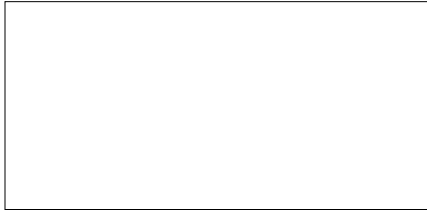
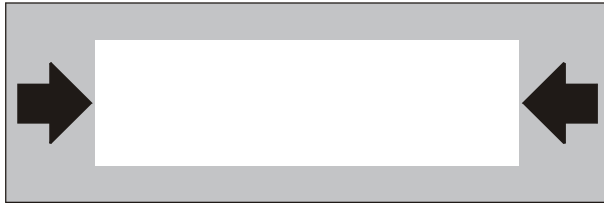


MINISTRY USE ONLY



Place Personal Education Number (PEN) here.



**Applications  
of Mathematics 12**

**AUGUST 2005**

**Course Code = AMA**



**Applications  
of Mathematics 12**

**AUGUST 2005**

**Course Code = AMA**

**BRITISH  
COLUMBIA**

### **Student Instructions**

1. Place the stickers with your Personal Education Number (PEN) in the allotted spaces above. **Under no circumstance is your name or identification, other than your Personal Education 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. 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**

.
5. 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.

MINISTRY USE ONLY

Place Personal Education Number (PEN) here.

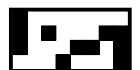


# Applications of Mathematics 12

**AUGUST 2005**

**Course Code = AMA**

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## GENERAL INSTRUCTIONS

1. Aside from an approved calculator, electronic devices, including dictionaries and pagers, are **not** permitted in the examination room.
2. 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.
3. For each of the written-response questions, write your answer in the space provided in this booklet.

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.

4. Ensure that you use language and content appropriate to the purpose and audience of this examination. Failure to comply may result in your paper being awarded a zero.
5. This examination is designed to be completed in **two hours**. *Students may, however, take up to 30 minutes of additional time to finish.*

## AUGUST 2005 APPLICATIONS OF MATHEMATICS 12 PROVINCIAL EXAMINATION

- |   | Value         | Suggested Time     |
|---|---------------|--------------------|
| 1. This examination consists of <b>two</b> parts: |               |                    |
| PART A: 40 multiple-choice questions              | 60            | 75                 |
| PART B: 18 written-response questions             | 30            | 45                 |
|   | <b>Total:</b> | <b>90 marks</b>    |
|   |               | <b>120 minutes</b> |
2. The last **four** pages inside the back cover contain **Formulae, The Standard Normal Distribution Table, Rough Work for Graphing, and Rough Work for Multiple-Choice**. These pages may be detached for convenient reference prior to writing this examination.
3. **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, for graphing functions and for performing statistical tests. Computers, calculators with a QWERTY keyboard or symbolic manipulation abilities, such as the Computer Algebraic System (CAS) and electronic writing pads will not be allowed. Students must not bring any external devices (peripherals) to support calculators such as manuals, printed or electronic cards, printers, memory expansion chips or cards, CD-ROMs, libraries or external keyboards. Students may have more than one calculator available during the examination. Calculators may not be shared and must not have the ability to either transmit or receive electronic signals. In addition to an approved calculator, students will be allowed to use rulers, compasses, and protractors during the examination.
- Calculators must not have any information programmed into the memory which would not be acceptable in paper form.* Specifically, calculators must not have any built-in notes, definitions, or libraries. There is no requirement to clear memories at the beginning of the examination but the use of calculators with built-in notes is equivalent to the use of notes in paper form. Any student deemed to have cheated on a provincial examination will receive a “0” on that examination and will be permanently disqualified from the Provincial Examination Scholarship Program.
4. 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.
5. 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.

**PART A: MULTIPLE CHOICE**

**Value: 60 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. Matrix  $A$  has dimension  $2 \times 3$  and matrix  $B$  has dimension  $3 \times 2$ . Determine the dimension of the product matrix  $AB$ .

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

2. What is the value of  $x$  if  $\begin{bmatrix} p & x \\ r & y \end{bmatrix} = -3 \begin{bmatrix} 4 & -2 \\ 5 & 8 \end{bmatrix}$ ?

- A.  $-6$
- B.  $-2$
- C.  $5$
- D.  $6$

3. What is  $(2R)^3$  if  $R = \begin{bmatrix} 2 & 0 \\ -1 & 1 \end{bmatrix}$ ?

A.  $\begin{bmatrix} 16 & -14 \\ 0 & 2 \end{bmatrix}$

B.  $\begin{bmatrix} 16 & 0 \\ -14 & 2 \end{bmatrix}$

C.  $\begin{bmatrix} 64 & -56 \\ 0 & 8 \end{bmatrix}$

D.  $\begin{bmatrix} 64 & 0 \\ -56 & 8 \end{bmatrix}$

4. Matrix  $M$  below shows the movie admissions at the Galaxy Cinema on a certain Saturday. The theatre charges \$4.50 for children, \$9 for adults and \$5 for students.

	Children	Adults	Students
$M =$ Lord of the Rings	42	68	81
Finding Nemo	65	27	42
The English Patient	0	75	21

Which of the matrix products calculates the total income for each movie?

- A.  $[4.50 \ 9 \ 5] \times M$                       B.  $M \times \begin{bmatrix} 4.50 \\ 9 \\ 5 \end{bmatrix}$
- C.  $\begin{bmatrix} 4.50 \\ 9 \\ 5 \end{bmatrix} \times M$                       D.  $M \times [4.50 \ 9 \ 5]$

5. Given  $A = \begin{bmatrix} 2 & -3 & 4 \\ -1 & 0 & 2 \end{bmatrix} \begin{bmatrix} 2 & -1 & 3 \\ 2 & 1 & -1 \\ 4 & -2 & 5 \end{bmatrix}$ , determine the value of  $a_{23}$  of the product matrix.

- A. -13  
 B. -7  
 C. -3  
 D. 7

6. If Trish passes her math test, the probability that she will pass her next one is 95%. If she fails her math test, the probability that she will pass the next one is 85%. If the probability that she will pass her first test is 90%, what is the probability that Trish will pass her fourth test?

