

Principles of Mathematics 10
Examination Booklet
2008/09 Released Exam
November 2007
Form A

DO NOT OPEN ANY EXAMINATION MATERIALS UNTIL INSTRUCTED TO DO SO.

Examination Instructions

1. On your Answer Sheet, fill in the bubble (Form A, B, C, D, E, F, G or H) that corresponds to the letter on this Examination Booklet.
2. Use a pencil to fill in bubbles when answering questions on your Answer Sheet.
3. When answering **Numerical-Response** questions on your Answer Sheet:

- print digits as illustrated:



- shade the bubble with the negative symbol if the answer is negative; shade or leave blank the bubble with the positive symbol if the answer is positive.
- write your answer in the spaces provided using one digit per box, noting proper place value.
- leave unused boxes blank. For example, the answer -70.6 will be written as shown:



4. When using your calculator:
 - use the programmed value of π rather than the approximation of 3.14.
 - rounding should occur only in the final step of the solution.
5. Diagrams are not necessarily drawn to scale.
6. When the examination begins, remove the data pages located in the centre of this booklet.
7. Read the Examination Rules on the back of this booklet.

You have **Examination Booklet Form A**. In the box above #1 on your **Answer Sheet**, fill in the bubble as follows.

Exam Booklet Form/ Cahier d'examen	A	B	C	D	E	F	G	H
	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

1. Simplify : $7\sqrt{3} - 4\sqrt{3} + 2\sqrt{3}$

- A. $\sqrt{3}$
- B. $5\sqrt{3}$
- C. $9\sqrt{3}$
- D. $13\sqrt{3}$

2. Simplify : $\sqrt{28} + 3\sqrt{63} - \sqrt{7}$

- A. $30\sqrt{7}$
- B. $18\sqrt{7}$
- C. $11\sqrt{7}$
- D. $10\sqrt{7}$

3. Simplify : $(\sqrt{x} - \sqrt{5})(\sqrt{x} + \sqrt{5})$

- A. $2\sqrt{x}$
- B. $x - 5$
- C. $x + 5$
- D. $x - 2\sqrt{5x} - 5$

4. Simplify : $(\sqrt{12} + 5\sqrt{3})^2$

- A. 87
- B. 117
- C. 147
- D. 189

5. Simplify : $\frac{8\sqrt{3}}{\sqrt{6} + \sqrt{5}}$

- A. $24\sqrt{2} - 8\sqrt{15}$
- B. $72\sqrt{2} - 8\sqrt{15}$
- C. $\frac{72\sqrt{2} + 8\sqrt{15}}{11}$
- D. $\frac{24\sqrt{2} - 8\sqrt{15}}{11}$

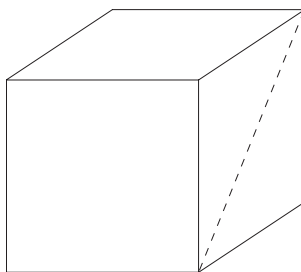
6. What is the area of an equilateral triangle with sides 18 cm long?

- A. $81\sqrt{3} \text{ cm}^2$
- B. $\frac{81\sqrt{3}}{2} \text{ cm}^2$
- C. $27\sqrt{3} \text{ cm}^2$
- D. 81 cm^2

7. Evaluate $\frac{\sqrt[3]{5}}{2\sqrt{3}-\sqrt{2}}$ to two decimal places.

Record your answer neatly on the Answer Sheet.

8. Determine the diagonal distance across a side of a cube with volume 100 cm^3 .



- A. 6.56 cm
B. 7.07 cm
C. 14.14 cm
D. 16.67 cm
9. To which set of numbers does $13.\overline{274}$ belong?
- A. whole
B. integer
C. rational
D. irrational

