

**JUNE 1998**

## **PROVINCIAL EXAMINATION**

**MINISTRY OF EDUCATION**

# **APPLICATIONS OF MATHEMATICS 12**

### **GENERAL INSTRUCTIONS**

1. Insert the stickers with your Student I.D. Number (PEN) in the allotted spaces above and on the **back** cover of this booklet. **Under no circumstance is your name or identification, other than your Student I.D. Number, to appear on this booklet.**
2. Ensure that in addition to this examination booklet, you have an **Examination Response Form**. Follow the directions on the front of the Response Form.
3. **Disqualification** from the examination will result if you bring books, paper, notes or unauthorized electronic devices into the examination room.
4. All multiple-choice answers must be entered on the Response Form using an **HB pencil**. Multiple-choice answers entered in this examination booklet will **not** be marked.
5. For each of the written-response questions, write your answer in the space provided in this booklet.
6. When instructed to open this booklet, **check the numbering of the pages** to ensure that they are numbered in sequence from page one to the last page, which is identified by

**END OF EXAMINATION**.

7. At the end of the examination, place your Response Form inside the front cover of this booklet and return the booklet and your Response Form to the supervisor.

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## APPLICATIONS OF MATHEMATICS 12 PROVINCIAL EXAMINATION

	Value	Suggested Time
1. This examination consists of <b>two</b> parts:		
PART A: 45 multiple-choice questions	45	75
PART B: 9 written-response questions	25	45
	<b>Total: 70 marks</b>	<b>120 minutes</b>

- Aside from an approved calculator, electronic devices including dictionaries and pagers are **not** permitted in the examination room.
- The last **three** pages inside the back cover contain **Formulae, Table of Z-scores, Rough Work for Graphing, and Rough Work for Multiple-Choice**. These pages may be detached for convenient reference prior to writing this examination.
- You will not be provided with any additional paper since rough-work space for the written-response questions has been incorporated into the space allowed for answering each question. You may not need all of the space provided to answer each question.
- A graphing calculator is essential for the Applications of Mathematics 12 Provincial Examination.** The calculator must be a hand-held device designed primarily for mathematical computations involving logarithmic and trigonometric functions as well as for graphing functions. Computers, calculators with a QWERTY keyboard, and electronic writing pads will not be allowed. You must not bring any external devices to support calculators such as manuals, printed or electronic cards, printers, memory expansion chips or cards, or external keyboards. You may have more than one calculator available during the examination, of which one may be a scientific calculator. Calculators may not be shared, and communication between calculators is prohibited during the examination. In addition to an approved calculator, you will be allowed to use rulers, compasses, and protractors during the examination.
- If, in a justification, you refer to information produced by the calculator, this information must be presented clearly in the response. For example, if a graph is used in the solution of the problem, it is important to sketch the graph, showing its general shape and indicating the appropriate window dimensions.
- When using the calculator, you should provide a decimal answer that is correct to **at least two decimal places** (unless otherwise indicated). Such rounding should occur **only** in the final step of the solution.
- The time allotted for this examination is **two hours**.

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**PART A: MULTIPLE CHOICE**

**Value: 45 marks**

**Suggested Time: 75 minutes**

**INSTRUCTIONS:** For each question, select the **best** answer and record your choice on the Response Form provided. Using an HB pencil, completely fill in the circle that has the letter corresponding to your answer.

1. Determine  $a_{23}$  in matrix  $A$  below.

$$A = \begin{bmatrix} -1 & 0 & 5 & 4 \\ -2 & -3 & 2 & 7 \\ 8 & 4 & -1 & 4 \end{bmatrix}$$

- A.  $3 \times 4$
- B.  $4 \times 3$
- C. 2
- D. 4

2. Consider the following matrices:

$$A = \begin{bmatrix} 4 & -2 & 1 \\ 7 & 3 & 2 \end{bmatrix} \quad \text{and} \quad B = \begin{bmatrix} 2 & 4 \\ 3 & -1 \\ 0 & 7 \end{bmatrix}$$

Find the element in the second row and first column of the product  $AB$ .

- A. 2
- B. 23
- C. 25
- D. 39

3. Determine  $x$ , such that

$$3 \begin{bmatrix} 8 & x \\ 2 & 3 \\ 1 & -2 \end{bmatrix} + 5 \begin{bmatrix} -1 & -3x \\ 2 & 7 \\ 8 & 9 \end{bmatrix} = \begin{bmatrix} p & 6 \\ q & r \\ s & t \end{bmatrix}$$

- A.  $-3$
- B.  $-2$
- C.  $-\frac{1}{2}$
- D.  $\frac{1}{3}$

4. A cashier makes a list of the coins that are in the till at the end of each day.

	PENNIES	NICKELS	DIMES	QUARTERS
SATURDAY	30	15	7	19
SUNDAY	28	9	10	15

Matrix  $N$  represents the number of coins, and Matrix  $V$  represents the value of each coin.

$$N = \begin{bmatrix} 30 & 15 & 7 & 19 \\ 28 & 9 & 10 & 15 \end{bmatrix} \quad V = \begin{bmatrix} 1 \\ 5 \\ 10 \\ 25 \end{bmatrix}$$

Which of the following will give the amount of money in coins at the end of each day?

- A.  $N + V$
- B.  $100(N + V)$
- C.  $NV$
- D.  $VN$

5. Solve the following system for  $x$ :

$$2x - y + 4z = 7$$

$$x - 3y + z = -2$$

$$3x - 2y + 2z = -2$$

- A.  $-2$
- B.  $-1$
- C.  $1$
- D.  $2$

**Use the following information to answer questions 6 and 7.**

Last year in Burns Lake, among companies that purchase new vehicles every year, 76% of the purchases made were trucks and 24% were cars. A survey indicates that 12% of those who bought trucks will buy cars next year, while 8% of the car buyers will switch to trucks.

6. If this trend continues, what percent of the companies will purchase a car next year?
- A. 24%
  - B. 28%
  - C. 31%
  - D. 33%
7. If the same trend continues over the long term, what percent of these companies will purchase cars?
- A. 60%
  - B. 63%
  - C. 67%
  - D. 69%

8. A schedule of base insurance costs for a certain car is as follows:

Third party liability	\$950
• increased liability (\$1 000 000)	\$150
• increased liability (\$2 000 000)	\$250
Collision (\$200 deductible)	\$450
Comprehensive (\$100 deductible)	\$300

What is the minimum cost to legally insure a car according to the fee schedule above?

- A. \$750
- B. \$950
- C. \$1 250
- D. \$1 850

Use the following spreadsheet to answer question 9.

	A	B	C	D
1	Rent	Supplies	Salaries	Utilities
2	3	5	27	4
3	4			
4				

9. What value would appear in cell B3 if the formula “= 2 \* (A2 + B2) ” is applied?

- A. 11
- B. 14
- C. 16
- D. 30



Use the following spreadsheet to answer question 10.

	A	B	C	D	E
1	Payment #	Payment	Interest Payment	Payment to Principle	Unpaid Balance
2					500.00
3	1	86.27	5.00		
4	2				
5	3				
6	4				

10. The spreadsheet shows the beginning of an amortization table for the payments made on a \$500 purchase over six equal monthly payments with an interest rate of 1% per month. How much of the second payment goes toward the principle?

- A. \$81.27
- B. \$82.08
- C. \$82.13
- D. \$86.27

11. Which of the following describes the sequence  $t_n = 2^{-n}$  ?

- A. constant
- B. divergent
- C. alternating
- D. convergent

12. Determine the third term of the sequence defined by the recursive formula:

$$t_1 = 5$$

$$t_n = 2t_{n-1} - 1, \quad n > 1$$

- A. 9
- B. 17
- C. 18
- D. 33

Use the following diagram to answer question 13.