- A. 69.26%  
 B. 77.16%  
 C. 81.14%  
 D. 94.44%

7. What value will appear in cell A4 in the spreadsheet below?

	A	B	C
1	Jan	Feb	Total
2			
3	10	12	=A3+B3
4	=C3*4		
5			

- A. 22
  - B. 26
  - C. 48
  - D. 88
8. A farmer buys a tractor for \$60 000. If this tractor depreciates at a rate of 8% per year, how much will it be worth after 6 years? Answer to the nearest \$100.
- A. \$31 200
  - B. \$33 500
  - C. \$36 400
  - D. \$39 500
9. Bill puts \$500 into an account at the beginning of every three months. If the account earns 4% per annum, compounded monthly, how much will he have after 8 years?
- A. \$18 886.91
  - B. \$18 934.50
  - C. \$18 945.36
  - D. \$19 633.56
10. Justin wants to buy a motorcycle valued at \$14 000 by making monthly payments over a 4-year period. If the interest rate is 6.8% per year, compounded monthly, what is the total amount of interest that he will pay on this loan?
- A. \$2029.60
  - B. \$2458.24
  - C. \$3808.00
  - D. \$3928.95

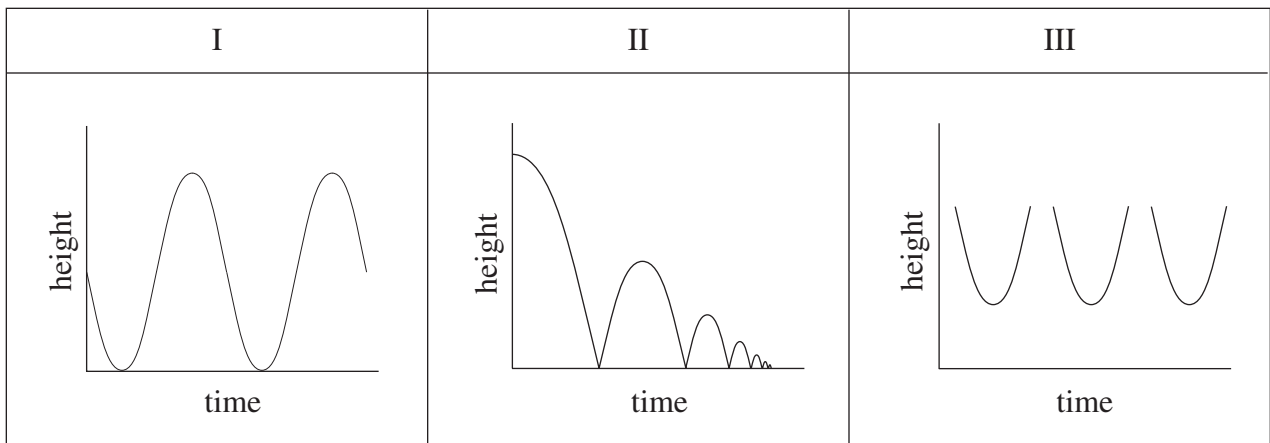
11. Determine the number of years it would take to save \$10 000 by depositing \$100 per month into an account which earns interest at a rate of 6% per annum, compounded semi-annually. Answer to the nearest year.

- A. 7
- B. 8
- C. 11
- D. 81

12. Brad has decided to purchase a condominium provided that his total payments (mortgage plus property taxes) do not exceed \$900 per month. If his property taxes would be \$130 per month, what is the maximum value of a mortgage he can afford given that the mortgage rates are 4.5% per annum, compounded semi-annually, over 25 years? Answer to the nearest \$1000.

- A. \$132 000
- B. \$139 000
- C. \$163 000
- D. \$186 000

13. Identify the periodic graph(s) below.

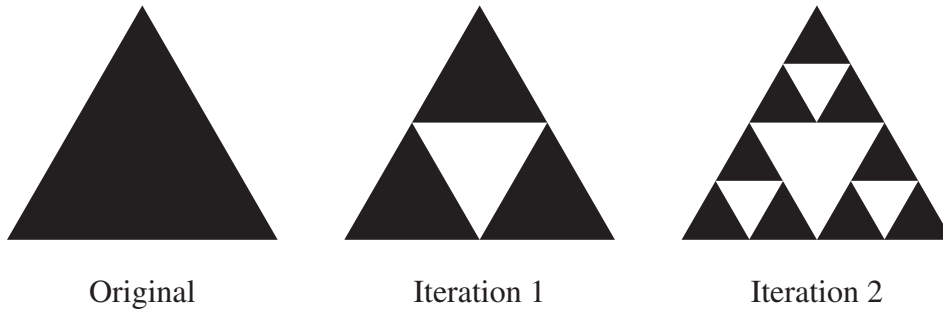


- A. I only.
- B. I and II only.
- C. I and III only.
- D. All are periodic.



14. The population,  $P$ , of rabbits in a certain area is given by the equation  $P = 8000 \sin(1.57t) + 10\,000$ , where  $t$  is the number of years after the initial survey was taken in 1990. Determine the expected population in 2010.
- A. 2 000
  - B. 9 900
  - C. 10 100
  - D. 18 000
15. Determine the maximum value of  $h$  if  $h = 3 \sin(5t - 7) - 4$ .
- A. -4
  - B. -1
  - C. 1
  - D. 3
16. A ball drops from a height of 200 cm. After each bounce, it rises to 60% of its previous height. After how many bounces does it first reach a maximum height which is less than 2.0 cm?
- A. 5
  - B. 8
  - C. 9
  - D. 10
17. A doctor prescribes a 100 mg pill to be taken every day. Thirty percent of the medication is eliminated from the patient's body every day. Assuming that the patient continues to receive one pill every day, what is the maximum level (its maintenance level) the medication will reach in the body?
- A. 70 mg
  - B. 143 mg
  - C. 233 mg
  - D. 333 mg

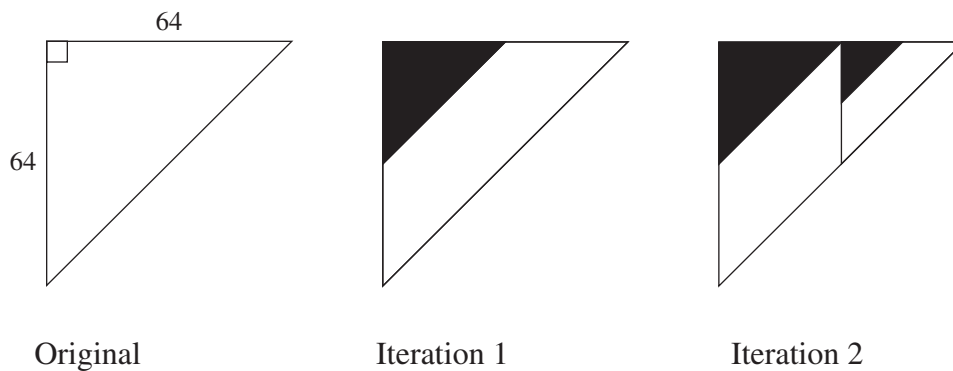
18. The Sierpinski gasket is a fractal pattern as shown below. The perimeter of a Sierpinski gasket is the total length of all sides of the shaded equilateral triangles.



