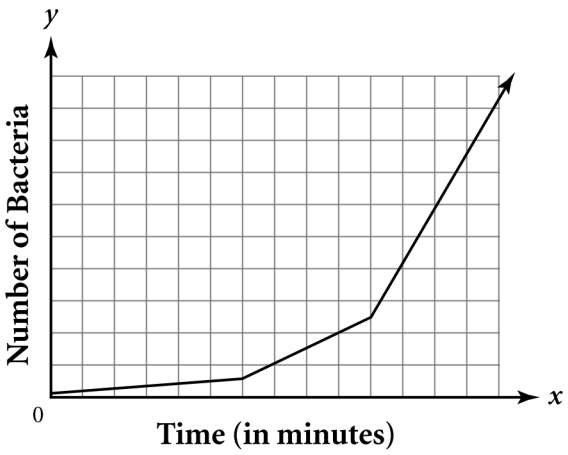
A.



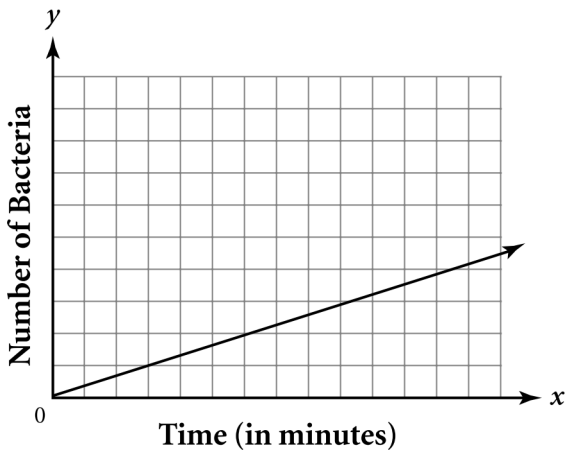
B.



C.



D.



7. The cost to rent a motorbike is given by the following formula:

   Cost = ($3 × number of hours) + $2

   Fill in the table.

Time in Hours	Cost in Dollars
1	5
4	
	17

8. A plumber charges customers $48 for each hour worked plus an additional $9 for travel. If h represents the number of hours worked, which of the following expressions could be used to calculate the plumber's total charge in dollars?

   A. $48 + 9 + h$ B. $48 \times 9 \times h$ C. $48 + (9 \times h)$ D. $(48 \times 9) + h$ E. $(48 \times h) + 9$

9. Frank wants to go bowling. The bowling alley charges $4 per game and a one-time charge of $3 for bowling shoes. Look at the information in the box below.

   $y = 4x + 3$
   y is the total cost of bowling
   x is the number of games bowled

   Based on the information, which of these is a true statement?

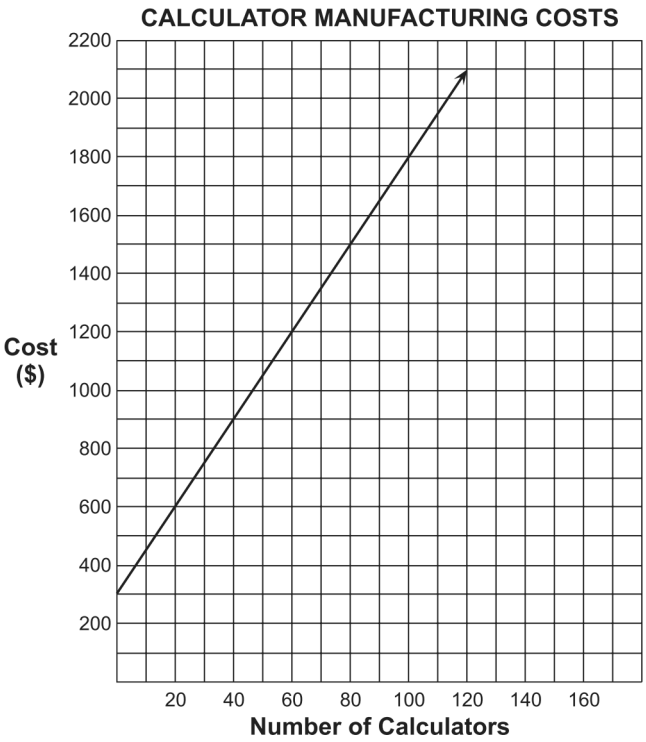
   A. The total cost will increase by $4 for every game bowled.

