

Principles of Mathematics 10

Examination Booklet

Sample 2007/08

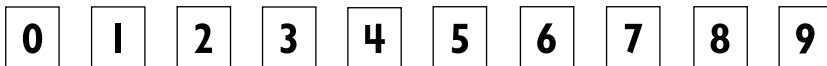
Form A

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
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1. Simplify : $3\sqrt{50}$

- A. $\sqrt{150}$
- B. $5\sqrt{2}$
- C. $15\sqrt{2}$
- D. $75\sqrt{2}$

2. Simplify : $3\sqrt{12} - 4\sqrt{3} + 5\sqrt{27}$

- A. $17\sqrt{3}$
- B. $23\sqrt{3}$
- C. $25\sqrt{3}$
- D. $53\sqrt{3}$

3. Simplify : $\sqrt{6}(2 + 4\sqrt{2})$

- A. $8\sqrt{3} + 2\sqrt{6}$
- B. $16\sqrt{3} + 2\sqrt{6}$
- C. $24\sqrt{2} + 2\sqrt{6}$
- D. $10\sqrt{3}$

4. Simplify : $\frac{10\sqrt{6}}{4\sqrt{18}}$

A. $\frac{5\sqrt{3}}{2}$

B. $\frac{5\sqrt{3}}{6}$

C. $\frac{5\sqrt{3}}{18}$

D. $\frac{5\sqrt{6}}{6}$

5. Simplify : $(2\sqrt{3} + \sqrt{6})^2$

A. 18

B. $18 + 6\sqrt{2}$

C. $12 + 12\sqrt{2}$

D. $18 + 12\sqrt{2}$

6. Find the equivalent form of the following expression :

$$\frac{\sqrt{6}}{\sqrt{6} - \sqrt{7}}$$

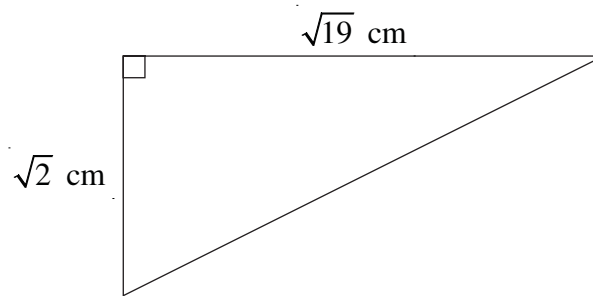
A. $6 + \sqrt{42}$

B. $6 - \sqrt{42}$

C. $-6 - \sqrt{42}$

D. $-6 + \sqrt{42}$

7. Determine the perimeter, in centimetres, of the triangle shown below. Answer to two decimal places.



Record your answer neatly on the Answer Sheet.

8. Which of the following is an irrational number?

- A. $\sqrt{24}$
- B. $-\sqrt[4]{16}$
- C. 2^{-4}
- D. $(-0.4)^2$

9. Which of the following statements are true?

I.	A whole number is an integer.
II.	A rational number is a real number.
III.	A repeating decimal is an irrational number.
IV.	A rational number can be expressed as a fraction.

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

10. Simplify : $\left(\frac{3x^4y}{5y^{-1}}\right)^{-2}$

- A. $-\frac{9x^8}{25y^2}$
- B. $-\frac{3y^4}{5x^8}$
- C. $\frac{5}{3x^8y^4}$
- D. $\frac{25}{9x^8y^4}$

11. Simplify : $\frac{x^{6a+7}}{(x^{a+1})(x^{a-2})}$

A. x^{8a+6}

B. x^{4a+8}

C. x^{4a+6}

D. x^{3a-7}

12. Which of the following is equivalent to $a^{\frac{2}{3}}$; $a > 0$, $a \neq 1$?

A. $\frac{1}{\frac{3}{a^2}}$

B. $\sqrt{a^3}$

C. $(\sqrt[3]{a})^2$

D. $(a^3)^{\frac{1}{2}}$

13. Simplify : $\left(2a^{\frac{1}{2}} \times 5a^{\frac{5}{2}}\right)^2$

A. $100a^9$

B. $100a^6$

C. $100a^{\frac{25}{16}}$

D. $10a^6$

14. Simplify : $\frac{x + \sqrt[4]{x^3}}{\sqrt{x}}$; $x > 0$

A. $x^{\frac{3}{4}}$

B. $x^{\frac{5}{4}}$

C. $x^{\frac{1}{2}} + x^{\frac{1}{4}}$

D. $x^{\frac{1}{2}} + x^{\frac{3}{4}}$

15. When $\sqrt{x^4}$ is written as a power of x , what is the exponent?

Record your answer neatly on the Answer Sheet.