If the original triangle has side length 20 cm, what is the perimeter of the Sierpinski gasket in Iteration 2?

- A. 90 cm  
 B. 105 cm  
 C. 135 cm  
 D. 202.5 cm
19. The fractal shown in the diagram below is created as follows:

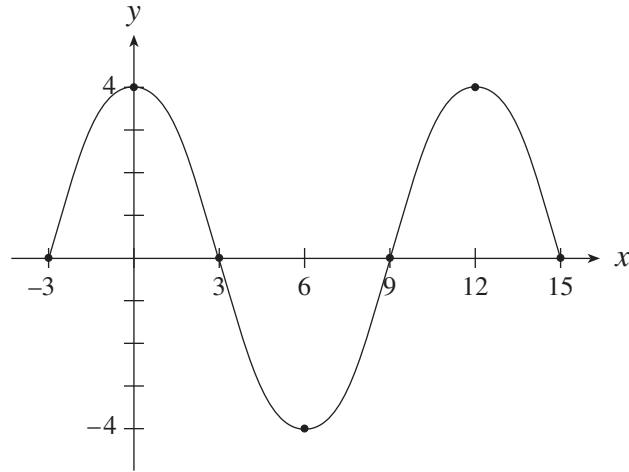
- A shaded triangle is formed by joining the midpoints of the vertical and horizontal sides of the original triangle.
- A vertical line is drawn from the midpoint of the horizontal side, creating a new isosceles right triangle.
- The process is continued.



What is the total shaded area in Iteration 4?

- A.  $677 \text{ cm}^2$   
 B.  $680 \text{ cm}^2$   
 C.  $682 \text{ cm}^2$   
 D.  $1360 \text{ cm}^2$

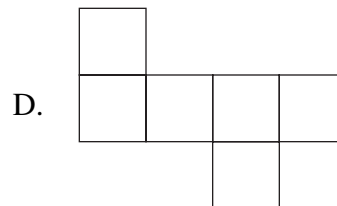
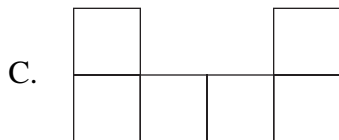
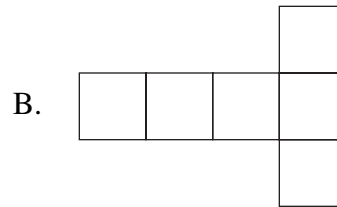
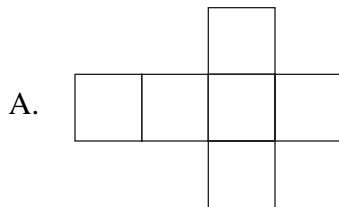
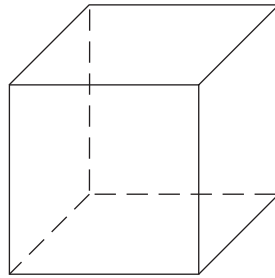
20. The function  $y = a \sin(bx + c) + d$  is described by the following graph.



Which of the following is a possible value of  $c$ ?

- A. -3.00
- B. 0.52
- C. 1.57
- D. 3.00

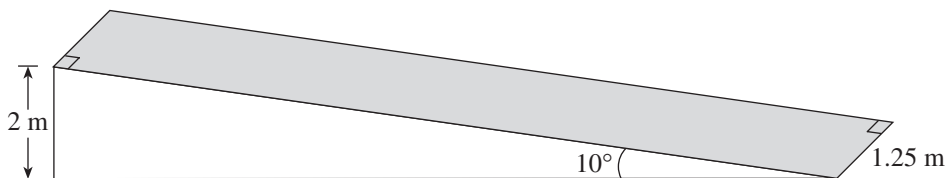
21. Which of the following nets will **not** produce the closed cube box as shown below?



22. A rectangular concrete slab is poured with dimensions  $8.5 \text{ m} \times 10 \text{ m}$  to a depth of  $0.15 \text{ m}$ . If the concrete costs  $\$155/\text{m}^3$  and the labour cost is  $\$25/\text{m}^3$ , what is the approximate cost for the slab?

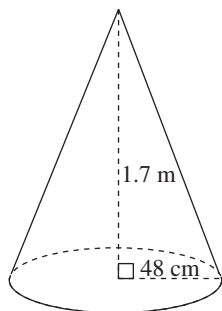
- A.  $\$1980$
- B.  $\$2000$
- C.  $\$2300$
- D.  $\$3360$

23. A wheelchair ramp for a building is constructed as shown. A safe angle of elevation used for this ramp is  $10^\circ$ . Determine the shaded area of the ramp to the nearest tenth of a  $\text{m}^2$ .



- A. 11.3
- B. 12.5
- C. 14.2
- D. 14.4

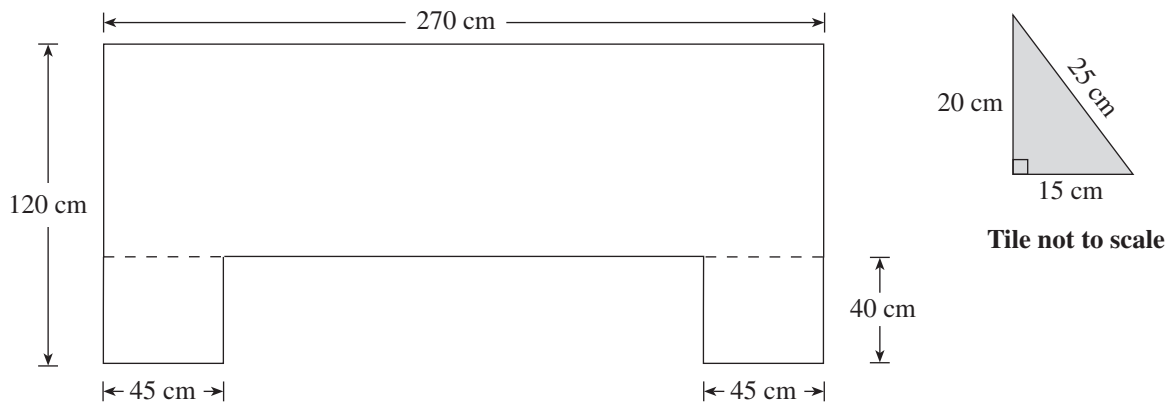
24. A styrofoam display is in the shape of a right circular cone.



What is its surface area if it has radius  $48 \text{ cm}$  and height  $1.70 \text{ m}$ ?