   B. The total cost will increase by $3 for every game bowled.

   C. The total cost will increase by $4 for every 3 games bowled.

   D. The total cost will increase by $3 for every 4 games bowled.

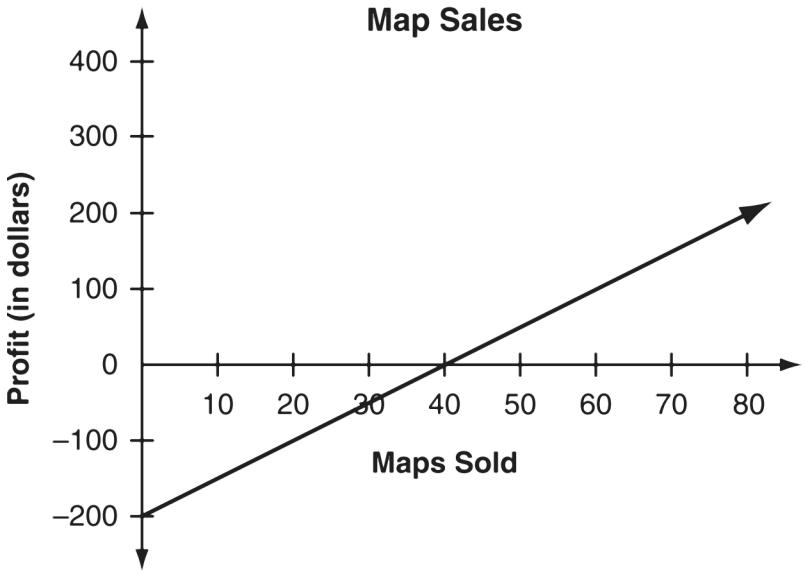
10. The graph below models the cost of manufacturing calculators.



Which equation shows the relationship between the number of calculators, n, and the total cost, C?

A. $C = 300 + 12.5n$ B. $C = 300 + 0.08n$ C. $C = 300 + n$ D. $C = 300 + 15n$

11. Brian started a business selling maps of hiking trails. His initial expense was $200. The graph below shows Brian's profit from selling different numbers of maps. [profit = revenue − expense]



What does the x-intercept of the graph represent?

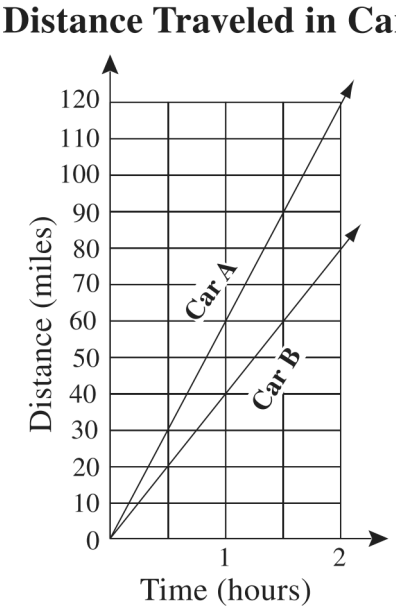
A. the amount of revenue before any maps were sold

B. the amount of revenue when all the maps were sold

C. the number of maps sold when the revenue was equal to the expense

D. the number of maps sold when the revenue was greater than the expense

12. The graph below shows the distance Car A and Car B traveled in two hours on the same road in the same direction.



Which of the following statements is true about the difference between the distance traveled by Car A and the distance traveled by Car B as time progresses?

A. The difference in the distance between Car A and Car B decreases.

B. The difference in the distance between Car A and Car B increases.

C. The difference in the distance between Car A and Car B stays the same.

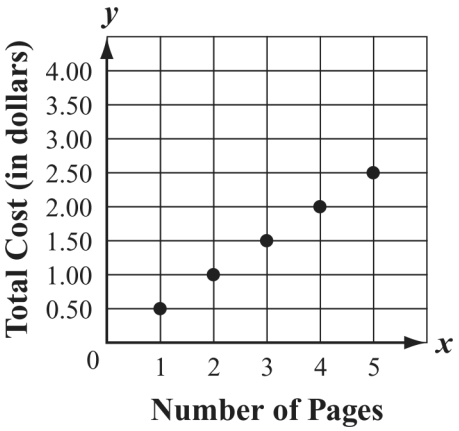
D. The difference in the distance between Car A and Car B is zero.