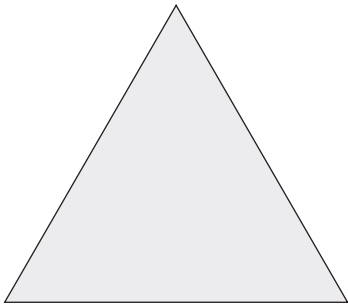


FIGURE 1

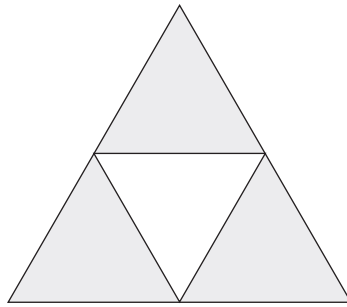


FIGURE 2

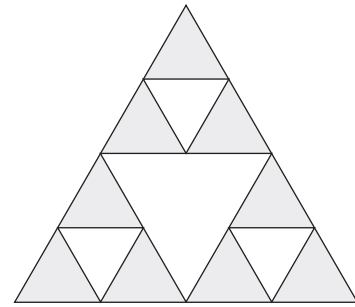
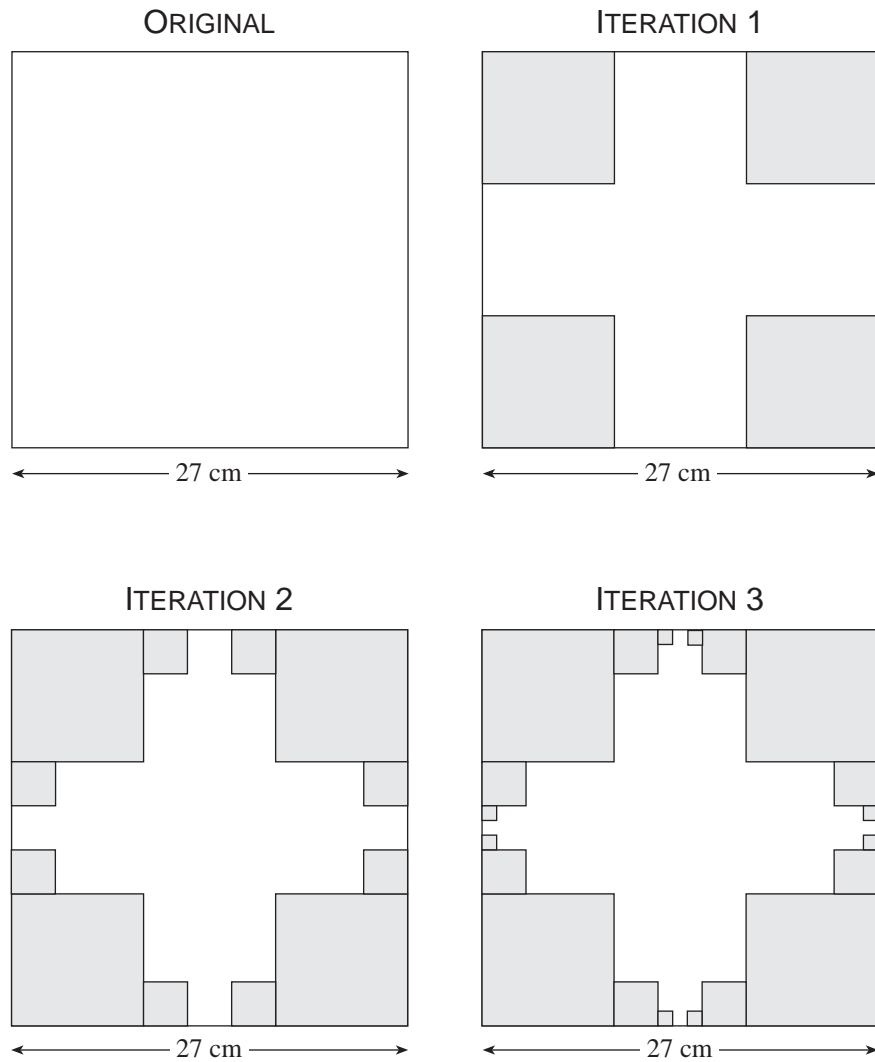


FIGURE 3

13. The diagram shows a fractal pattern known as the *Sierpinski Triangle*. How many grey triangles will there be in the eighth figure?

- A. 729
- B. 2 187
- C. 3 280
- D. 6 561

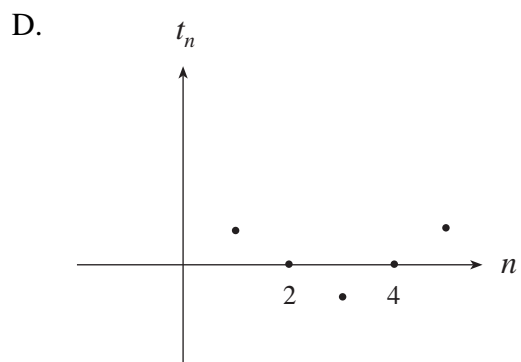
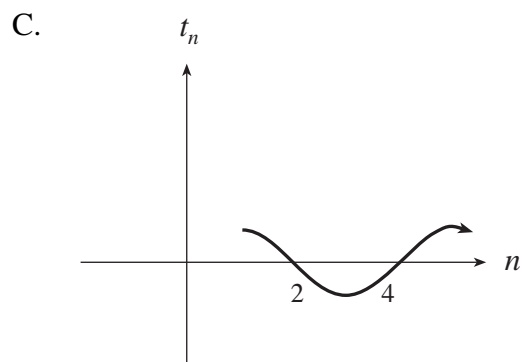
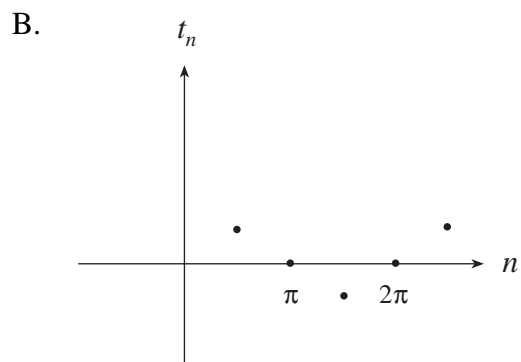
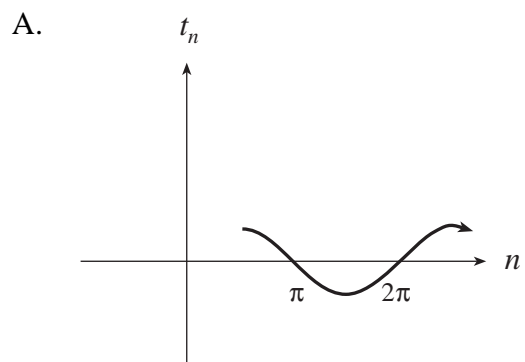
14. The diagram below shows the first three iterations in the generation of a fractal. Sets of successively smaller squares (shaded region) are removed as shown in the diagrams. Squares removed have sides that are  $\frac{1}{3}$  of the length of the previous set.



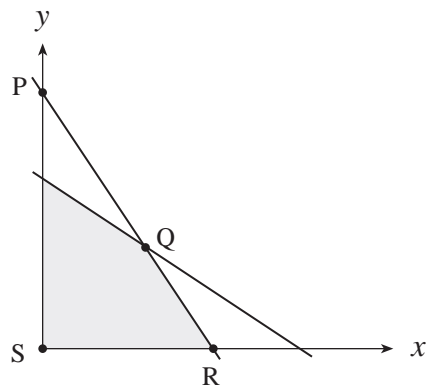
If the original square has sides 27 cm long, determine the **area**, in  $\text{cm}^2$ , of the fractal (white region) after the third iteration.

- A. 325
- B. 333
- C. 381
- D. 405

15. Which graph represents the **sequence** defined by  $t_n = \sin\left(\frac{\pi}{2}n\right)$ ,  $n \geq 1$ ?



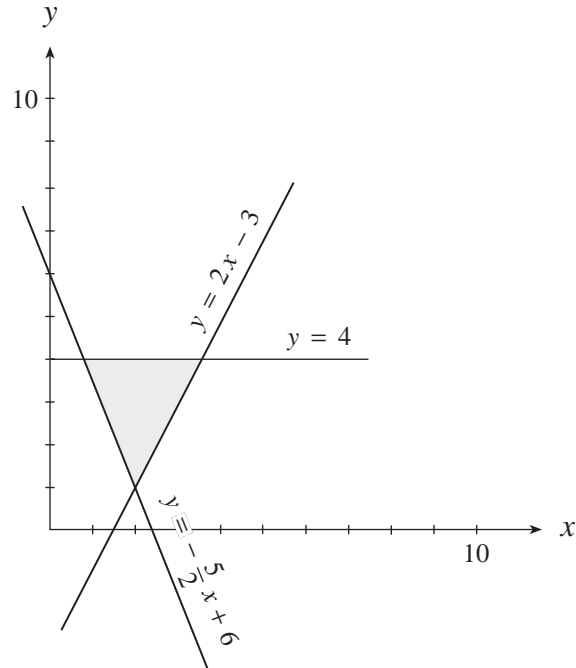
Use the following graph to answer question 16.



16. Which point could **not** provide the optimal solution for the linear programming problem graphed above?

- A. P
- B. Q
- C. R
- D. S

17. Which system of inequalities describes the graph below?



A.  $y \geq 4$   
 $y \geq 2x - 3$   
 $y \geq -\frac{5}{2}x + 6$

B.  $y \geq 4$   
 $y \leq 2x - 3$   
 $y \leq -\frac{5}{2}x + 6$

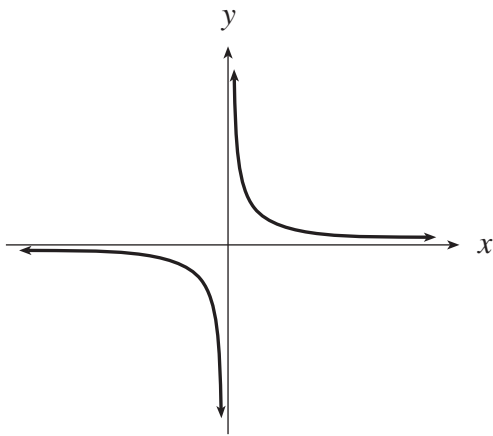
C.  $y \leq 4$   
 $y \geq 2x - 3$   
 $y \leq -\frac{5}{2}x + 6$

D.  $y \leq 4$   
 $y \geq 2x - 3$   
 $y \geq -\frac{5}{2}x + 6$

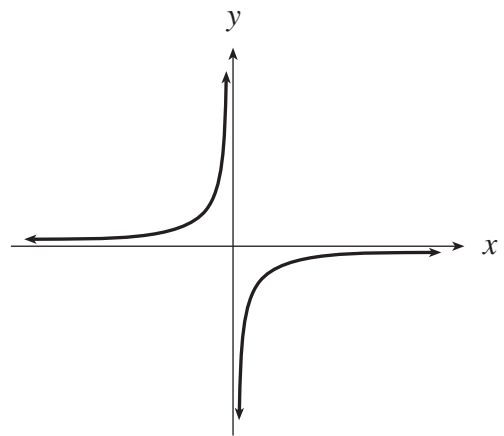
OVER

18. Which graph illustrates a function  $y = \frac{a}{x}$  where  $a > 0$  ?

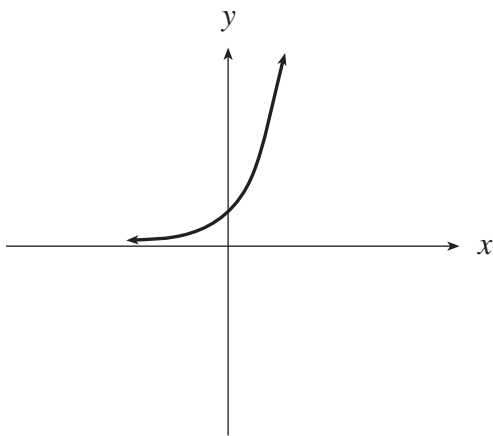
A.