- A.  $1.23 \text{ m}^2$
- B.  $2.19 \text{ m}^2$
- C.  $3.29 \text{ m}^2$
- D.  $3.39 \text{ m}^2$

25. A rectangular countertop with 2 identical rectangular side pieces is to be tiled with triangular tiles as shown below.

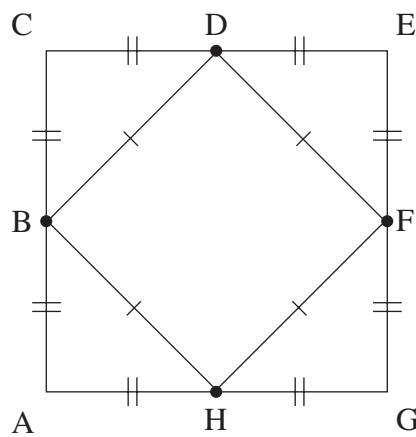


Determine the minimum number of triangular tiles required to completely tile this surface.

- A. 72  
B. 84  
C. 144  
D. 168
26. How long would it take to fill a cylindrical tank of radius 3.0 m and height 4.0 m if the pump delivers water at a rate of 550 L/min? ( $1 \text{ m}^3 = 1000 \text{ L}$ )
- A. 1.1 h  
B. 3.4 h  
C. 4.2 h  
D. 4.6 h
27. Which of the following is **not** a vector?
- A. speed  
B. weight  
C. velocity  
D. frictional force

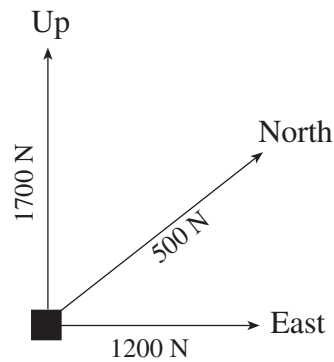
28. The vector  $\vec{v}$  represents a velocity of 50 km/h towards  $[030^\circ]$ . What is  $4\vec{v}$ ?
- A. 50 km/h towards  $[-120^\circ]$
  - B. 50 km/h towards  $[120^\circ]$
  - C. 200 km/h towards  $[030^\circ]$
  - D. 200 km/h towards  $[120^\circ]$

29. Using the diagram below, determine a vector equal to the vector sum  $\vec{GH} + \vec{BD}$ .



- A.  $\vec{DE}$
  - B.  $\vec{FE}$
  - C.  $\vec{FG}$
  - D.  $\vec{HB}$
30. The airspeed of an airplane is 300 km/h. A wind blows from due east at 50 km/h. In what direction does the plane need to head in order to travel due north?
- A.  $[010^\circ]$
  - B.  $[296^\circ]$
  - C.  $[304^\circ]$
  - D.  $[350^\circ]$

31. Three forces, which are mutually perpendicular, are pulling on a crate, as shown in the diagram below.



Determine the direction the resultant force makes with the horizontal. Answer to the nearest degree.

- A.  $37^\circ$   
B.  $53^\circ$   
C.  $55^\circ$   
D.  $74^\circ$
32. A box contains 5 green balls and 8 red balls. One ball is picked at random and not replaced. Another ball is then selected. These two events are
- A. dependent.  
B. independent.  
C. complementary.  
D. mutually exclusive.

33. Thirty households were surveyed and the number of children in each was recorded. The table below shows the results of this survey.

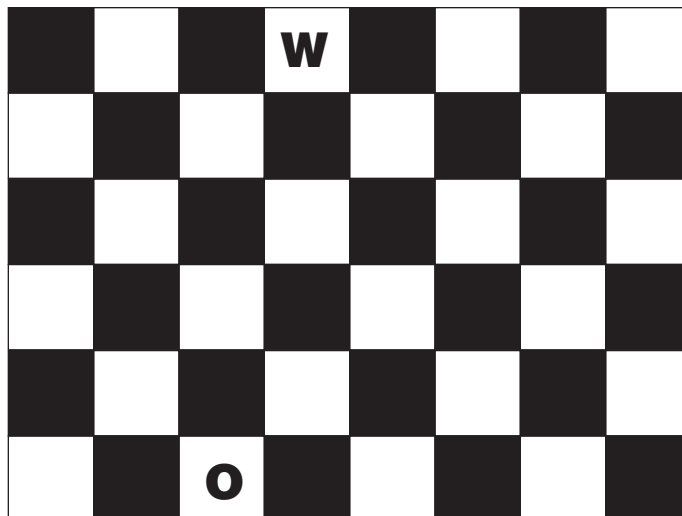
Number of Children	Frequency
0	4
1	6
2	10
3	7
4	3

Determine the mean number of children in a household.

- A. 1.17  
B. 1.19  
C. 1.97  
D. 2.00
34. A traffic light at a certain intersection shows red for 22 s, yellow for 6 s, and green for 32 s in each minute. What is the probability that the light will **not** be red at any random time during one minute?
- A.  $\frac{6}{60}$   
B.  $\frac{28}{60}$   
C.  $\frac{32}{60}$   
D.  $\frac{38}{60}$



35. On the game board shown below, a player can only move his piece forward diagonally and must stay on the white squares.



Determine the number of different pathways from the game piece marked **O** to the square marked **W** on the other side of the board.

- A. 8  
B. 9  
C. 10  
D. 11
36. A licence plate consists of 4 digits followed by 3 letters. Any digit from 0 to 9 can appear, but cannot be repeated. Any letter from A to Z can appear, but can be repeated. How many licence plates are possible?
- A. 78 624 000  
B. 88 583 040  
C. 156 000 000  
D. 175 760 000
37. Two regular six-sided dice are rolled. What is the probability that their sum is 10 or less?
- A. 0.72  
B. 0.75  
C. 0.83  
D. 0.92

38. The masses of 200 dogs are normally distributed. If the mean mass of the dogs is 37.2 kg with a standard deviation of 2.3 kg, how many of the dogs are expected to have a mass greater than 40 kg?
- A. 22
  - B. 31
  - C. 169
  - D. 178
39. Four balls numbered 1 to 4 are contained in a jar. Each ball has an equal chance of being selected. If two balls are randomly selected, what is the probability that the sum of the two numbers removed is even?
- A.  $\frac{1}{12}$
  - B.  $\frac{1}{3}$
  - C.  $\frac{1}{2}$
  - D.  $\frac{2}{3}$
40. A regular six-sided die is rolled 5 times. Determine the probability that the number 4 turns up at least 3 times.
- A. 0.035
  - B. 0.161
  - C. 0.839
  - D. 0.965

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

## PART B: WRITTEN RESPONSE

Value: 30 marks

Suggested Time: 45 minutes

**INSTRUCTIONS:** Rough-work space has been incorporated into the space allowed for answering each question. You may not need all the space provided to answer each question. Where required, place the final answer for each question in the space provided.

