PART A

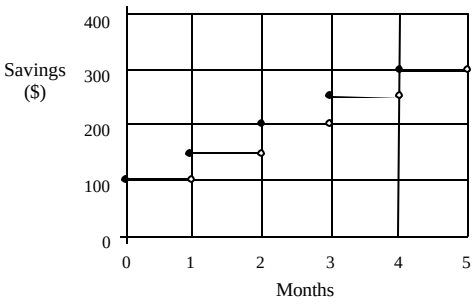
This part of the examination consists of questions 1 to 11.

In your answer booklet, circle the letter that corresponds to your answer.

1. Lisa wants to start saving money for a new mountain bike. She decides that she will start by putting $100 into her piggy bank at the beginning of the month. On the first day of every following month, she will add another $50 to her piggy bank.

   Which of the following Cartesian graphs represents the relation between the number of months Lisa has been saving and the amount she has saved?

A)



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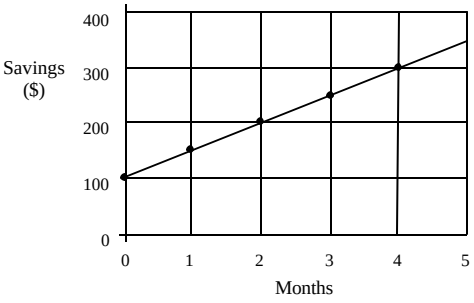

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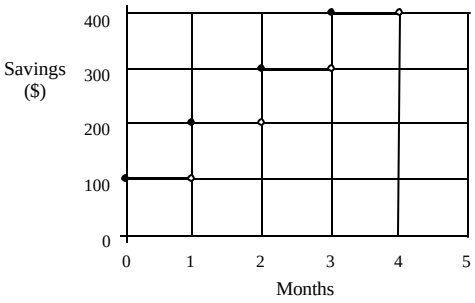
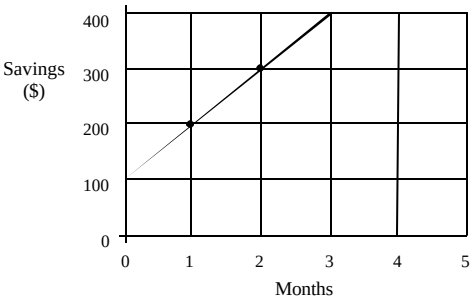


D)



2. In 2003, a used car salesman noticed that his yearly sales had decreased by 10 % each year since the year 2000.

Which one of the following tables of values could he have used to record his observation?

A)

Year	2000	2001	2002	2003
Sales ($)	500 000	450 000	405 000	364 500

B)

Year	2000	2001	2002	2003
Sales ($)	500 000	450 000	400 000	350 000

C)

Year	2000	2001	2002	2003
Sales ($)	500 000	400 000	300 000	200 000

D)

Year	2000	2001	2002	2003
Sales ($)	500 000	495 000	490 000	485 000

3. In Old Montreal, the charge for renting roller blades is $10 for the first hour and $5 for each additional hour (or part of an hour).

Julie rented roller blades for 3 hours and 49 minutes.
How much did she have to pay when she returned them?

A) $20

B) $25

C) $30

D) $35

4. Suzie has $30 in the bank and Stephen has $60. Suzie plans to save $5 a week and Stephen $3 a week.

Which table of values shows the savings pattern of each?

A)

Number of Weeks	0	2	4	6
Suzie's savings	0	10	20	30
Stephen's savings	0	6	12	18

C)

Number of Weeks	0	2	4	6
Suzie's savings	5	65	125	185
Stephen's savings	3	123	243	363

B)

Number of Weeks	0	2	4	6
Suzie's savings	30	32	34	36
Stephen's savings	60	62	64	66

D)

Number of Weeks	0	2	4	6
Suzie's savings	30	40	50	60
Stephen's savings	60	66	72	78

5. The system of linear relations below represents the cost of dance lessons, C_1 and C_2, charged by two different dance schools based on the number of hours (h) of lessons.

$$C_1 = 5h + 30$$
$$C_2 = 6h + 20$$

After a certain number of hours, the cost would be identical.
Which equation represents the above situation?

What would this cost be?