10. Simplify : $\frac{(2a^2b)^5}{(4a^2b^3)^2}$

A. $\frac{5a^6}{4b}$

B. $\frac{2a^6}{b}$

C. $\frac{2a^3}{b}$

D. $\frac{1}{2b}$

11. Simplify : $\frac{(6x^{-1}y)^{-2}}{(xy^{-1})^2}$

A. $\frac{1}{12y^4}$

B. $\frac{1}{36y^4}$

C. $\frac{1}{12}$

D. $\frac{1}{36}$

12. Simplify: $\frac{(x^{a-1})^3}{(x^{2a})(x)}$

- A. x^a
- B. x^{a-2}
- C. x^{a-3}
- D. x^{a-4}

13. Simplify: $(\sqrt[4]{x^3})(\sqrt[8]{x^{12}})$

- A. $x^{\frac{9}{8}}$
- B. $x^{\frac{5}{4}}$
- C. x^2
- D. $x^{\frac{9}{4}}$

14. Simplify: $\left(\frac{a^4}{16}\right)^{-\frac{3}{4}}; a \neq 0$

- A. $-\frac{8}{a^3}$
- B. $\frac{8}{a^3}$
- C. $-\frac{a^3}{8}$
- D. $\frac{a^3}{8}$

15. For what value of x is $3^x = \frac{1}{27}$ true?

Record your answer neatly on the Answer Sheet.

16. Determine the common difference in the following arithmetic sequence :

-3, 1, 5, 9, 13, ...

- A. -3
- B. 4
- C. 16
- D. 17

17. Determine the value of t_{20} in the following arithmetic sequence :

1, -2, -5, -8, ...

- A. -59
- B. -58
- C. -56
- D. -55

18. In a certain arithmetic sequence, $t_{11} = 52$ and $t_{14} = 70$. What is the value of the first term?

- A. -8
- B. -2
- C. 6
- D. 8

19. Zoë is arranging some rocks in rows such that each row has 4 more rocks than the row before it. If she makes n rows and puts n rocks in the shortest row, which expression represents the **total** number of rocks she uses?

- A. n^2
- B. $5n - 4$
- C. $n^2 - 4n$
- D. $3n^2 - 2n$

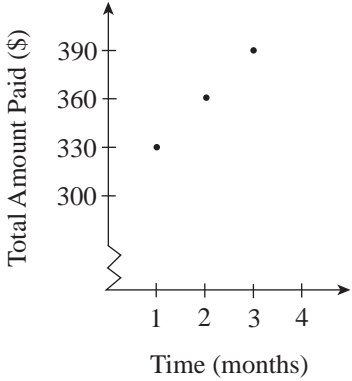
20. Determine the value of S_{15} for the following arithmetic series :

$4 + 9 + 14 + \dots$

Record your answer neatly on the Answer Sheet.

21. The cost of a pizza varies partially with the number of toppings. The basic pizza costs \$12.95 plus \$1.25 for each topping. What is the total cost of a pizza with three toppings?
- A. \$14.20
 - B. \$16.70
 - C. \$17.20
 - D. \$38.85

22. A fitness club charges \$300 to join and a \$30 monthly fee. Which of the following are true?

I.	The situation can be described by the following graph.  <table border="1"><caption>Data points from the graph</caption><thead><tr><th>Time (months)</th><th>Total Amount Paid (\$)</th></tr></thead><tbody><tr><td>1</td><td>330</td></tr><tr><td>2</td><td>360</td></tr><tr><td>3</td><td>390</td></tr></tbody></table>	Time (months)	Total Amount Paid (\$)	1	330	2	360	3	390
Time (months)	Total Amount Paid (\$)								
1	330								
2	360								
3	390								
II.	The total amount paid varies partially as time.								
III.	The total amount paid varies directly as time.								