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.

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

**Use the following information to answer questions 1 to 3.**

Emily wishes to obtain a new car with a total price of \$18 752.

Option 1: Purchase the car now with a down payment of \$4000 and a loan at 2% per annum compounded monthly and paid monthly for 3 years.

Option 2: Lease the car with no down payment and pay \$325 per month for 3 years and then purchase the car outright at its lease-end value of \$8000.

1. What is the monthly payment for Option 1?

**(2 marks)**

ANSWER:

2. What is the total paid in Option 2?

**(1 mark)**

ANSWER:

3. Which option will cost Emily the least amount and by how much?

**(2 marks)**

ANSWER:

**Use the following information to answer questions 4 to 6.**

The following table describes the height of a seat on a Ferris wheel as the wheel rotates.

<b>Time (s)</b>	0	5	10	15	20	25	30
<b>Height (m)</b>	1.5	9.79	23.21	23.21	9.79	1.5	9.79

4. Determine a sinusoidal regression equation for this data.

**(2 marks)**

ANSWER:

5. Determine the radius of the Ferris wheel.

**(1 mark)**

ANSWER:



**Use the following information to answer questions 7 to 9.**

A network of agents has been created according to the following conditions:

- Each agent can contact himself/herself directly.
- Agent A is able to contact Agents B and C directly.
- Agent B is able to contact Agents C and D directly.
- Agent C is able to contact Agent B directly.
- Agent D is able to contact Agents A and B directly.

7. Determine a matrix to represent this network of agents.

**(2 marks)**

		<b>To</b>			
		A	B	C	D
<b>From</b>	A				
	B				
	C				
	D				



8. Determine a matrix that shows the number of ways one agent can contact another by using at most one intermediate agent. **(2 marks)**

		<b>To</b>			
		A	B	C	D
<b>From</b>	A				
	B				
	C				
	D				

9. What is the least number of intermediate agents necessary for Agent C to contact Agent A? (Justify your answer.) **(1 mark)**

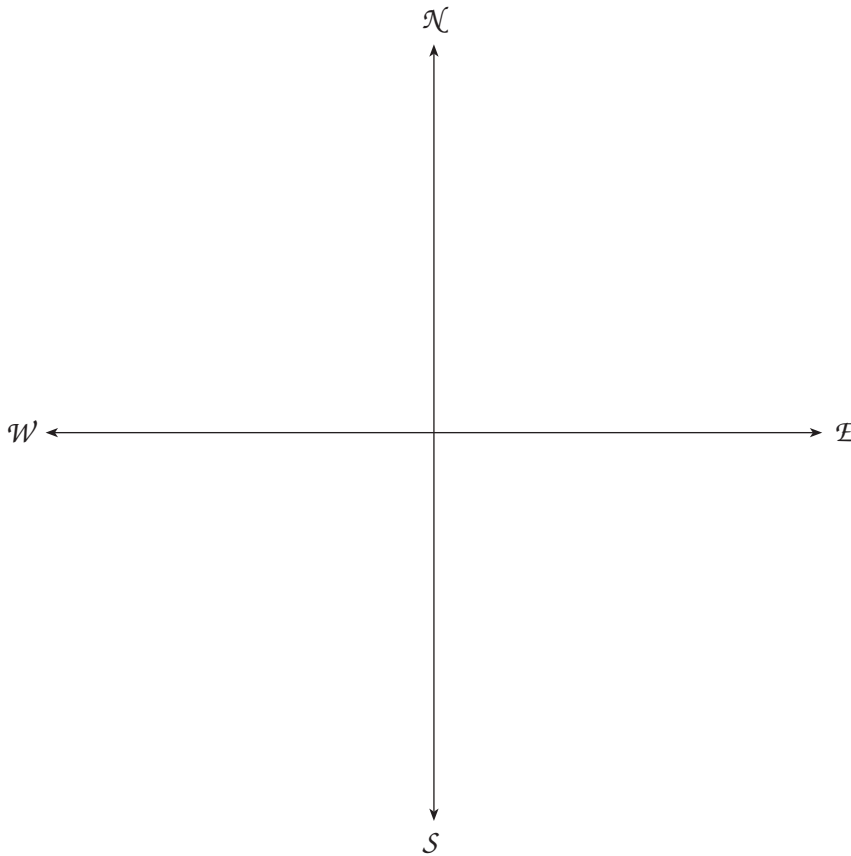
ANSWER:

Use the following information to answer questions 10 to 12.

A ship travels 15 km on a bearing of  $[070^\circ]$ . It then changes direction and travels 22 km on a bearing of  $[200^\circ]$ .

10. Draw a vector diagram modelling this situation.

**(1 mark)**



11. How far is the ship from its starting point?

**(2 marks)**

ANSWER:

12. Determine the direction the ship must head in order to return to its starting point.  
Answer to the nearest degree.

**(2 marks)**

ANSWER:

**Use the following information to answer questions 13 to 15.**

Ron wrote a History test and a Mathematics test. His scores, along with the mean and standard deviation for his class, are listed below. Assume that the class marks are normally distributed.

<b>Subject</b>	<b>Ron's Score</b>	<b>Mean</b>	<b>Standard Deviation</b>
History	73	70	6.2
Mathematics	67	64	5.3

13. On which test did Ron perform better in relation to the class? Justify your answer. (2 marks)

ANSWER:

14. What percentage of the class scored between 65 and 75 on the History test? **(2 marks)**

ANSWER:

15. If the top 18% of the class received an A or a B on the History test, determine the minimum mark for a B. **(1 mark)**

ANSWER:

**Use the following information to answer questions 16 to 18.**

A spherical weather balloon has diameter 3.6 m. An additional  $20 \text{ m}^3$  of air is pumped into the balloon, increasing its volume and surface area.