16. Which of the following is an arithmetic sequence?

A. 1, 3, 4, 7, 11, ...

B. 1, 2, 4, 8, 16, ...

C. 0, -2, 4, -6, 8, ...

D. -12, -5, 2, 9, 16, ...

17. Find the number of terms in the following arithmetic sequence :

48, 52, 56, ..., 148

A. 25

B. 26

C. 27

D. 28

18. Determine the fifth term in the following arithmetic sequence :

$$-2x + 3y, -5x + y, -8x - y, \dots$$

- A. $-11x - 3y$
B. $-14x - 5y$
C. $-17x - 7y$
D. $-20x - 9y$
19. Felicity starts a new job with a salary of \$16 000 per year. She receives a raise of \$850 each year with this company. Calculate her total earnings after fourteen years.
- A. \$27 050
B. \$274 300
C. \$301 350
D. \$329 250
20. Determine the value of S_{19} for the following arithmetic series.

$$(-10) + (-4) + 2 + \dots$$

Record your answer neatly on the Answer Sheet.

21. A plumber charges \$30 to come out to your home and \$45 for each hour of work.
Which of the following are true?

I.	The equation representing this function is $C = 45h + 30$.
II.	The total charge versus the hours worked represents a linear function.
III.	The total charge varies directly as the number of hours worked.
IV.	<p>The graph of the function is:</p>

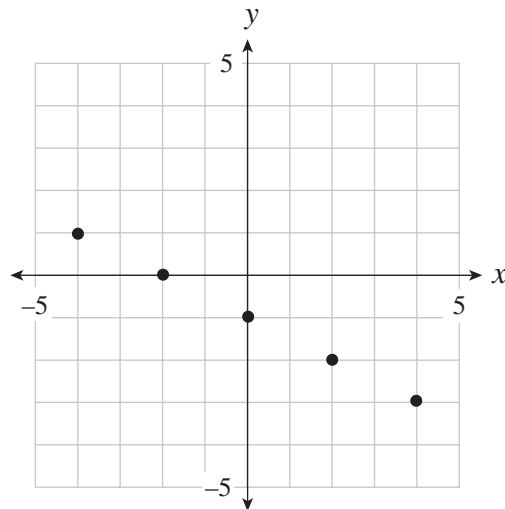
- A. I and II only
 B. II and III only
 C. I, II and III only
 D. I, II and IV only

22. Which of the following ordered pairs are found on the line represented by the equation $x + 3y = 6$?

I.	$(3, 1)$
II.	$(-6, 4)$
III.	$(0, 2)$

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

23. Determine the value of x if $f(x) = -2$.



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

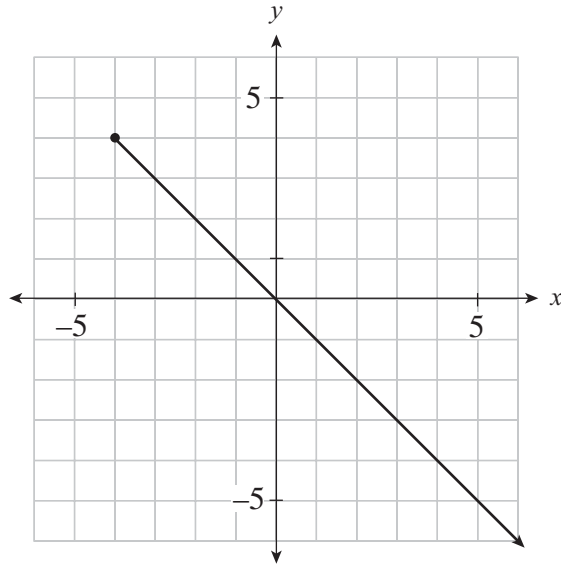
24. If $f(x) = -2x + 3$ and $g(x) = \frac{1}{2}x - 8$, which statement is true?

- A. $f(-2) - g(-2) = -2$
- B. $f(-2) - g(-2) = 2$
- C. $f(-2) + g(-2) = -2$
- D. $f(-2) + g(-2) = 2$

25. If $g(x) = 2x + 2$ and $f(x) = 4x - 1$, evaluate $g\left(-\frac{3}{\sqrt{2}}\right) - f\left(-\frac{1}{\sqrt{2}}\right)$.