- A. I only
- B. II only
- C. I and II only
- D. I and III only

23. Which of the following describe the same linear function?

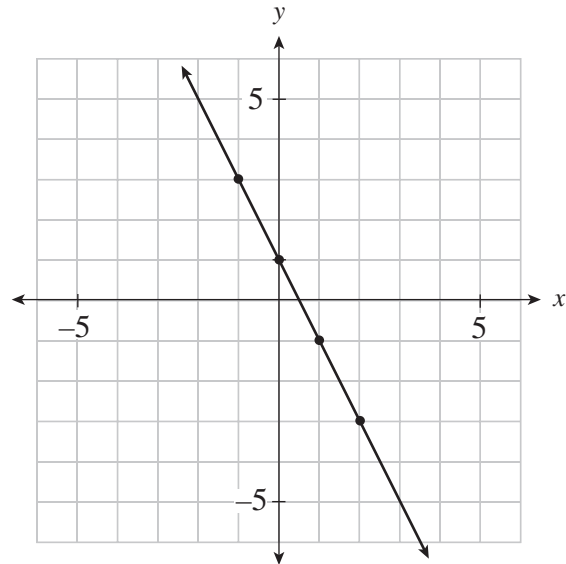
I.															
II.	$x - 2y + 6 = 0$														
III.	<table border="1"> <thead> <tr> <th>x</th> <th>y</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>3</td> </tr> <tr> <td>1</td> <td>5</td> </tr> <tr> <td>2</td> <td>7</td> </tr> <tr> <td>.</td> <td>.</td> </tr> <tr> <td>.</td> <td>.</td> </tr> <tr> <td>.</td> <td>.</td> </tr> </tbody> </table>	x	y	0	3	1	5	2	7
x	y														
0	3														
1	5														
2	7														
.	.														
.	.														
.	.														
IV.	3 more than one half of a number.														

- A. I and III only
- B. I and IV only
- C. II and III only
- D. II and IV only

24. If $f(x) = 2x - 1$, what is the value of $f(-3)$?

- A. -7
- B. -4
- C. -1
- D. 5

Use the following graph to answer question 25.



25. What is the value of $f(-1) + f(1)$?

- A. 3
 - B. 2
 - C. 1
 - D. 0
-

26. Given $f(x) = \frac{3}{4}x + 12$, determine an expression for $f(2x + 4)$.

- A. $\frac{3}{2}x + 4$
- B. $\frac{3}{2}x + 15$
- C. $\frac{3}{2}x + 16$
- D. $6x + 16$

27. Determine the x -intercept of the graph of $y = \frac{x+8}{2}$.

- A. -16
- B. -8
- C. 4
- D. 8

28. Determine the y -intercept of the graph of $9x + 6y - 72 = 0$.

- A. -72
- B. 6
- C. 8
- D. 12

29. Which statement is true for the graph of $x - 4 = 0$?

- A. The domain is $x = 4$.
- B. The slope is zero.
- C. The range is $y = 4$.
- D. The domain is all real numbers.

30. Determine the slope of the graph of $y = -3x + 8$.

Record your answer neatly on the Answer Sheet.

31. Simplify: $7x(3x - 2) - (2x - 1)$

- A. $21x^2 - 16x - 1$
- B. $21x^2 - 16x + 1$
- C. $21x^2 - 12x + 1$
- D. $7x^2 - 21x$

32. Expand and simplify : $3x(2x - 3)^2 - (x + 4)$

A. $12x^3 - 26x - 4$

B. $144x^4 - 81x^2 - x - 4$

C. $12x^3 - 36x^2 + 26x - 4$

D. $36x^4 + 81x^2 - x + 4$

33. What is the remainder when $3a^2 + 6a + 20$ is divided by $a - 2$?

Record your answer neatly on the Answer Sheet.

34. Determine the quotient in the following division statement : $\frac{12x^3 - 5x^2 + x}{4x - 3} = 3x^2 + x + 1 + \frac{3}{4x - 3}$.

A. 3

B. $4x - 3$

C. $3x^2 + x + 1$

D. $12x^3 - 5x^2 + x$

35. Determine a factor of $2a^2 - 6a + 4$.

A. 2

B. $a - 4$

C. $a + 1$

D. $2a + 1$

36. Determine a factor of $28x^2 + 5xy - 12y^2$.

- A. $7x - 6y$
- B. $7x + 6y$
- C. $4x - 3y$
- D. $4x + 3y$

37. Determine a factor of $45a^2 - 125b^2$.

- A. $3a + 5b$
- B. $9a - 5b$
- C. $3a - 25b$
- D. $9a + 25b$

38. Simplify for all permissible values : $\frac{x^2 - 144}{(x - 12)^2}$

- A. 1
- B. $\frac{1}{x - 12}$
- C. $\frac{x - 12}{x + 12}$
- D. $\frac{x + 12}{x - 12}$

39. Simplify for all permissible values : $\frac{y^2 - 5y + 6}{2y^2 - 7y + 6}$

A. $\frac{y-3}{2y-3}$

B. $\frac{y-2}{2y-3}$

C. $\frac{y-5}{2y-7}$

D. $\frac{-5y+6}{-7y+8}$

40. Simplify : $\frac{6}{5x} - \frac{1}{3x}$; $x \neq 0$

A. $\frac{1}{3x}$

B. $\frac{5}{2x}$

C. $\frac{13}{15x}$

D. $\frac{23}{15x}$

41. How many non-permissible values does the following expression have?

$$\frac{a+2}{a} - \frac{a+4}{a-3}$$

Record your answer neatly on the Answer Sheet.