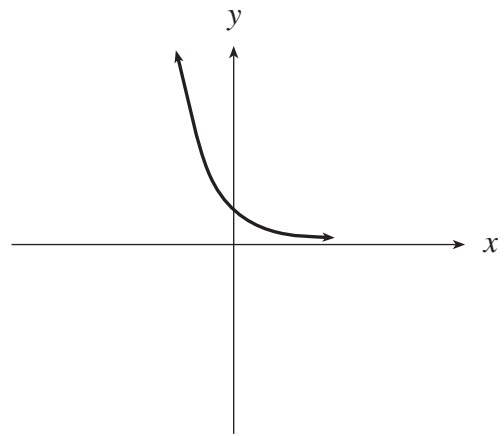
B.



C.



D.



19. Solve for  $x$ :  $2x^3 - x^2 = 8x - 4$

A. 0.5

B. -2, 2

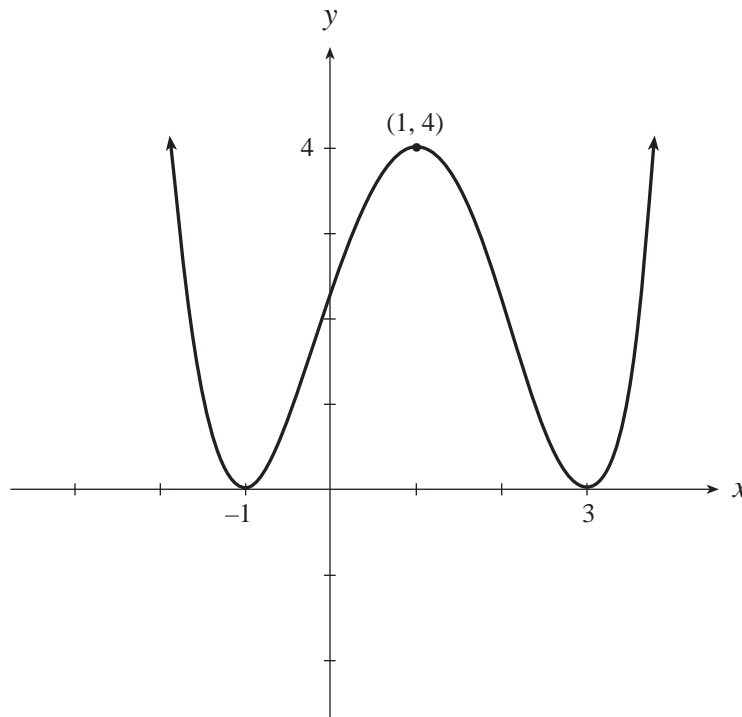
C. -2, 0, 2

D. -2, 0.5, 2

20. A certain antibiotic reduces the number of bacteria in your system by 10% each day. If  $P =$  present level,  $P_0 =$  original level and  $t =$  time in days, which equation determines the present level of bacteria?

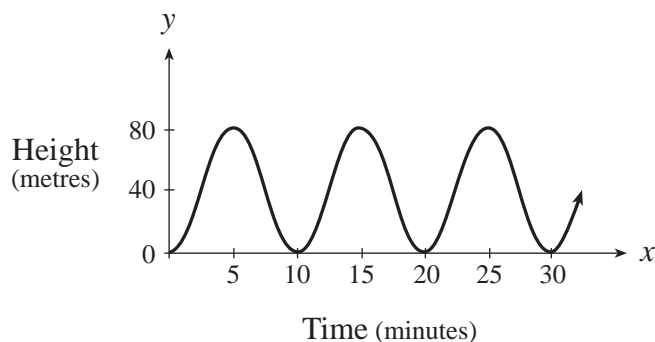
- A.  $P = P_0 - 0.1t$
- B.  $P = P_0(0.9t)$
- C.  $P = P_0(0.1)^t$
- D.  $P = P_0(0.9)^t$

21. Given the graph of  $y = f(x)$ , how many **positive**  $x$ -intercepts would the function  $y = f(x - 1) - 2$  have?



- A. 0
- B. 2
- C. 3
- D. 4

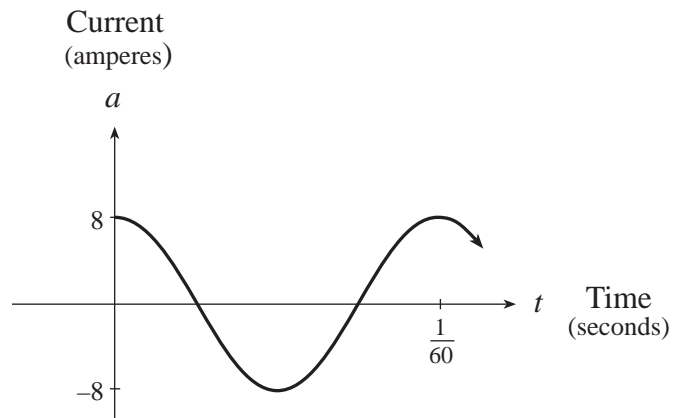
Use the following graph to answer questions 22 and 23.



22. What is the period of the graph?
- A. 10 minutes
  - B. 15 minutes
  - C. 40 metres
  - D. 80 metres
23. What is the amplitude of the graph?
- A. 5 minutes
  - B. 10 minutes
  - C. 40 metres
  - D. 80 metres
24. The volume  $V$  of air in the lungs during deep breathing can be expressed as a sinusoidal function with respect to time  $t$ . If one complete breath takes 10 seconds, and the volume of air in the lungs varies from 1 000 mL to 5 000 mL, which of the following equations **best** models this situation?
- A.  $V = 3\,000 \sin\left(\frac{\pi}{5}t\right) + 2\,000$
  - B.  $V = 2\,000 \sin\left(\frac{\pi}{10}t\right) + 3\,000$
  - C.  $V = 2\,000 \sin\left(\frac{\pi}{5}t\right) + 3\,000$
  - D.  $V = 4\,000 \sin\left(\frac{\pi}{5}t\right) + 3\,000$

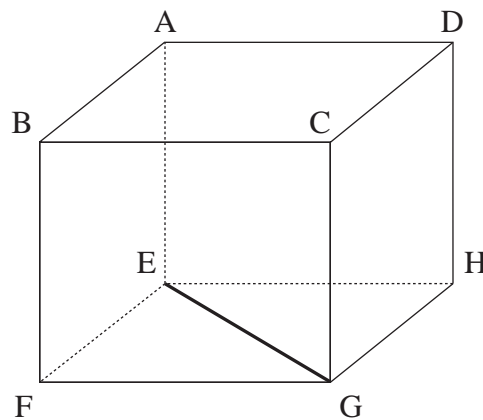


25. The sinusoidal graph below shows how the alternating electric current supplied to our houses varies over time. The period of one cycle is  $\frac{1}{60}$  s.



If the current is at its maximum of 8.0 amperes at time  $t = 0$  seconds, what would the current be at  $t = 2.01$  s?

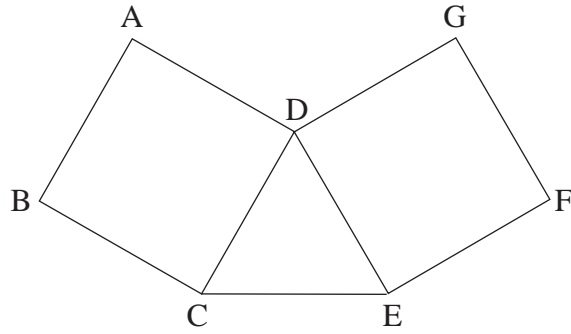
- A. -6.50 amperes
  - B. -6.47 amperes
  - C. -4.70 amperes
  - D. -2.47 amperes
26. In the right rectangular prism shown,  $AB = 3$ cm,  $AD = 4$ cm, and  $DH = 4$ cm.



What is the length of  $EG$  in centimetres?

- A. 5
- B. 7
- C.  $\sqrt{7}$
- D.  $\sqrt{41}$

27. A backyard patio is designed as shown in the diagram.



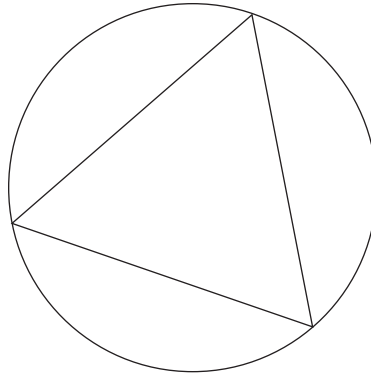
If  $\angle DCE = 70^\circ$  and ABCD and DEFG are equal squares, find the measure of the obtuse angle,  $\angle ADG$ .