13. The cost for sending a fax from the local library is shown on the sign below.

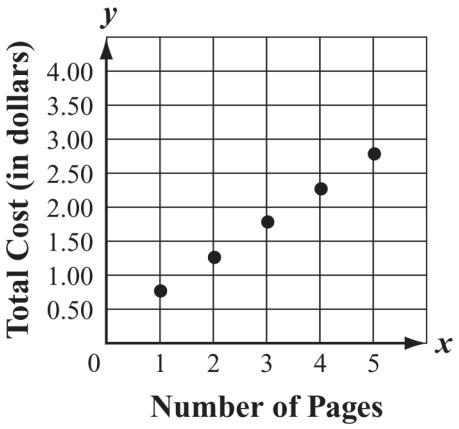
> **Cost for Sending a Fax**
>
> First page:
> \$0.75
>
> Each additional page:
> \$0.50

Which of the following graphs represents the total cost for sending a fax from the library?

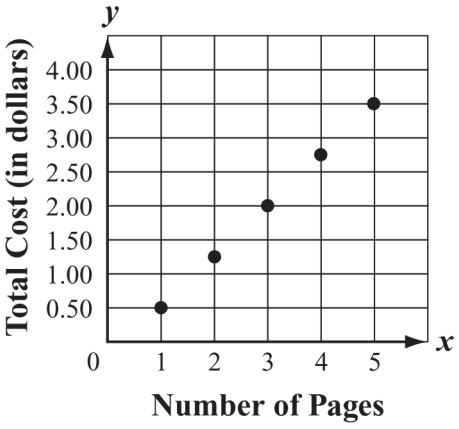
A.



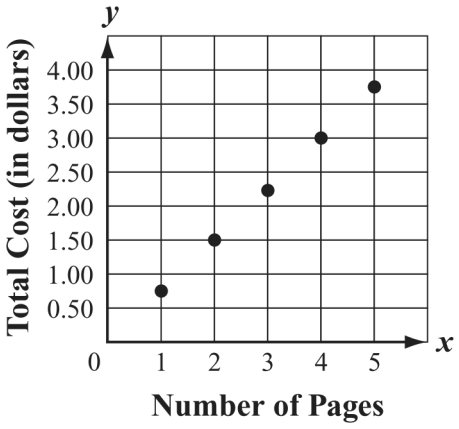
B.



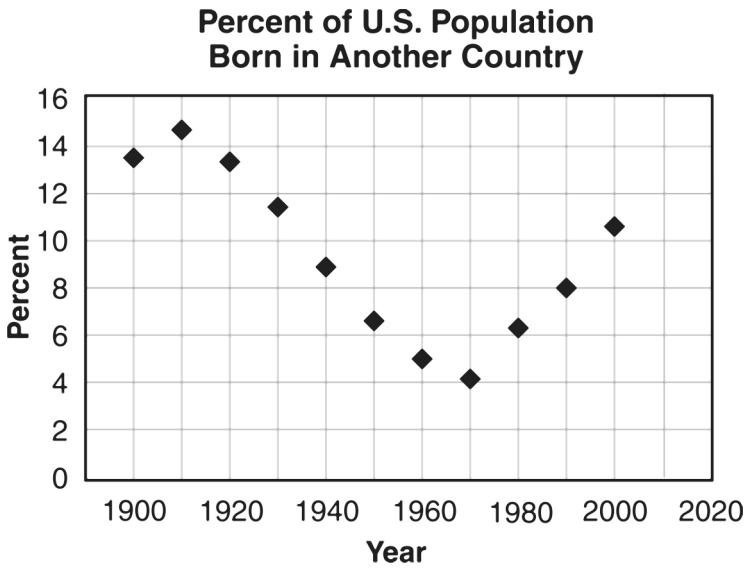
C.



D.

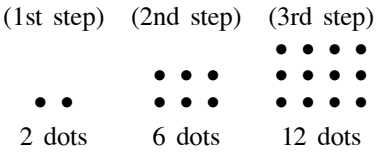


14. The graph below shows the percent of the U.S. population born in another country.



If the trend since 1970 continues, in 2010 approximately what percent of the U.S. population will have been born in another country?