42. Simplify for all permissible values : $\frac{x^2 - 3x}{2x^2 - 5x + 2} \times \frac{2x^2 + x - 1}{x^2 - 2x - 3}$

A. $-\frac{1}{2}$

B. $\frac{x}{x-2}$

C. $\frac{x(x-3)}{x+3}$

D. $\frac{x(2x-1)}{(x+2)(2x+1)}$

43. Simplify for all permissible values : $\frac{3}{x-1} - \frac{1}{x} + 2$

A. $\frac{2x^2 + 1}{x(x-1)}$

B. $\frac{2x^2 - 1}{x(x-1)}$

C. $\frac{4}{x(x-1)}$

D. $\frac{2}{x(x-1)}$

44. Solve for x : $\frac{5x-7}{2} + 3 = \frac{2x-1}{3} - 4x$

A. $-\frac{1}{7}$

B. 0

C. $\frac{1}{35}$

D. $\frac{16}{15}$

45. Solve for x : $\frac{5x+1}{x^2-16} - \frac{5}{x+4} = \frac{6}{x-4}$

A. $-\frac{5}{2}$

B. $-\frac{7}{6}$

C. $-\frac{1}{2}$

D. 2

46. Which of the following is the equation of the horizontal line containing the point $(5, -4)$?

A. $x = -4$

B. $y = -4$

C. $x = 5$

D. $y = 5$

47. Determine an equation of the line with slope $\frac{3}{2}$ and passing through the point $(6, 12)$.

A. $3x - 2y + 6 = 0$

B. $3x - 2y + 12 = 0$

C. $3x - 2y + 42 = 0$

D. $2x - 3y + 24 = 0$

48. Which of the following is the equation of the line that passes through $(-2, 5)$ and has an x -intercept of 6?

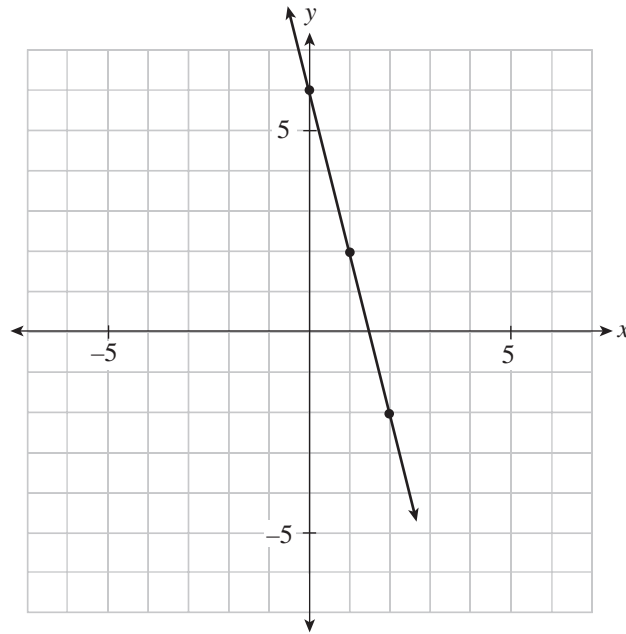
A. $y = -\frac{1}{2}x + 3$

B. $y = -\frac{5}{8}x + 6$

C. $y = -\frac{5}{8}x + \frac{15}{4}$

D. $y = -\frac{11}{5}x + \frac{48}{5}$

49. Determine the slope of the following line :



Record your answer neatly on the Answer Sheet.