16. Determine the new volume of the balloon.

**(2 marks)**

ANSWER:

17. Determine the new radius of the balloon.

**(2 marks)**

ANSWER:

18. Determine the new surface area of the balloon.

**(1 mark)**

ANSWER:

**END OF EXAMINATION**

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## FORMULAE

### Geometry:

$$\begin{aligned}\text{Triangle: Area} &= \frac{1}{2}bh \\ &= \frac{1}{2}ab \sin C\end{aligned}$$

$$\text{Trapezoid: } A = \frac{1}{2}(b_1 + b_2) \cdot h$$

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

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

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

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

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

$$\text{Volume of prism: } V = A_b h$$

### Interest:

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

$$I = Prt$$

### Miscellaneous:

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

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

### Probability and Statistics:

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

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

$$\mu = np$$

$$\sigma = \sqrt{np(1-p)}$$

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

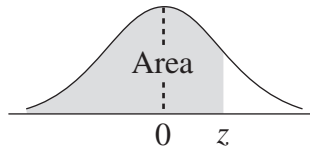
$$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$$

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

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# THE STANDARD NORMAL DISTRIBUTION TABLE



$$F_z(z) = P[Z < z]$$

$z$	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
-3.4	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0002
-3.3	0.0005	0.0005	0.0005	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0003
-3.2	0.0007	0.0007	0.0006	0.0006	0.0006	0.0006	0.0006	0.0005	0.0005	0.0005
-3.1	0.0010	0.0009	0.0009	0.0009	0.0008	0.0008	0.0008	0.0008	0.0007	0.0007
-3.0	0.0013	0.0013	0.0013	0.0012	0.0012	0.0011	0.0011	0.0011	0.0010	0.0010
-2.9	0.0019	0.0018	0.0017	0.0017	0.0016	0.0016	0.0015	0.0015	0.0014	0.0014
-2.8	0.0026	0.0025	0.0024	0.0023	0.0023	0.0022	0.0021	0.0021	0.0020	0.0019
-2.7	0.0035	0.0034	0.0033	0.0032	0.0031	0.0030	0.0029	0.0028	0.0027	0.0026
-2.6	0.0047	0.0045	0.0044	0.0043	0.0041	0.0040	0.0039	0.0038	0.0037	0.0036
-2.5	0.0062	0.0060	0.0059	0.0057	0.0055	0.0054	0.0052	0.0051	0.0049	0.0048
-2.4	0.0082	0.0080	0.0078	0.0075	0.0073	0.0071	0.0069	0.0068	0.0066	0.0064
-2.3	0.0107	0.0104	0.0102	0.0099	0.0096	0.0094	0.0091	0.0089	0.0087	0.0084
-2.2	0.0139	0.0136	0.0132	0.0129	0.0125	0.0122	0.0119	0.0116	0.0113	0.0110
-2.1	0.0179	0.0174	0.0170	0.0166	0.0162	0.0158	0.0154	0.0150	0.0146	0.0143
-2.0	0.0228	0.0222	0.0217	0.0212	0.0207	0.0202	0.0197	0.0192	0.0188	0.0183
-1.9	0.0287	0.0281	0.0274	0.0268	0.0262	0.0256	0.0250	0.0244	0.0239	0.0233
-1.8	0.0359	0.0352	0.0344	0.0336	0.0329	0.0322	0.0314	0.0307	0.0301	0.0294
-1.7	0.0446	0.0436	0.0427	0.0418	0.0409	0.0401	0.0392	0.0384	0.0375	0.0367
-1.6	0.0548	0.0537	0.0526	0.0516	0.0505	0.0495	0.0485	0.0475	0.0465	0.0455
-1.5	0.0668	0.0655	0.0643	0.0630	0.0618	0.0606	0.0594	0.0582	0.0571	0.0559
-1.4	0.0808	0.0793	0.0778	0.0764	0.0749	0.0735	0.0722	0.0708	0.0694	0.0681
-1.3	0.0968	0.0951	0.0934	0.0918	0.0901	0.0885	0.0869	0.0853	0.0838	0.0823
-1.2	0.1151	0.1131	0.1112	0.1093	0.1075	0.1056	0.1038	0.1020	0.1003	0.0985
-1.1	0.1357	0.1335	0.1314	0.1292	0.1271	0.1251	0.1230	0.1210	0.1190	0.1170
-1.0	0.1587	0.1562	0.1539	0.1515	0.1492	0.1469	0.1446	0.1423	0.1401	0.1379
-0.9	0.1841	0.1814	0.1788	0.1762	0.1736	0.1711	0.1685	0.1660	0.1635	0.1611
-0.8	0.2119	0.2090	0.2061	0.2033	0.2005	0.1977	0.1949	0.1922	0.1894	0.1867
-0.7	0.2420	0.2389	0.2358	0.2327	0.2296	0.2266	0.2236	0.2206	0.2177	0.2148
-0.6	0.2743	0.2709	0.2676	0.2643	0.2611	0.2578	0.2546	0.2514	0.2483	0.2451
-0.5	0.3085	0.3050	0.3015	0.2981	0.2946	0.2912	0.2877	0.2843	0.2810	0.2776
-0.4	0.3446	0.3409	0.3372	0.3336	0.3300	0.3264	0.3228	0.3192	0.3156	0.3121
-0.3	0.3821	0.3783	0.3745	0.3707	0.3669	0.3632	0.3594	0.3557	0.3520	0.3483
-0.2	0.4207	0.4168	0.4129	0.4090	0.4052	0.4013	0.3974	0.3936	0.3897	0.3859
-0.1	0.4602	0.4562	0.4522	0.4483	0.4443	0.4404	0.4364	0.4325	0.4286	0.4247
-0.0	0.5000	0.4960	0.4920	0.4880	0.4840	0.4801	0.4761	0.4721	0.4681	0.4641