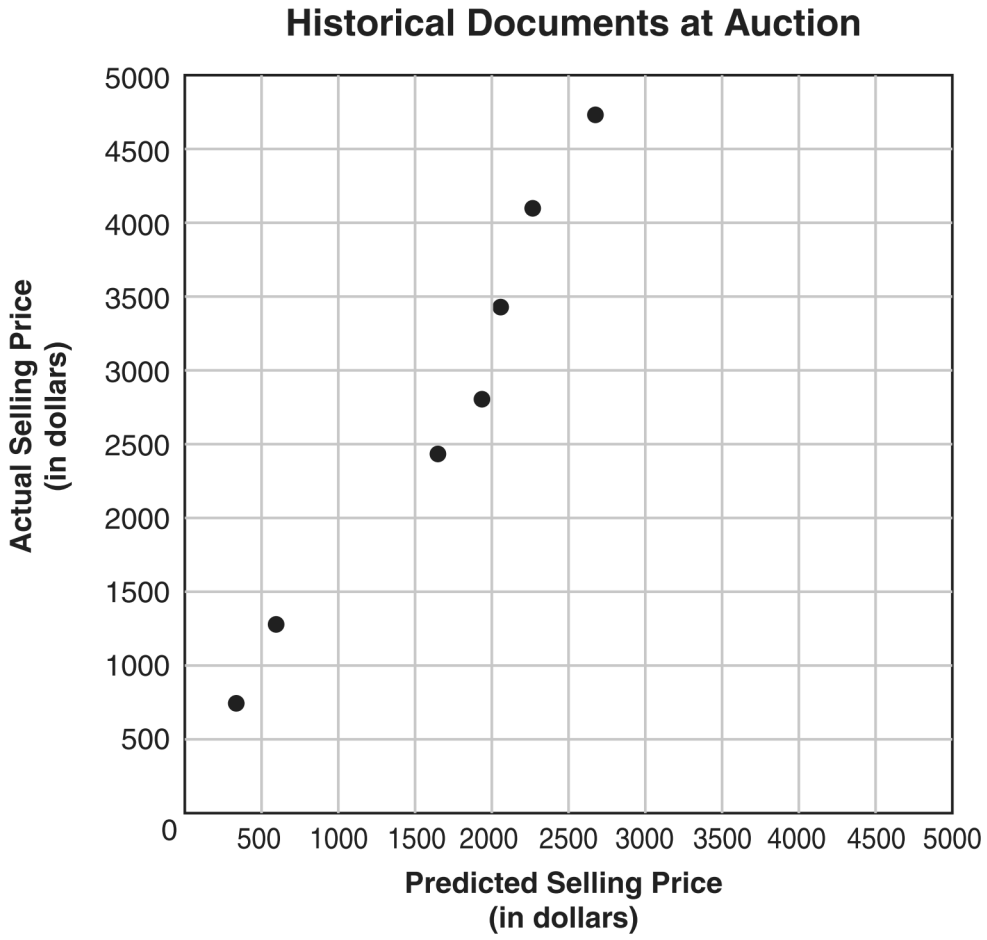
15. A pattern of dots is shown. At each step, more dots are added to the pattern. The number of dots added at each step is more than the number added in the previous step. The pattern continues infinitely.



Marcy has to determine the number of dots in the 20th step, but she does not want to draw all 20 pictures and then count the dots.

Explain or show how she could do this *and* give the answer that Marcy should get for the number of dots.

16. A financial analyst was asked to predict selling prices for some historical documents that would be sold at an auction. The scatterplot below shows the analyst's predicted price compared to the actual selling price for seven different items.



Based on the trend shown in the graph, what selling price should be expected for an item predicted to sell for $1000?

17. **Computer Science Degrees**

A college has been tracking the number of computer science degrees it has awarded over the past 20 years. This information is shown in the table below.

Number of Computer Science Degrees Awarded in Selected Years

Year	Number of Degrees
1976	47
1980	124
1984	385
1988	748
1992	1533
1996	2588

Predict the number of computer science degrees to be awarded in 2000. Show the mathematics you used and explain how you arrived at your prediction.

18. **Population Boom**

A small town experienced a population boom during the 1990s. The table below shows the town's population from 1990 to 1997.

POPULATION GROWTH

Year	**Population**
1990	159
1991	215
1992	289
1993	370
1994	494
1995	576
1996	652
1997	790

Use your equation to predict the town's population in 2005. Explain how you arrived at this estimate.

1.

2.
Answer: C

3.
Answer: A

4.
Answer: B

5.

6.
Answer: B

7.
Answer: Time in Hours = 5 hours; Cost in Dollars = 14 dollars

8.
Answer: E

9.

10.
Answer: D

11.
Answer: C

12.
Answer: B

13.
Answer: B

14.
Answer: 13%

15.
Answer: 420 dots

16.

17.

18.