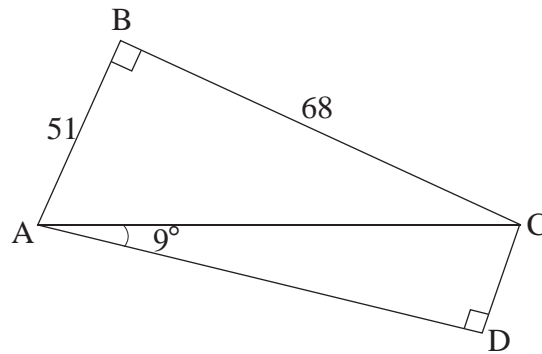
50. The slope of a line segment joining $M(-8, 3)$ and $N(7, k)$ is $\frac{2}{5}$. Determine the value of k .

- A. $\frac{6}{5}$
- B. $\frac{13}{5}$
- C. 9
- D. $\frac{81}{2}$

51. Which of the following equations for a line is parallel to the graph of $y = \frac{1}{2}x + 7$ and passes through the point $(0, -4)$?
- A. $y = -2x - 4$
 - B. $y = \frac{1}{2}x - 4$
 - C. $y = \frac{1}{2}x + 2$
 - D. $y = \frac{1}{2}x + 4$
52. Which of the following is the equation of the line passing through $(-1, 5)$ and perpendicular to the graph of $y = -3x + 7$?
- A. $y = -\frac{1}{3}x + \frac{14}{3}$
 - B. $y = \frac{1}{3}x - \frac{14}{3}$
 - C. $y = \frac{1}{3}x + \frac{16}{3}$
 - D. $y = \frac{1}{3}x + \frac{14}{3}$
53. A line segment with length $\sqrt{65}$ has one endpoint at $(3, 9)$. The other endpoint is at $(-4, y)$. Determine a value of y .
- A. 1
 - B. 5
 - C. 9
 - D. 17

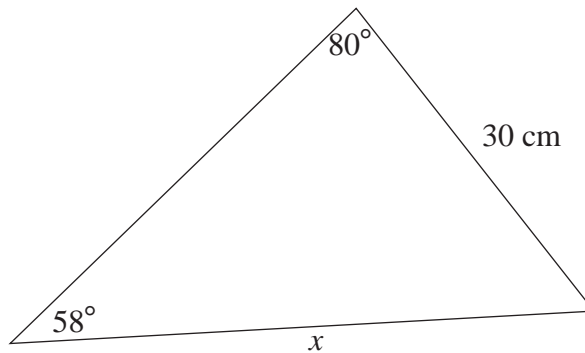
54. A circle has a centre at $(-3, 1)$ and point $P(0, 5)$ is on the circle. What is the area of the circle, in units squared?
- A. 78.54
 B. 31.42
 C. 25
 D. 5

55. Determine the measure of $\angle BCD$. Answer to the nearest degree.



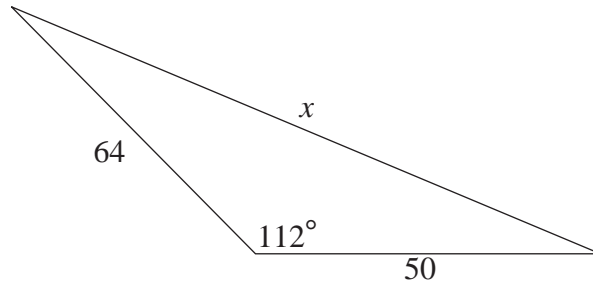
Record your answer neatly on the Answer Sheet.

56. Determine the length of x .



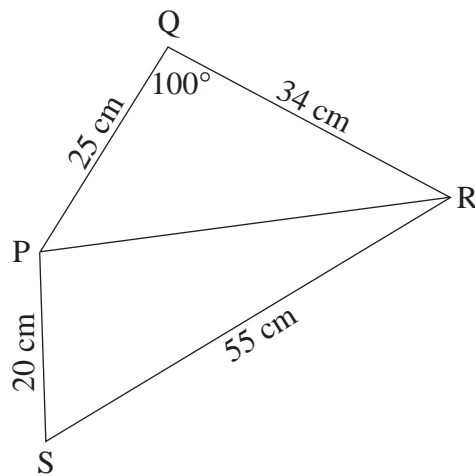
- A. 35.4 cm
 B. 34.8 cm
 C. 25.8 cm
 D. 25.1 cm