A) $10 C) $50

B) $20 D) $80

6. Every month, grocery stores buy a large supply of soda cans to sell to the public.
   - Grocery Store A purchases 2 000 soda cans and sells on average 65/day.
   - Grocery Store B purchases 2 500 soda cans and sells on average 90/day.

   This situation can be represented as follows:

   $Y_A = 2\,000 - 65x$

   $Y_B = 2\,500 - 90x$

   where, x : number of days
   Y_A : number of soda cans left from Grocery Store A's monthly purchase
   Y_B : number of soda cans left from Grocery Store B's monthly purchase

   After how many days will both Grocery Stores have the same amount of soda cans left?

   A) 10
   B) 20
   C) 25
   D) 30

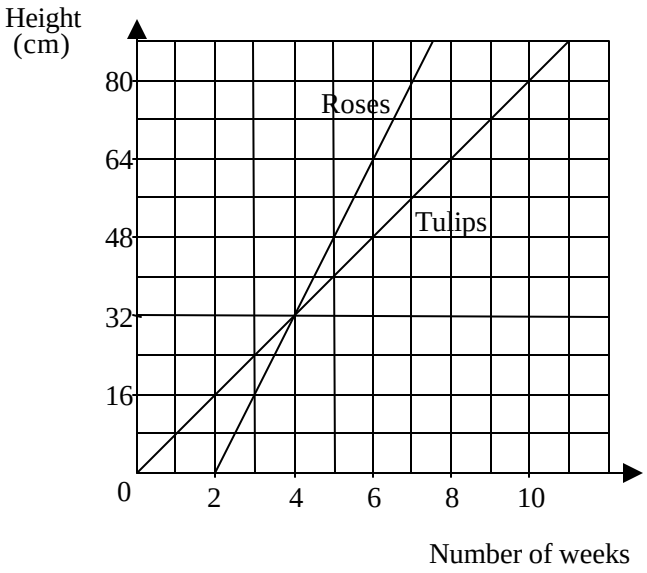
7. Mona wants to rent some DVD's. At *DVD's R US* it costs \$4 per DVD rented. At *Super DVD*, customers have to pay a \$25 membership fee and then each DVD costs \$2 to rent.
   Given that d is the number of DVD's rented and c is the total cost.

   Which system of linear relations represents this situation?

   A) $c = 4d$
      $c = 2d$
   B) $c = 25 + 4d$
      $c = 25 + 2d$
   C) $c = 4d$
      $c = 25 + 2d$
   D) $c = 25 + 4d$
      $c = 2d$

8. Frank makes a flower garden every year. He always plants the roses two weeks after the tulips.

The following graph shows the relationship between the height of the flowers in centimetres and the number of weeks elapsed since the planting of the tulips.



Which of the following statements is TRUE?

A) Both types of flowers reach the same height 2 weeks after the planting of the tulips.

B) The tulips are taller than the roses after each had been growing for 4 weeks.

C) The difference in height of the flowers after each had been growing for 6 weeks is 2 cm.

D) The growth rate of the roses is greater than that of the tulips.

9. In 2003, 400 German-made and American-made TV's were sold at "*Electronics Mania*". Three times as many German-made TV's were sold as American-made TV's were sold.

Let x : the number of German TV's
y : the number of American TV's

This situation is represented by the following system of linear relations:

$$x = 3y$$
$$x + y = 400$$

Which system is equivalent to the one above?

A) $2x = 6y$
$-2x - 2y = 800$

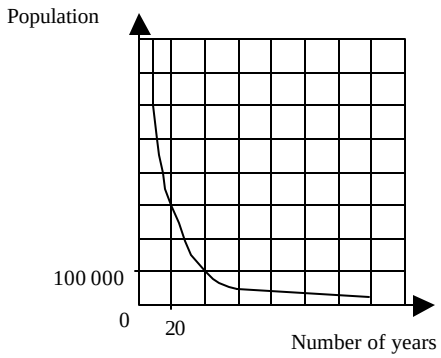
B) $-2x - 6y = 0$
$x + y = 400$

C) $y = \frac{x}{3}$
$y = 800 + x$

D) $x - 3y = 0$
$2x + 2y = 800$

10. The population of a small but growing city is 100 000. Its population will increase by 2 % each year. Considering the relationship between the number of years elapsed and the population growth of the city, which of the graphs below represents this situation?