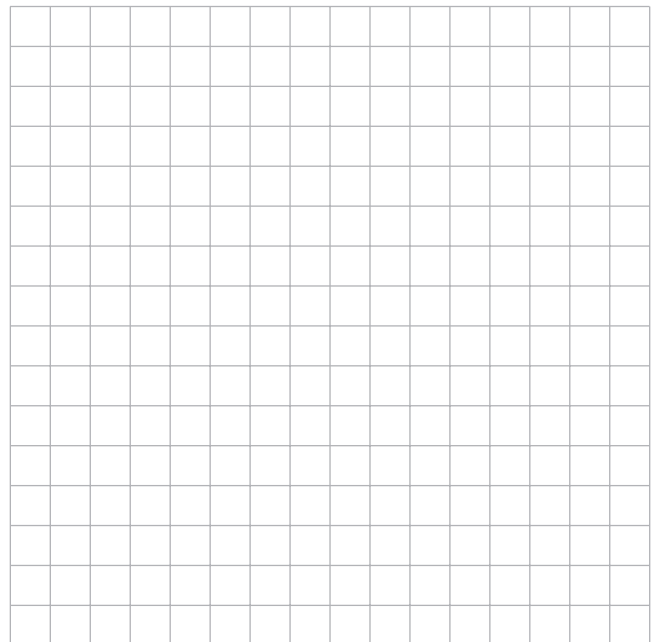
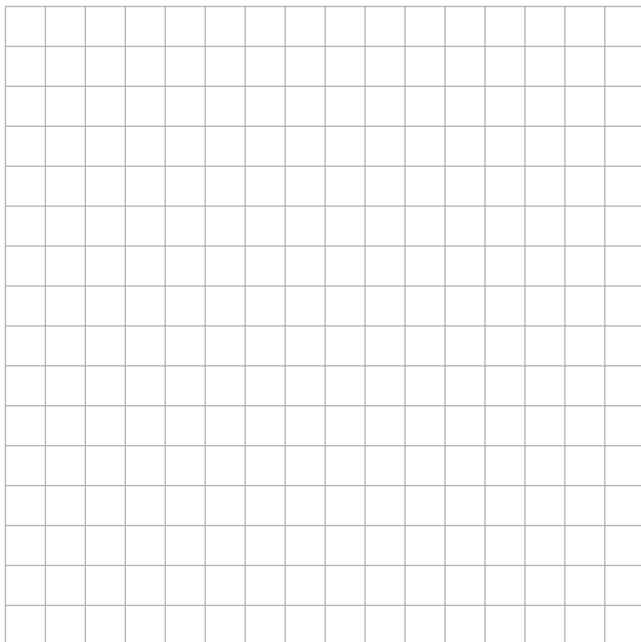
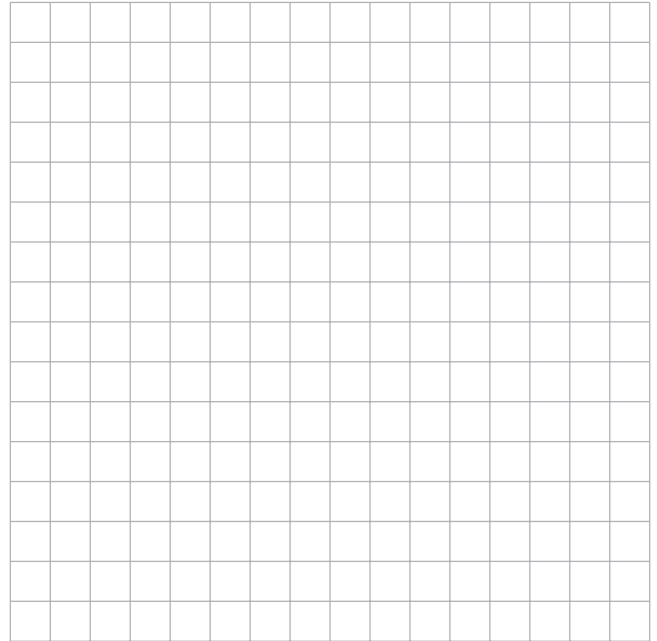
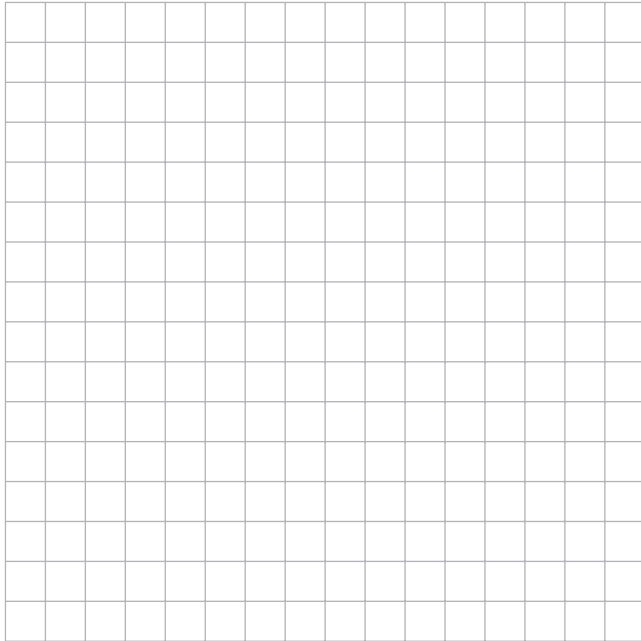
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$$F_z(z) = P[Z < z]$$

$z$	<b>0.00</b>	<b>0.01</b>	<b>0.02</b>	<b>0.03</b>	<b>0.04</b>	<b>0.05</b>	<b>0.06</b>	<b>0.07</b>	<b>0.08</b>	<b>0.09</b>
0.0	0.5000	0.5040	0.5080	0.5120	0.5160	0.5199	0.5239	0.5279	0.5319	0.5359
0.1	0.5398	0.5438	0.5478	0.5517	0.5557	0.5596	0.5636	0.5675	0.5714	0.5753
0.2	0.5793	0.5832	0.5871	0.5910	0.5948	0.5987	0.6026	0.6064	0.6103	0.6141
0.3	0.6179	0.6217	0.6255	0.6293	0.6331	0.6368	0.6406	0.6443	0.6480	0.6517
0.4	0.6554	0.6591	0.6628	0.6664	0.6700	0.6736	0.6772	0.6808	0.6844	0.6879
0.5	0.6915	0.6950	0.6985	0.7019	0.7054	0.7088	0.7123	0.7157	0.7190	0.7224
0.6	0.7257	0.7291	0.7324	0.7357	0.7389	0.7422	0.7454	0.7486	0.7517	0.7549
0.7	0.7580	0.7611	0.7642	0.7673	0.7704	0.7734	0.7764	0.7794	0.7823	0.7852
0.8	0.7881	0.7910	0.7939	0.7967	0.7995	0.8023	0.8051	0.8078	0.8106	0.8133
0.9	0.8159	0.8186	0.8212	0.8238	0.8264	0.8289	0.8315	0.8340	0.8365	0.8389
1.0	0.8413	0.8438	0.8461	0.8485	0.8508	0.8531	0.8554	0.8577	0.8599	0.8621
1.1	0.8643	0.8665	0.8686	0.8708	0.8729	0.8749	0.8770	0.8790	0.8810	0.8830
1.2	0.8849	0.8869	0.8888	0.8907	0.8925	0.8944	0.8962	0.8980	0.8997	0.9015
1.3	0.9032	0.9049	0.9066	0.9082	0.9099	0.9115	0.9131	0.9147	0.9162	0.9177
1.4	0.9192	0.9207	0.9222	0.9236	0.9251	0.9265	0.9278	0.9292	0.9306	0.9319
1.5	0.9332	0.9345	0.9357	0.9370	0.9382	0.9394	0.9406	0.9418	0.9429	0.9441
1.6	0.9452	0.9463	0.9474	0.9484	0.9495	0.9505	0.9515	0.9525	0.9535	0.9545
1.7	0.9554	0.9564	0.9573	0.9582	0.9591	0.9599	0.9608	0.9616	0.9625	0.9633
1.8	0.9641	0.9649	0.9656	0.9664	0.9671	0.9678	0.9686	0.9693	0.9699	0.9706
1.9	0.9713	0.9719	0.9726	0.9732	0.9738	0.9744	0.9750	0.9756	0.9761	0.9767
2.0	0.9772	0.9778	0.9783	0.9788	0.9793	0.9798	0.9803	0.9808	0.9812	0.9817
2.1	0.9821	0.9826	0.9830	0.9834	0.9838	0.9842	0.9846	0.9850	0.9854	0.9857
2.2	0.9861	0.9864	0.9868	0.9871	0.9875	0.9878	0.9881	0.9884	0.9887	0.9890
2.3	0.9893	0.9896	0.9898	0.9901	0.9904	0.9906	0.9909	0.9911	0.9913	0.9916
2.4	0.9918	0.9920	0.9922	0.9925	0.9927	0.9929	0.9931	0.9932	0.9934	0.9936
2.5	0.9938	0.9940	0.9941	0.9943	0.9945	0.9946	0.9948	0.9949	0.9951	0.9952
2.6	0.9953	0.9955	0.9956	0.9957	0.9959	0.9960	0.9961	0.9962	0.9963	0.9964
2.7	0.9965	0.9966	0.9967	0.9968	0.9969	0.9970	0.9971	0.9972	0.9973	0.9974
2.8	0.9974	0.9975	0.9976	0.9977	0.9977	0.9978	0.9979	0.9979	0.9980	0.9981
2.9	0.9981	0.9982	0.9982	0.9983	0.9984	0.9984	0.9985	0.9985	0.9986	0.9986
3.0	0.9987	0.9987	0.9987	0.9988	0.9988	0.9989	0.9989	0.9989	0.9990	0.9990
3.1	0.9990	0.9991	0.9991	0.9991	0.9992	0.9992	0.9992	0.9992	0.9993	0.9993
3.2	0.9993	0.9993	0.9994	0.9994	0.9994	0.9994	0.9994	0.9995	0.9995	0.9995
3.3	0.9995	0.9995	0.9995	0.9996	0.9996	0.9996	0.9996	0.9996	0.9996	0.9997
3.4	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9998