57. Determine the length of x .



- A. 64.8
- B. 81.2
- C. 88.3
- D. 94.8

58. Determine the measure of $\angle PSR$.



- A. 39°
- B. 41°
- C. 49°
- D. 52°

59. What obtuse angle has a sine value of $\frac{2}{5}$?

- A. 23.58°
- B. 66.42°
- C. 113.58°
- D. 156.42°

60. The point $M(a, 1)$ is the midpoint of the line segment \overline{VW} with point $V(-10, b)$ and point $W(6, 11)$. Determine the value of $a + b$.

- A. -2
- B. -5
- C. -11
- D. -15

You have **Examination Booklet Form A**. In the box above #1 on your **Answer Sheet**, ensure you filled in the bubble as follows.

Exam Booklet Form/ Cahier d'examen	A	B	C	D	E	F	G	H
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END OF EXAMINATION

Examination Rules

1. The time allotted for this examination is two hours.
You may, however, take up to 60 minutes of additional time to finish.
2. Answers entered in the Examination Booklet will not be marked.
3. Cheating on an examination will result in a mark of zero. The Ministry of Education considers cheating to have occurred if students break any of the following rules:
 - Students must not be in possession of or have used any secure examination materials prior to the examination session.
 - Students must not communicate with other students during the examination.
 - Students must not give or receive assistance of any kind in answering an examination question during an examination, including allowing one's paper to be viewed by others or copying answers from another student's paper.
 - Students must not possess any book, paper or item that might assist in writing an examination, including a dictionary or piece of electronic equipment, that is not specifically authorized for the examination by ministry policy.
 - Students must not copy, plagiarize or present as one's own, work done by any other person.
 - Students must immediately follow the invigilator's order to stop writing at the end of the examination time and must not alter an Examination Booklet, Response Booklet or Answer Sheet after the invigilator has asked students to hand in examination papers.
 - Students must not remove any piece of the examination materials from the examination room, including work pages.
4. The use of inappropriate language or content may result in a mark of zero being awarded.
5. Upon completion of the examination, return all examination materials to the supervising invigilator.

Formulae Sheet

$$\text{Area of a triangle: } = \frac{bh}{2}$$

$$\text{Circumference of a circle: } = 2\pi r$$

$$\text{Area of a circle: } = \pi r^2$$

$$\text{Volume of rectangular prism: } = lwh$$

NOTE: Use the value of π programmed in your calculator rather than the approximation of 3.14.

$$c^2 = a^2 + b^2$$

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

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$M = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