A)



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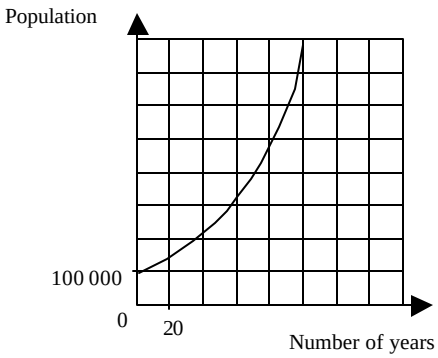

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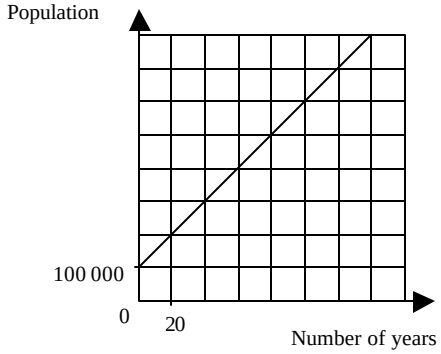

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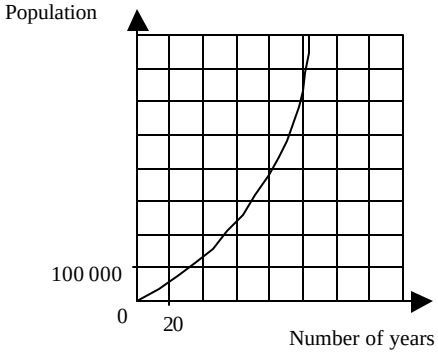


11. John and Steven must sell 280 and 210 chocolate bars respectively to raise funds for the youth center.

John sells 10 bars a day, while Steven sells 5 bars a day.

When one of the two has sold all of his chocolate bars, how many will the other have left?

PART B

This part of the examination consists of questions 12 to 17.

In your answer booklet, write each answer in the space provided.

12. Susan decides to rent a car for the day. Its costs her $35 for the rental of the car plus an additional $0.10 per kilometre for her distance traveled.

$$Y = 0.1x + 35,$$

Given that Y is the total rental cost and x is the number of kilometres traveled, graph this relation for a distance traveled between 0 and 1000 km.

13. Nick would like a hook up for the Internet. He signs up with "Net-Express". The monthly fees for a first-time user are listed below.

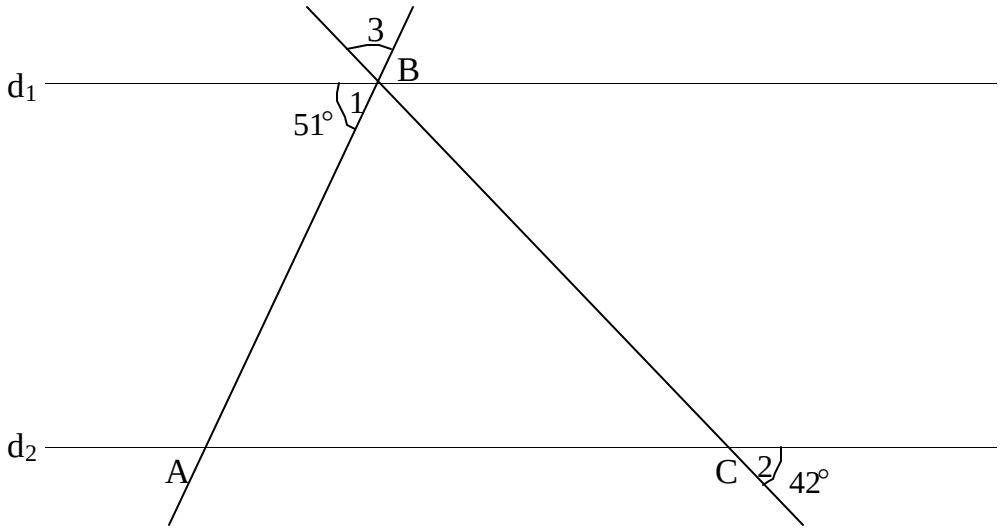
Number of hours on line	Fees ($)
[0, 7]	12.00
]7, 8]	13.50
]8, 9]	15.00
]9, 10]	16.50
]10,… [	18.00

Draw the graph for this relation.