# ROUGH WORK FOR GRAPHING

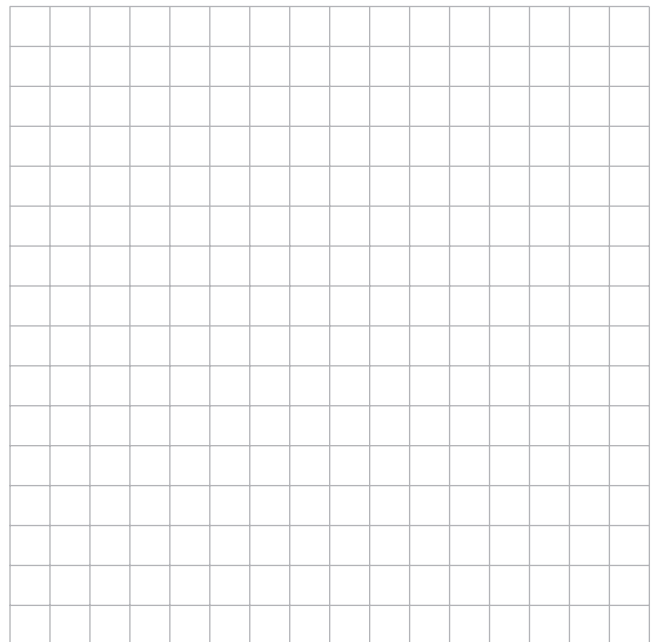
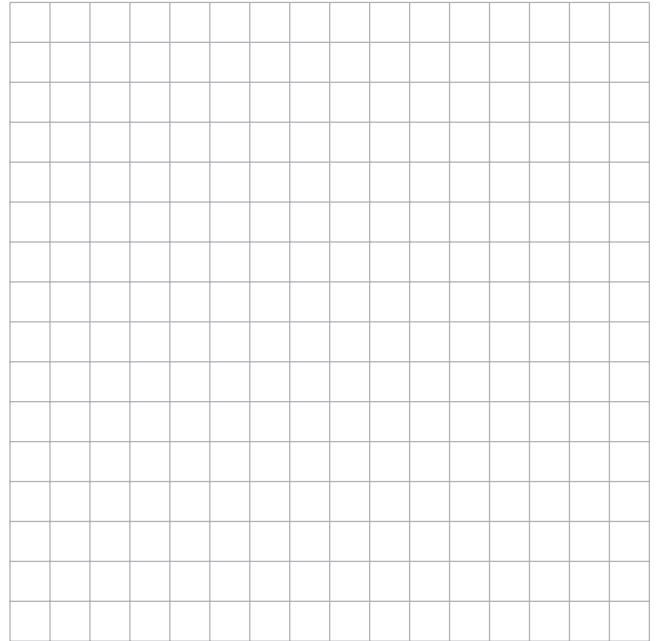
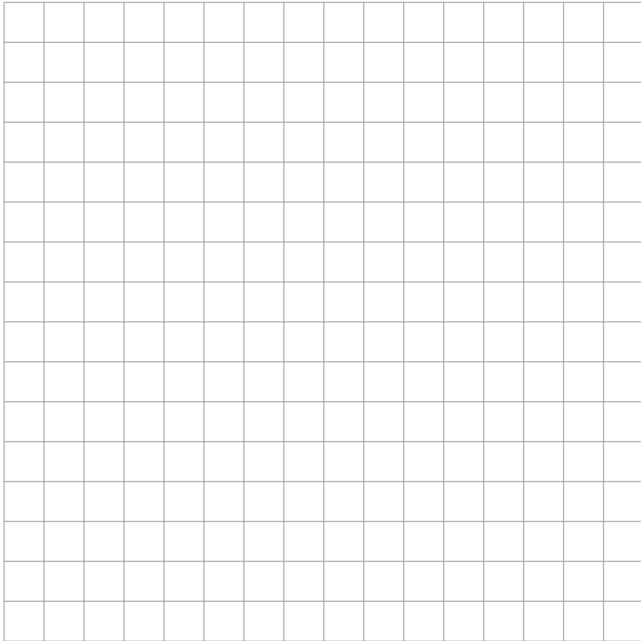
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# ROUGH WORK FOR GRAPHING

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**ROUGH WORK FOR MULTIPLE-CHOICE**

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# **ROUGH WORK FOR MULTIPLE-CHOICE**