- A.  $130^\circ$
- B.  $140^\circ$
- C.  $150^\circ$
- D.  $160^\circ$

28. Which statement describes the ratio of the circumference of a circle to its radius?

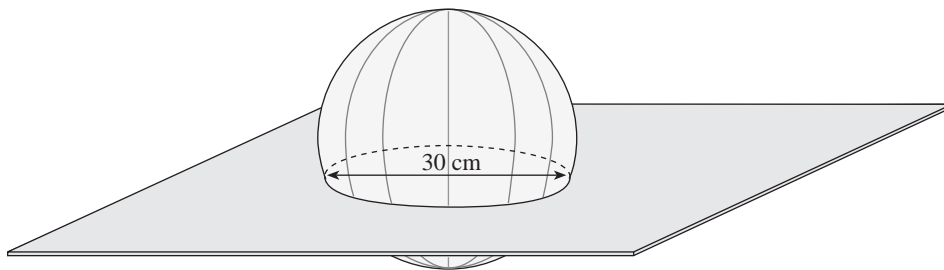
- A.  $1:\pi$
- B.  $\pi:1$
- C.  $1:2\pi$
- D.  $2\pi:1$

29. An equilateral triangle is inscribed in a circle of radius 2.0 m. Find the length of a side of the triangle, accurate to the nearest tenth of a metre.



- A. 2.0
- B. 3.0
- C. 3.3
- D. 3.5

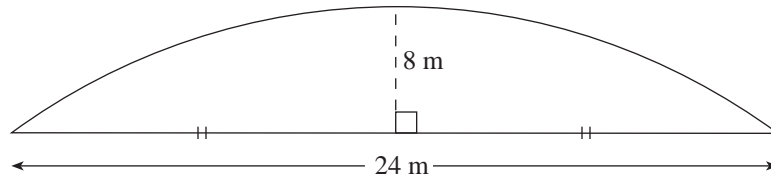
30. A circular hole 30 cm in diameter is cut in a sheet of plywood as shown in the diagram. A sphere with radius 17 cm is set in the hole.



How far below the top surface of the plywood will the sphere extend?

- A. 6 cm
- B. 7 cm
- C. 8 cm
- D. 9 cm

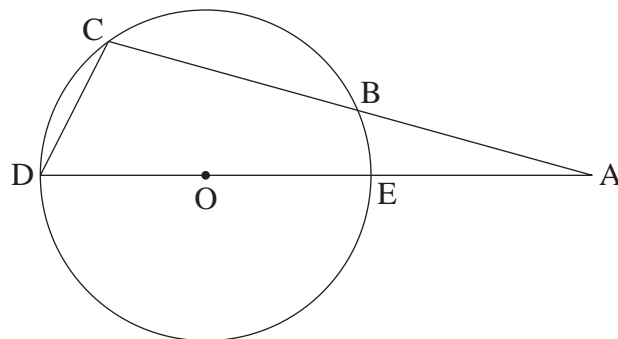
31. A flower garden is constructed in the shape of a segment of a circle as shown in the diagram.



What is the radius of the circle used to construct the garden?

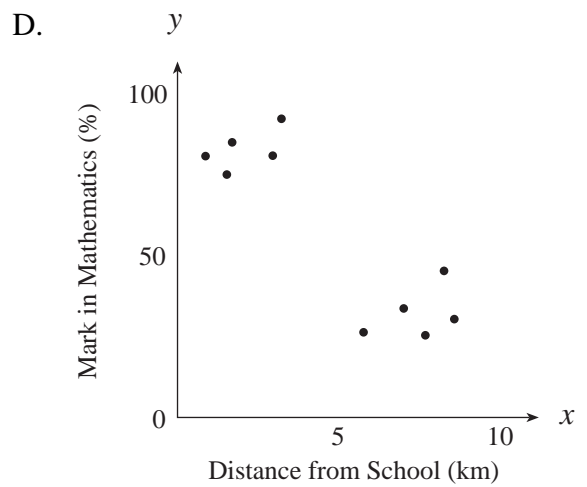
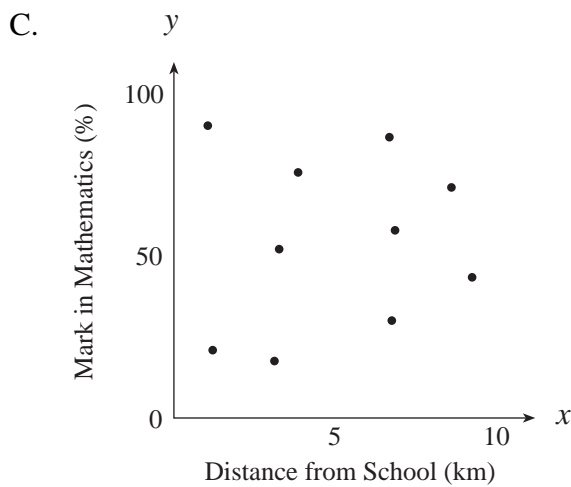
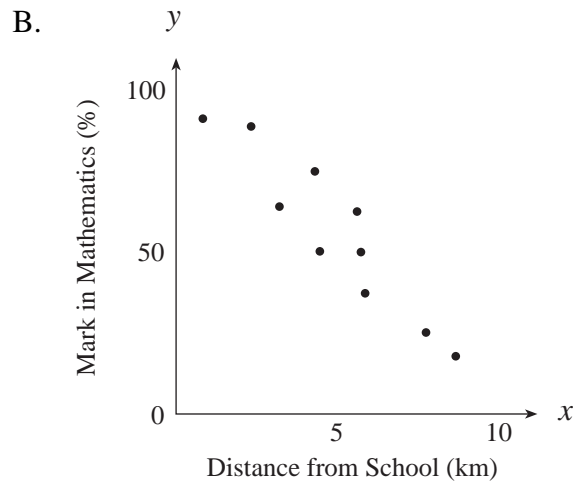
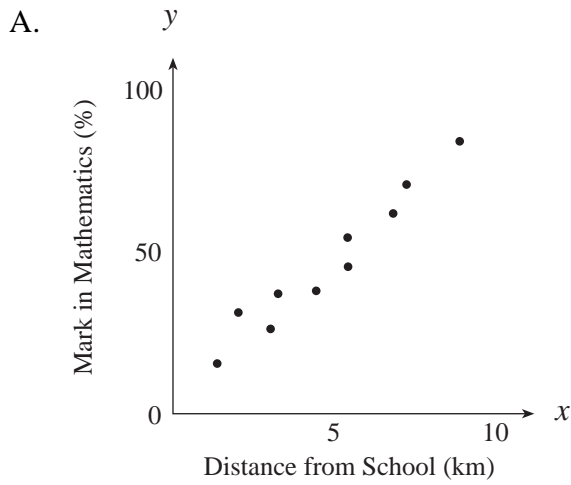
- A. 12.0 m
- B. 13.0 m
- C. 14.4 m
- D. 17.0 m

32. Given the diagram with  $\angle CAD = 20^\circ$ ,  $AB = 5$  cm and  $DO = 5$  cm, find  $\angle DCB$ .



- A.  $80^\circ$
- B.  $90^\circ$
- C.  $100^\circ$
- D.  $110^\circ$

33. Which of the following scatter plots **best** illustrates the relationship between the distance a person lives from school and their % mark in mathematics?



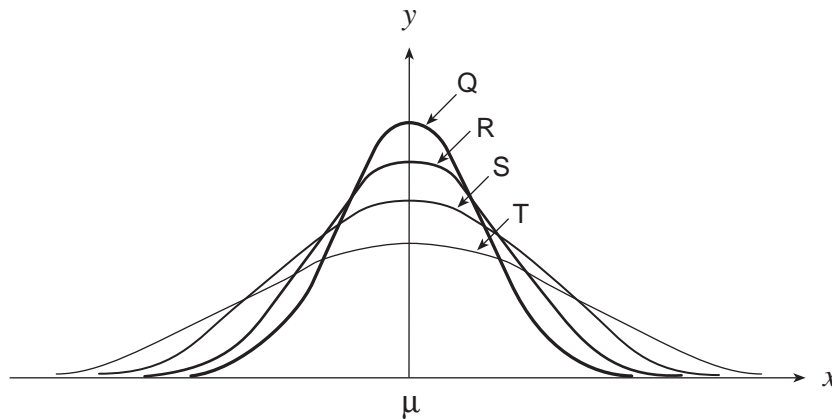
34. A high school math teacher compared his students' final grades for a first year math course at BCIT with their SMS (Standard Ministry Score) for their Applications of Mathematics 12 Provincial Examination.

Final Grade at BCIT	SMS
68	440
88	560
93	720
83	520
75	480

Using this data, determine the correlation coefficient.

- A. 0.816
- B. 0.904
- C. 0.945
- D. 0.972

Use the following graph to answer question 35.