14. White water rafting in Colorado costs $40 for the day and $5 for every hour down the river.
In California, white water rafting costs $30 for the day and $7 for every hour down the river.

After how many hours is the cost the same for both locations?

15. Given triangle ABC as illustrated below. Lines d_1 and d_2 are parallel. Angle 1 measures 51° and angle 2 measures 42°.



Prove that the measure of angle 3 is 87^o.

16. Sean decides to rent a chalet up north for the weekend. The cost for the weekend rental is $300. Sean is thinking of inviting a few friends along. Construct a table to show the relation between cost and number of people at the chalet if Sean can invite a maximum of 4 friends.

17. The following table shows your salary in relation to how many hours you work.

# of hours worked	0	10	20	30	40
Salary ($)	150	250	350	450	550

What is the rule for this relation?

PART C

This part of the examination consists of questions 18 to 25.

In your answer booklet, show your work for each problem and write your final answer in the space provided.

Each question is worth 4 marks, which will be allotted on the following criteria:

- **The appropriateness of the method you used to solve the problem**
- **The accuracy of your calculations**
- **The clarity of the written information**

No marks will be given for a correct final answer if you have not shown your work.

18. To join a tennis club, new members must pay a single annual membership fee plus an hourly rate for court use.
The table of values below represents the relation between hours of court use and the annual cost.

Hours	0	1	2	3	…
Annual Cost ($)	255	265	275	285	…

If John's bill for the year is $1025, how many hours did he play that year?

19. A chemist notices in his lab that Virus A doubles every hour whereas Virus B triples every hour. At the outset there are 500 strands of Virus A and 80 strands of Virus B.

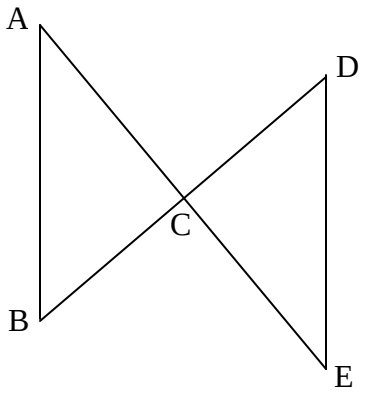
What is the difference in strands between the two Viruses after 5 hours?

20. Solve graphically to find the point of intersection of the following linear system.

$y + 3x = -6$

$-4y + 8x = -16$

21. Refer to the diagram at right.



Given:

- $\overline{AB} \parallel \overline{DE}$
- C is the midpoint of $\overline{BD}$

Prove that $\Delta ABC \cong \Delta EDC$.

22. At a country fair, the main attraction is going on a hot air balloon ride. Mary decides to take a ride and is told that her hot air balloon rises at 10m per second. As her balloon rises, Mary notices that her friend Amy is on another balloon which is descending back to the ground.

Amy's balloon is at a height of 120m and is descending at a rate of 5m per second.

Graph both relations on the same Cartesian plane and determine after how many seconds the two balloons will be at the same height.

23. Peter, Tara, and Olivia love to go bowling. They each have their favourite bowling alley.

- At Peter's favourite bowling alley, they charge a flat rate of $5 for every hour you bowl.
- At Tara's favourite bowling alley, they use the following relation to determine the cost: $y = 3x + 5$; where y represents the cost and x is the number of hours bowled.
- Finally, at Olivia's favourite bowling alley, the cost is represented by the table below:

Number of hours played	0	1	2	3	4	5
Cost $	15.00	15.00	15.00	15.00	15.00	15.00

If the next time they go out to bowl they decide to play for 3 hours, whose

favourite bowling alley offers the best deal?

24. George is tiling a floor with square tiles whose sides measure 40cm. The tiles come in boxes containing 20 tiles. Consider the relation between the floor area and the number of boxes of tiles required.

Determine the rule for this relation by first completing the following table.

# of boxes of tiles	Floor Area (cm^2)
0	
1	
2	
3	
4	
5	

25. Find the measure of $\overline{BD}$.
Show all your work.