$$t_n = a + (n-1)d$$

$$S_n = \frac{n}{2}(a + t_n)$$

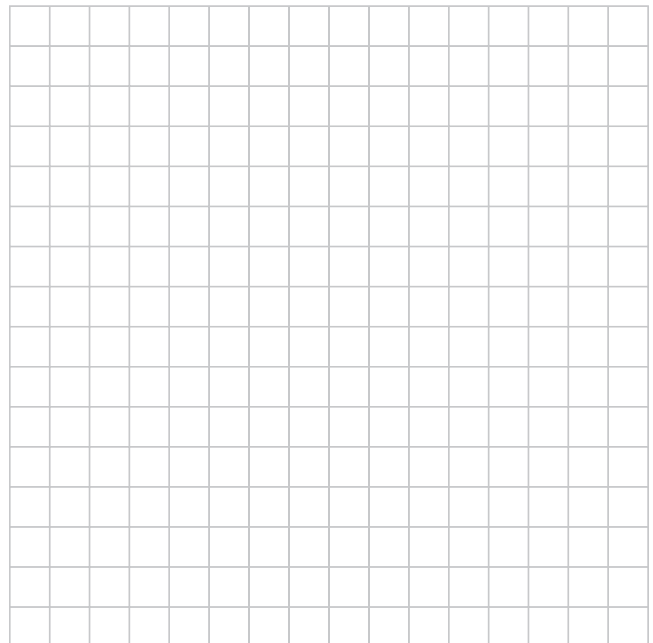
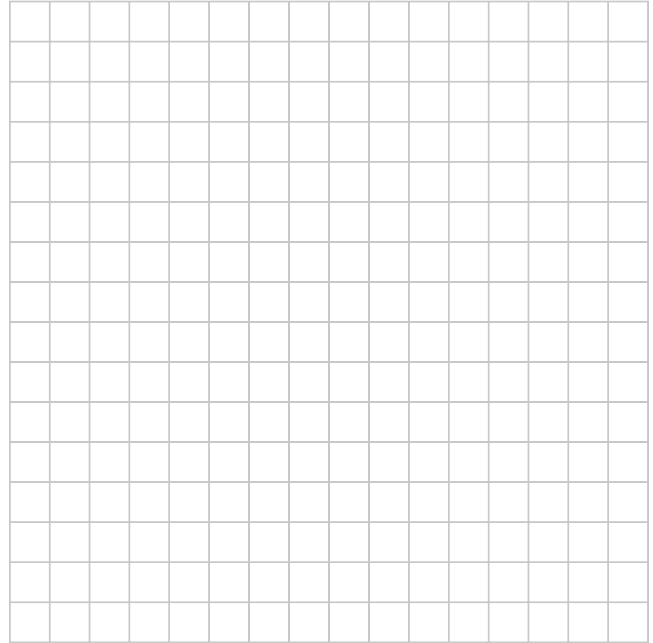
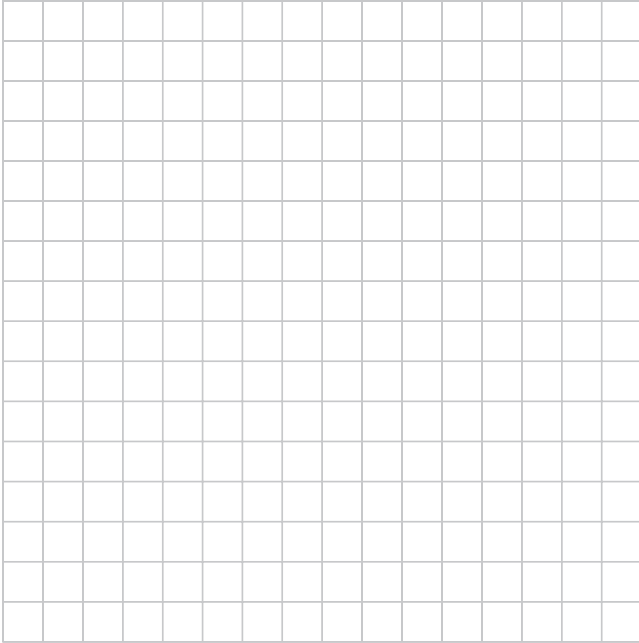
$$S_n = \frac{n}{2}[2a + (n-1)d]$$