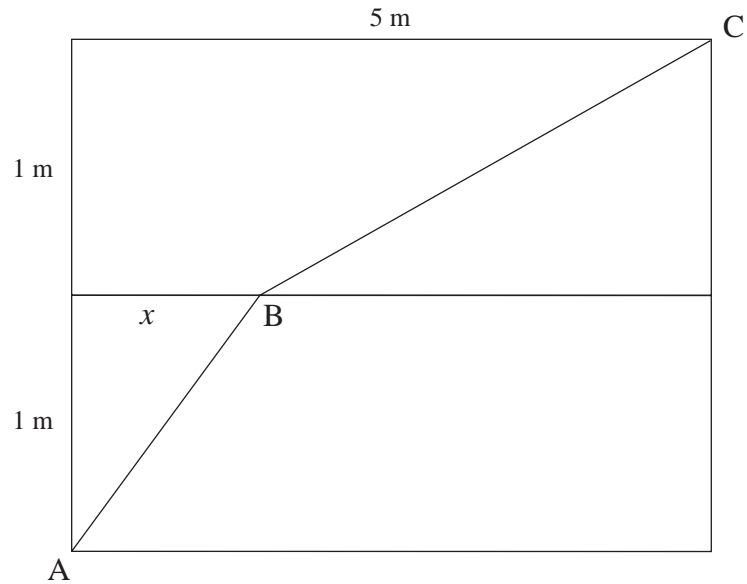
35. Which of the standard normal curves above has the **largest** standard deviation?
- A. Q
  - B. R
  - C. S
  - D. T

36. A factory produces spools of fishing line. The length of line on a spool is normally distributed, with a mean of 94.49 m and a standard deviation of 0.23 m. Calculate the  $z$ -score for a spool containing 94.00 m of line.
- A.  $-2.13$
  - B.  $-0.48$
  - C.  $0.48$
  - D.  $2.13$
37. A certain type of seed has a 75% germination rate. If the seeds are planted in rows of 20, find the standard deviation for the number of seeds that germinate in each row.
- A. 1.82
  - B. 1.94
  - C. 3.87
  - D. 15.00
38. Forty percent of the voters of a region are Liberals. If five voters are selected at random, determine the probability that all five are Liberals.
- A. 1%
  - B. 2%
  - C. 5%
  - D. 8%
39. Two coins lie on a table, each showing heads. One is a fair coin, the other has heads on both sides. You are to select one of the coins and then flip it 3 times. What is the probability that you will flip 3 heads in a row?
- A.  $\frac{1}{2}$
  - B.  $\frac{9}{16}$
  - C.  $\frac{5}{8}$
  - D.  $\frac{3}{4}$

40. A store takes a random sample of the prices for 64 ski outfits. The sample mean and standard deviation are \$850 and \$200, respectively. Find a 95% confidence interval for  $\mu$ , the mean price of all ski outfits.
- A.  $801 < \mu < 899$
  - B.  $825 < \mu < 875$
  - C.  $843.9 < \mu < 856.1$
  - D.  $846.5 < \mu < 853.5$
41. If a set of normally distributed examination scores has a mean of 75 and a standard deviation of 15, what mark would denote the 70<sup>th</sup> percentile (i.e. 70% of the scores are less than or equal to this score)?
- A. 52
  - B. 53
  - C. 81
  - D. 83
42. A disk jockey must alternate vocal selections with instrumental selections. She has five vocal and four instrumental selections. How many different play sequences are possible if none of the selections is repeated?
- A. 144
  - B. 2 880
  - C. 181 440
  - D. 362 880



43. Two adjacent rectangles have a common side as shown in the diagram.

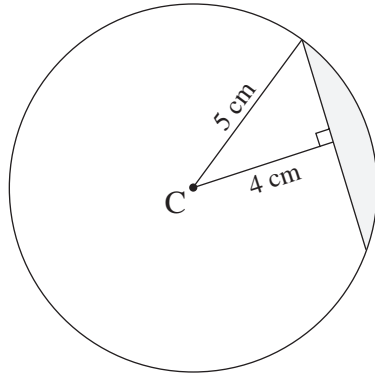


Determine an expression for the length of the segment BC.

- A.  $\sqrt{5^2 + x^2}$   
B.  $\sqrt{(5-x)^2 + x^2}$   
C.  $\sqrt{(5-x)^2 + 1}$   
D.  $\sqrt{(x-5)^2 - 1}$
44. Simplify the following:  $\frac{(n-1)! - (n-2)!}{(n-1)!}$

- A.  $\frac{-3}{n-1}$   
B.  $\frac{1}{n-1}$   
C.  $\frac{n}{n-1}$   
D.  $\frac{n-2}{n-1}$

45. Given the following circle with centre C, find the area of the shaded region.



- A.  $2.04 \text{ cm}^2$
- B.  $4.09 \text{ cm}^2$
- C.  $4.20 \text{ cm}^2$
- D.  $6.08 \text{ cm}^2$

**This is the end of the multiple-choice section.  
Answer the remaining questions directly in this examination booklet.**

## PART B: WRITTEN RESPONSE

Value: 25 marks

Suggested Time: 45 minutes

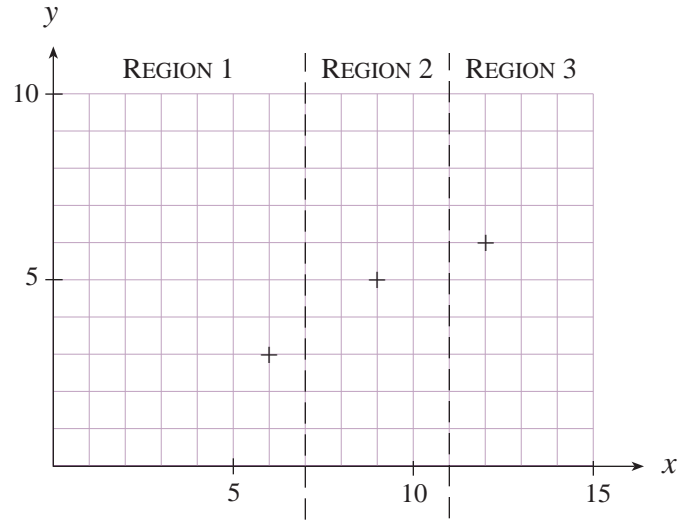
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When using the calculator, you should provide a decimal answer that is correct to **at least two decimal places** (unless otherwise indicated). Such rounding should occur **only** in the final step of the solution.

**Full marks will NOT be given for the final answer only.**

Use the following graph to answer question 1.



1. In order to find the line of best fit for a set of data, the following three summary points were determined to represent the data set:

$$\begin{array}{ccc} (6, 3) & (9, 5) & (12, 6) \\ \text{Region 1} & \text{Region 2} & \text{Region 3} \end{array}, \text{ and}$$

Find the equation of the median-median line.

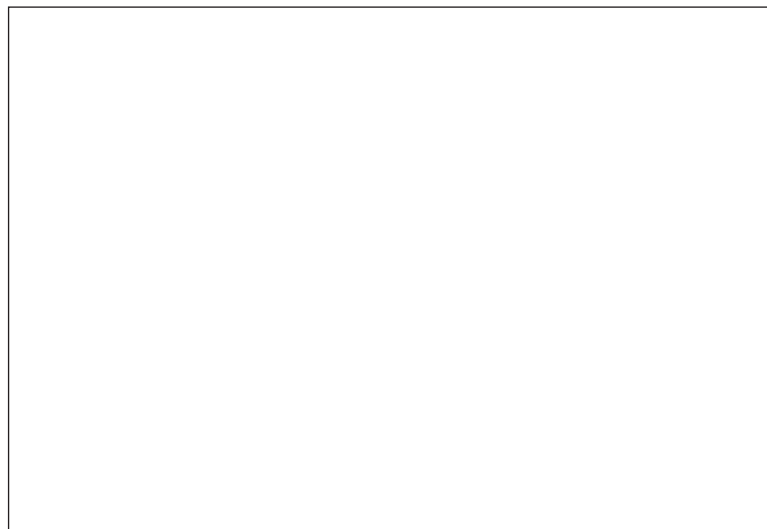
**(2 marks)**

ANSWER:

2. Determine  $x$  such that  $10^x = 400$ . (Accurate to 4 decimal places.)

**(2 marks)**

If a graph is used, sketch the graph, indicate appropriate window dimensions and explain clearly how your solution is derived from the graph.

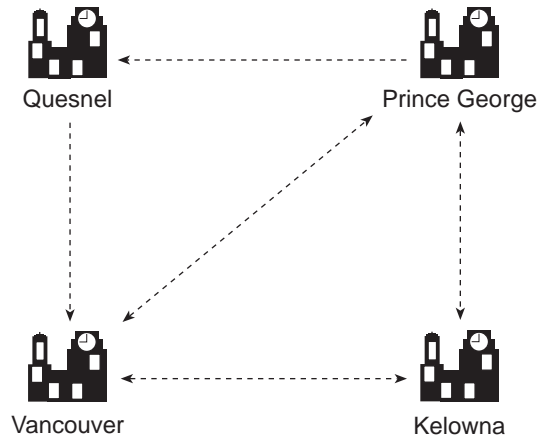


[  $x_{\min}$  ,  $x_{\max}$  ]                      [  $y_{\min}$  ,  $y_{\max}$  ]

ANSWER:

**OVER**

Use the following diagram to answer question 3.



3. The diagram above illustrates direct flights, between four cities, offered by a certain airline. Complete the following network matrix and determine all situations where a traveller can go from one city to a different city having exactly two routes with one stopover on each route.

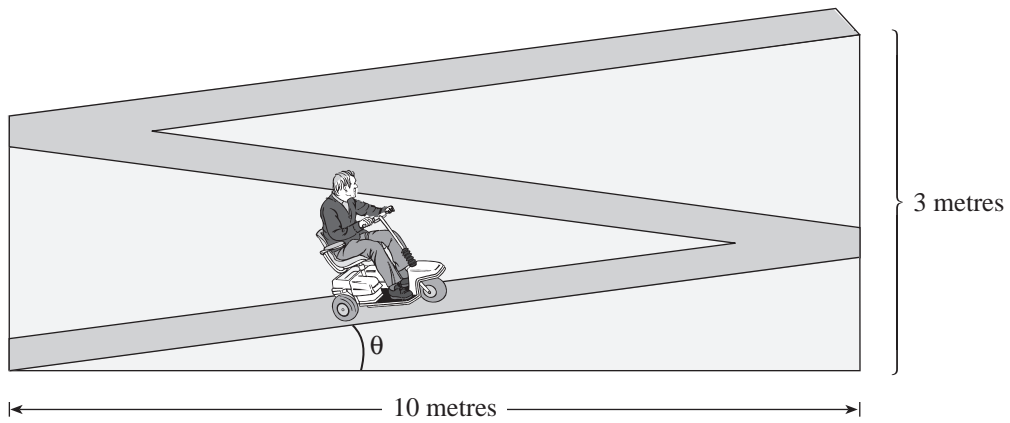
(3 marks)

		To			
		V	Q	K	P
From	V				
	Q				
	K				
	P				



ANSWER:

4. A wheelchair ramp is to be constructed in three sections, with a uniform rise throughout, as shown in the diagram. Over its entire distance, the ramp must rise 3 m. The horizontal distance covered is 10 m.



- a) At what angle,  $\theta$ , must the ramp be constructed from the horizontal? (Accurate to the nearest tenth of a degree.) **(1 mark)**

ANSWER:

- b) If the cost of constructing the ramp is \$400 per lineal metre, determine the cost of the ramp to the nearest dollar. **(2 marks)**

ANSWER:

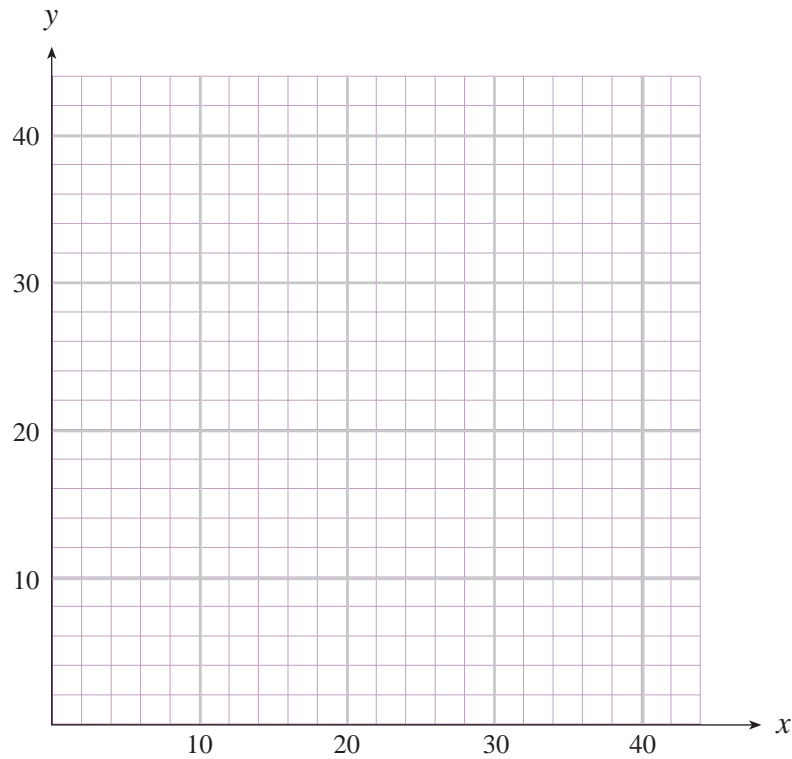
**OVER**

5. How much should a parent invest now, at 8% compounded quarterly, to accumulate \$24 000 in 18 years, for their child's post-secondary education? **(3 marks)**

ANSWER:

6. An engineering firm is hiring  $x$  engineers at \$50 000 per year and  $y$  assistants at \$30 000 per year. The budget for these salaries is \$1 200 000 per year. There must be at least 12 engineers and at least one assistant for each engineer.

a) Determine a system of inequalities that must be satisfied by the numbers of engineers and assistants and plot these inequalities on the grid provided. **(3 marks)**



b) Determine the maximum number of engineers that can be hired.

**(1 mark)**

ANSWER:

**OVER**

7. Statistics Canada lists the value of RRSP holdings by Canadians (in millions of dollars) for various years as shown in the table below.

YEAR	MILLIONS OF \$
1970	187
1980	3 355
1985	7 769
1990	13 645
1994	16 072

- a) Determine the least squares linear regression line for this data.

**(1 mark)**

ANSWER:



b) Calculate the projected value of RRSP holdings by Canadians in the year 2000. (1 mark)

ANSWER:

**OVER**

8. The number of salmon  $n$  caught in a stream over the past 15 years is as follows:

NUMBER CAUGHT ( $n$ )	YEARS
$500 \leq n < 1\,500$	4
$1\,500 \leq n < 2\,500$	8
$2\,500 \leq n < 3\,500$	2
$3\,500 \leq n < 4\,500$	1

a) What is the mean of the number of salmon caught?

**(2 marks)**

ANSWER:

b) What is the standard deviation of the number of salmon caught?

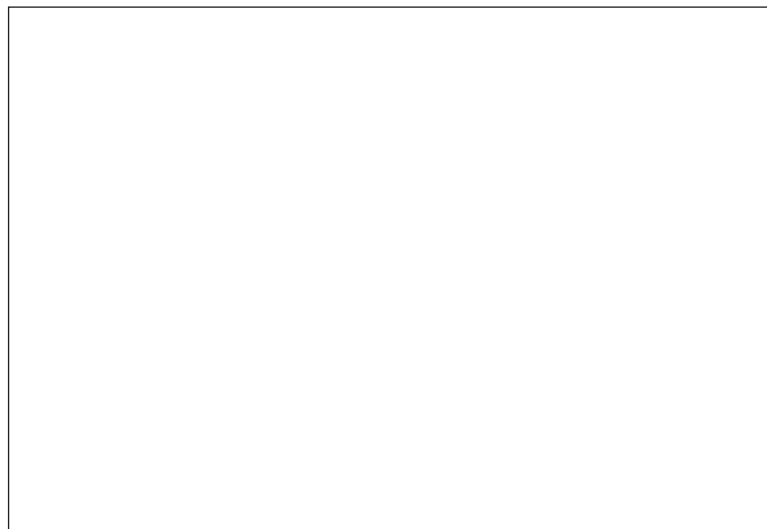
**(1 mark)**

ANSWER:

**OVER**

9. The revenue  $R$  received by a company selling calculators is given by  $R = xp$ , where  $x$  is the number of calculators sold at price  $p$  in dollars. If  $x = 4\,000 - 25p$ , find the price  $p$  that would generate the maximum revenue. **(3 marks)**

If a graph is used, sketch the graph, indicate appropriate window dimensions and explain clearly how your solution is derived from the graph.



[            ,            ]  
           $x$              $x$   
          min            max

[            ,            ]  
           $y$              $y$   
          min            max

ANSWER:

**END OF EXAMINATION**

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## FORMULAE

### Geometry:

Triangle: 
$$\begin{aligned} \text{Area} &= \frac{1}{2}bh \\ &= \frac{1}{2}ab \sin C \\ &= \frac{1}{2} \frac{a^2 \sin B \sin C}{\sin A} \\ &= \sqrt{s(s-a)(s-b)(s-c)} \\ &\text{where } s = \frac{a+b+c}{2} \end{aligned}$$

Circle:  $A = \pi r^2, C = 2\pi r = \pi d$

Sphere:  $A = 4\pi r^2, V = \frac{4}{3}\pi r^3$

Cylinder:  $A = 2\pi r^2 + 2\pi rh, V = \pi r^2 h$

Cone:  $A = \pi rs + \pi r^2, V = \frac{1}{3}\pi r^2 h$

Volume of pyramid:  $V = \frac{1}{3}A_b h$

Volume of prism:  $V = A_b h$

### Interest:

$$A = P\left(1 + \frac{r}{n}\right)^{nt}$$

$$I = Prt$$

### Miscellaneous:

$$a^2 = b^2 + c^2 - 2bc \cos A$$

$$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$$

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$S_\infty = \frac{a}{1-r}$$

### Probability and Statistics:

$${}_n P_r = P(n, r) = \frac{n!}{(n-r)!}$$

$${}_n C_r = C(n, r) = \binom{n}{r} = \frac{n!}{r!(n-r)!}$$

$$\bar{x} = \frac{1}{n} \sum (f_i)(x_i)$$

$$\sigma = \sqrt{\frac{1}{n} \sum (x_i - \bar{x})^2} = \sqrt{\frac{1}{n} \sum x_i^2 - \bar{x}^2}$$

$$\mu = np$$

$$\sigma = \sqrt{npq}$$

$$b(n, r; p) = \binom{n}{r} p^r q^{n-r}$$

$$z = \frac{x - \bar{x}}{\sigma}$$

$$\bar{x} - z_{\alpha/2} \frac{\sigma}{\sqrt{n}} < \mu < \bar{x} + z_{\alpha/2} \frac{\sigma}{\sqrt{n}}$$

$$E(x) = x_1 p_1 + x_2 p_2 + \dots + x_n p_n$$

$$P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

$$r = \frac{n \sum xy - (\sum x)(\sum y)}{\left(\sqrt{n(\sum x^2) - (\sum x)^2}\right) \left(\sqrt{n(\sum y^2) - (\sum y)^2}\right)}$$

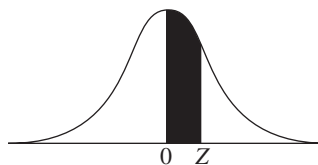
**Note:** Graphing calculators will contain many of these formulae as pre-programmed functions.