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

$$c^2 = a^2 + b^2 - 2ab \cos C$$

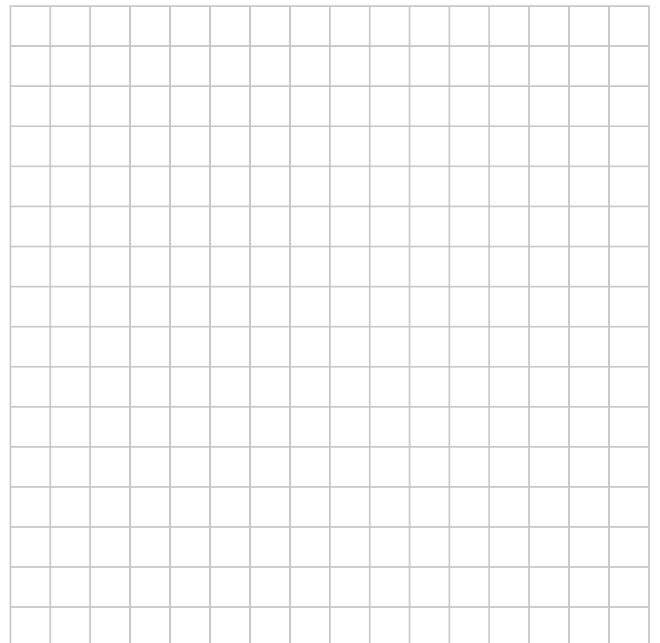
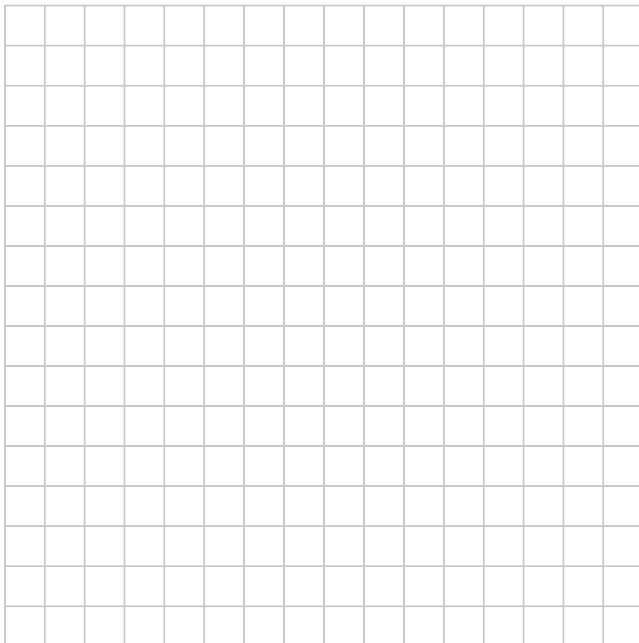
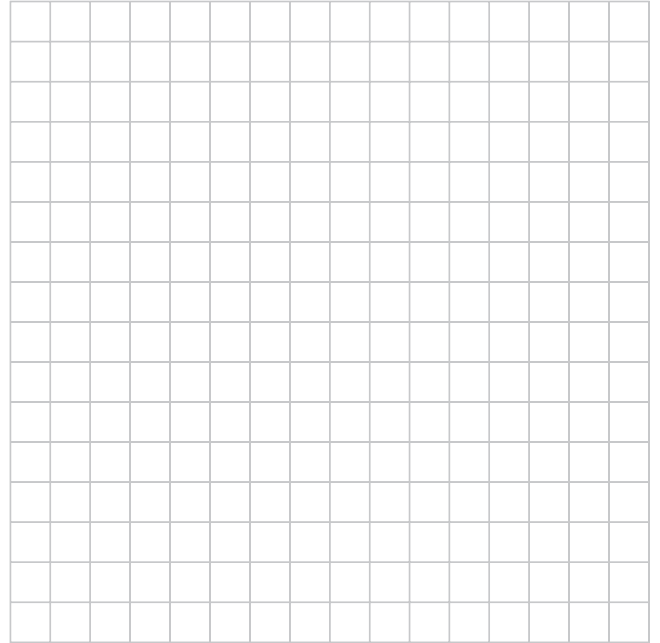
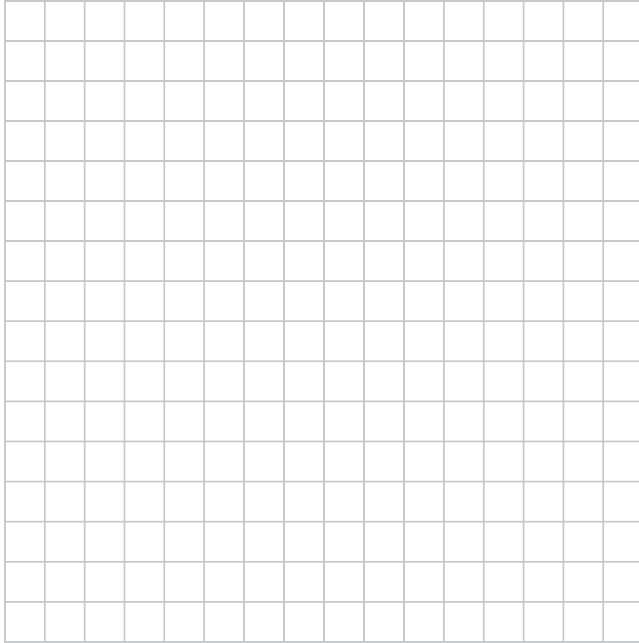
ROUGH WORK FOR GRAPHING

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ROUGH WORK FOR GRAPHING

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ROUGH WORK SPACE