**You may detach this page for convenient reference.  
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# TABLE OF Z-SCORES

## Z = Z-Score

An entry in the table is the area under the curve between  $Z = 0$  and a positive value of  $Z$ . Areas for negative values of  $Z$  are obtained by symmetry.

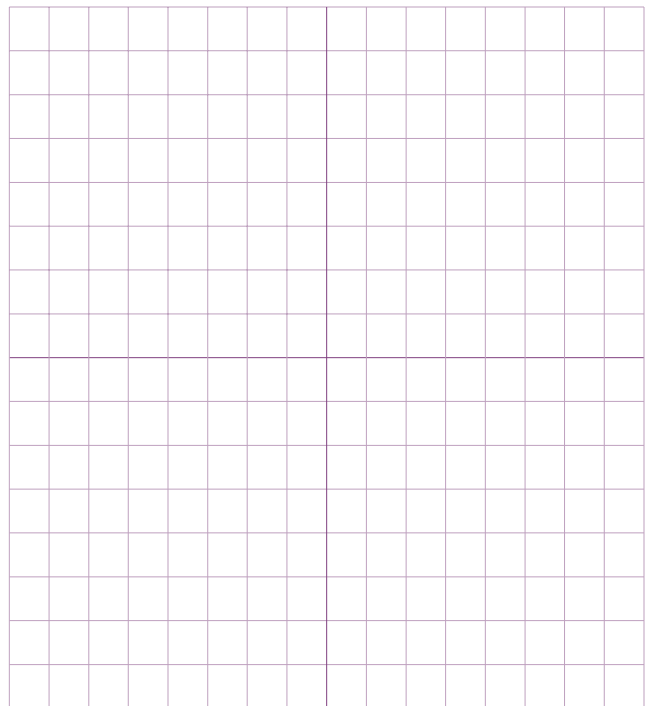
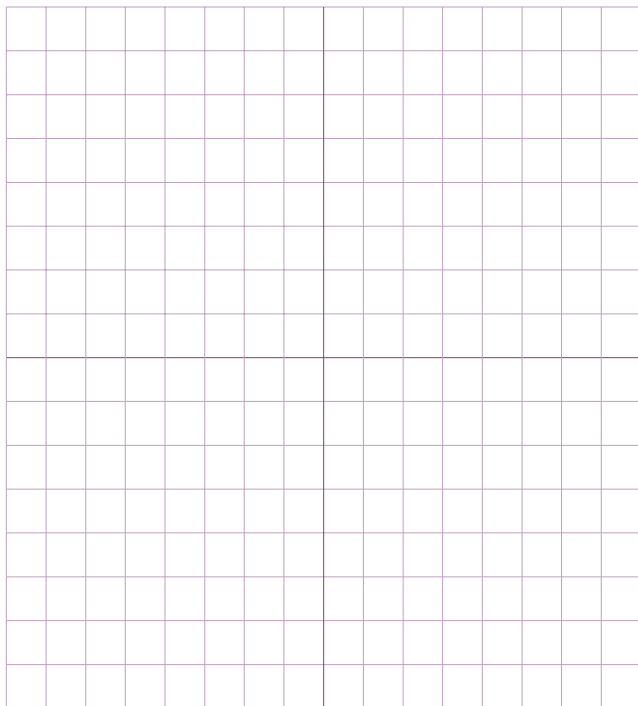
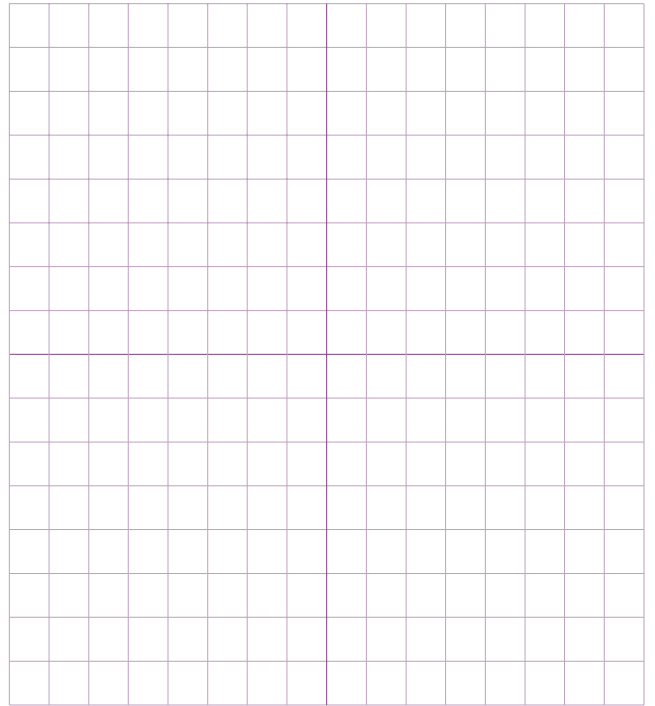
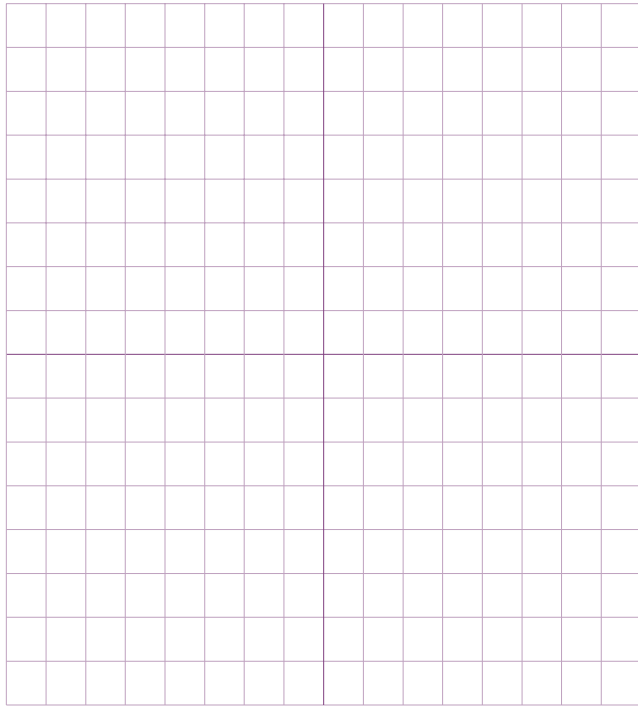


Z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0.0000	0.0040	0.0080	0.0120	0.0160	0.0199	0.0239	0.0279	0.0319	0.0359
0.1	0.0398	0.0438	0.0478	0.0517	0.0557	0.0596	0.0636	0.0675	0.0714	0.0753
0.2	0.0793	0.0832	0.0871	0.0910	0.0948	0.0987	0.1026	0.1064	0.1103	0.1141
0.3	0.1179	0.1217	0.1255	0.1293	0.1331	0.1368	0.1406	0.1433	0.1480	0.1517
0.4	0.1554	0.1591	0.1628	0.1664	0.1700	0.1736	0.1772	0.1808	0.1844	0.1879
0.5	0.1915	0.1950	0.1985	0.2019	0.2054	0.2088	0.2123	0.2157	0.2190	0.2224
0.6	0.2257	0.2291	0.2324	0.2357	0.2389	0.2422	0.2454	0.2486	0.2517	0.2549
0.7	0.2580	0.2611	0.2642	0.2673	0.2703	0.2734	0.2764	0.2794	0.2823	0.2852
0.8	0.2881	0.2910	0.2939	0.2967	0.2995	0.3023	0.3051	0.3078	0.3106	0.3133
0.9	0.3159	0.3186	0.3212	0.3238	0.3264	0.3289	0.3315	0.3340	0.3365	0.3389
1.0	0.3413	0.3438	0.3461	0.3485	0.3508	0.3531	0.3554	0.3577	0.3599	0.3621
1.1	0.3642	0.3665	0.3686	0.3708	0.3729	0.3749	0.3770	0.3790	0.3810	0.3830
1.2	0.3849	0.3869	0.3888	0.3907	0.3925	0.3944	0.3962	0.3980	0.3997	0.4015
1.3	0.4032	0.4049	0.4066	0.4082	0.4099	0.4115	0.4131	0.4147	0.4162	0.4177
1.4	0.4192	0.4207	0.4222	0.4236	0.4251	0.4265	0.4279	0.4292	0.4306	0.4319
1.5	0.4332	0.4345	0.4357	0.4370	0.4382	0.4394	0.4406	0.4418	0.4429	0.4441
1.6	0.4452	0.4463	0.4474	0.4484	0.4495	0.4505	0.4515	0.4525	0.4535	0.4545
1.7	0.4554	0.4564	0.4573	0.4582	0.4591	0.4599	0.4608	0.4616	0.4625	0.4633
1.8	0.4641	0.4649	0.4656	0.4664	0.4671	0.4678	0.4686	0.4693	0.4699	0.4706
1.9	0.4713	0.4719	0.4726	0.4732	0.4738	0.4744	0.4750	0.4756	0.4761	0.4767
2.0	0.4772	0.4778	0.4783	0.4788	0.4793	0.4798	0.4803	0.4808	0.4812	0.4817
2.1	0.4821	0.4826	0.4830	0.4834	0.4838	0.4842	0.4846	0.4850	0.4854	0.4857
2.2	0.4861	0.4864	0.4868	0.4871	0.4875	0.4878	0.4881	0.4884	0.4887	0.4890
2.3	0.4893	0.4896	0.4898	0.4901	0.4904	0.4906	0.4909	0.4911	0.4913	0.4916
2.4	0.4918	0.4920	0.4922	0.4925	0.4927	0.4929	0.4931	0.4932	0.4934	0.4936
2.5	0.4938	0.4940	0.4941	0.4943	0.4945	0.4946	0.4948	0.4949	0.4951	0.4952
2.6	0.4953	0.4955	0.4956	0.4957	0.4959	0.4960	0.4961	0.4962	0.4963	0.4964
2.7	0.4965	0.4966	0.4967	0.4968	0.4969	0.4970	0.4971	0.4972	0.4973	0.4974
2.8	0.4974	0.4975	0.4976	0.4977	0.4977	0.4978	0.4979	0.4979	0.4980	0.4981
2.9	0.4981	0.4982	0.4982	0.4983	0.4984	0.4984	0.4985	0.4985	0.4986	0.4986
3.0	0.4987	0.4987	0.4987	0.4988	0.4988	0.4989	0.4989	0.4989	0.4990	0.4990



**ROUGH WORK FOR GRAPHING**

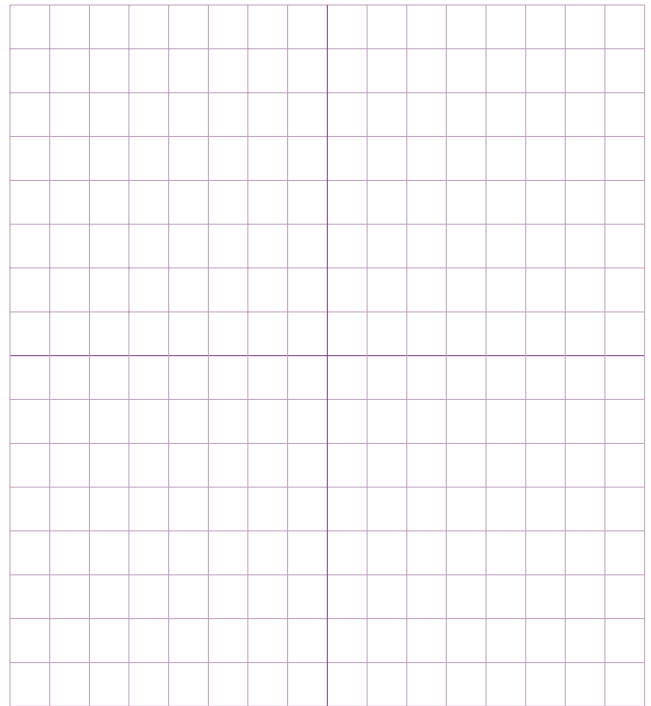
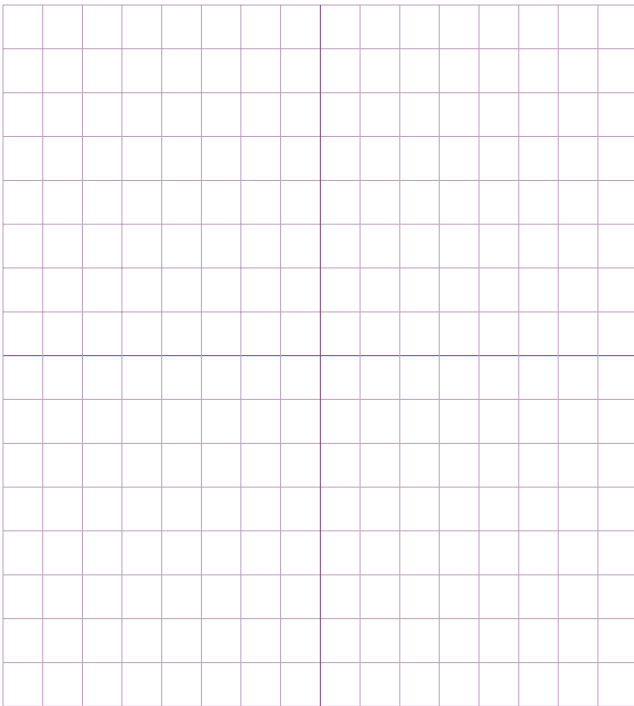
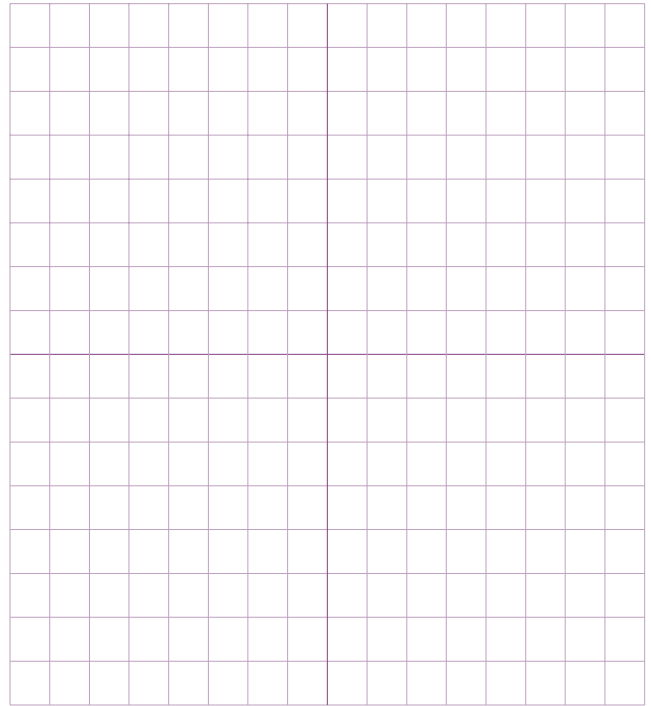
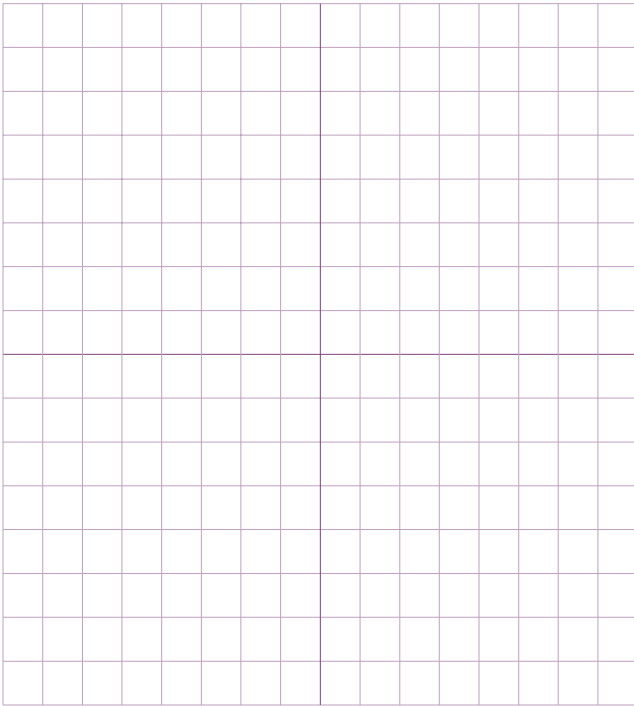
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# ROUGH WORK FOR GRAPHING

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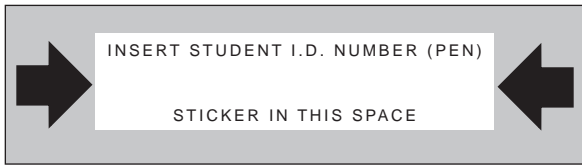


**ROUGH WORK FOR MULTIPLE-CHOICE**

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## ROUGH WORK FOR MULTIPLE-CHOICE





# **APPLICATIONS OF MATHEMATICS 12**

**June 1998**

Course Code = AMA

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**APPLICATIONS OF  
MATHEMATICS 12**

**June 1998**

Course Code = AMA

Score for  
Question 1:

1.  $\frac{\quad}{(2)}$

Score for  
Question 6b:

8.  $\frac{\quad}{(1)}$

Score for  
Question 2:

2.  $\frac{\quad}{(2)}$

Score for  
Question 7a:

9.  $\frac{\quad}{(1)}$

Score for  
Question 3:

3.  $\frac{\quad}{(3)}$

Score for  
Question 7b:

10.  $\frac{\quad}{(1)}$

Score for  
Question 4a:

4.  $\frac{\quad}{(1)}$

Score for  
Question 8a:

11.  $\frac{\quad}{(2)}$

Score for  
Question 4b:

5.  $\frac{\quad}{(2)}$

Score for  
Question 8b:

12.  $\frac{\quad}{(1)}$

Score for  
Question 5:

6.  $\frac{\quad}{(3)}$

Score for  
Question 9:

13.  $\frac{\quad}{(3)}$

Score for  
Question 6a:

7.  $\frac{\quad}{(3)}$