- A. $-5\sqrt{2} + 1$
- B. $-5\sqrt{2} + 3$
- C. $-\sqrt{2} + 1$
- D. $-\sqrt{2} + 3$

26. Which of the following is true about the domain of the following relation?



- A. $x \geq -2$
- B. $x \leq -2$
- C. $y \leq 2$
- D. all real numbers

27. Determine the slope of the following relation : $3x - 2y + 4 = 0$

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

28. Which of the following equations represents the steepest line?

A. $3x + 4y = -17$

B. $3x + 5y = 18$

C. $4x + 3y = 10$

D. $5x + 3y = 10$

29. Determine the range of the following relation : $y - 6 = 0$

A. 0

B. 6

C. undefined

D. all real numbers

30. Determine the y-intercept of the line whose equation is $5x - 4y - 10 = 0$.

Record your answer neatly on the Answer Sheet.

31. When $(a + b)^2$ is expanded, how many terms are in the simplified product?

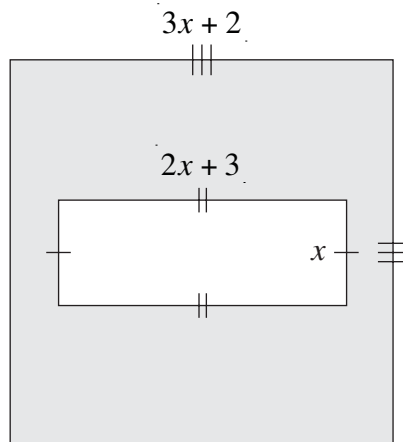
A. 2

B. 3

C. 4

D. 5

Use the following diagram to answer question 32.



32. Determine the area of the shaded region.

- A. $7x^2 - 3x + 4$
 - B. $7x^2 + 3x + 4$
 - C. $7x^2 + 9x + 4$
 - D. $7x^2 + 15x + 4$
-

33. Solve: $\frac{x-2}{3x+1} = \frac{1}{2}$

Record your answer neatly on the Answer Sheet.

34. Kim is thinking of a certain whole number. Nine more than that number is divided by the original number. This gives the same result as when one more than the number is divided by five less than the number. What is the number?
- A. 3
 - B. 9
 - C. 11
 - D. 15

35. Determine the remainder : $\frac{2x^3 + 5x^2 - 2x + 6}{2x + 1}$

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

36. Determine the quotient : $\frac{x^3 - 6x - 10}{x + 2}$

- A. $x^2 + 2x - 2$
- B. $x^2 - 2x - 2$
- C. $x^2 - 4x - 18$
- D. $x^2 - 8x + 6$

37. Which of the following is a factor of $4x^2 - 7x - 2$?

- A. $x + 3$
- B. $2x + 1$
- C. $4x + 1$
- D. $4x - 1$

38. Which of the following is a factor of $3(x + y)^2 - 5(x + y) - 2$?

- A. $x + y - 1$
- B. $x + y + 2$
- C. $3x + 3y - 2$
- D. $3x + 3y + 1$

39. What are the non-permissible values of x in the following rational expression?

$$\frac{x-3}{x^4-5x^2-36}$$

- A. $-3, 3$
- B. $-3, -2, 2$
- C. $-2, 2, 3$
- D. $-3, -2, 2, 3$

40. Simplify for all permissible values of x : $\frac{4x^2-15x+9}{2x^2-x-15}$

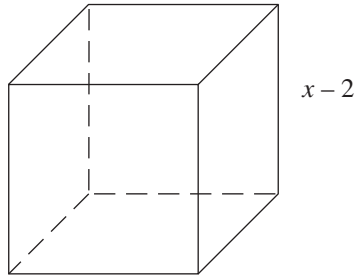
- A. $\frac{4x-3}{2x+5}$
- B. $\frac{4x-3}{2x-5}$
- C. $\frac{4x-5}{2x+3}$
- D. $\frac{4x+3}{2x-5}$

41. Given that both rational expressions are defined, what is the value of k ?

$$\frac{x^2-2x-8}{x^2+8x+12} = \frac{x-4}{x+k}$$

Record your answer neatly on the Answer Sheet.

42. A cube has side length $x - 2$.



Which of the following represents the ratio of the cube's surface area to its volume?

- A. $\frac{6(x+2)^2}{(x-2)^3}$
- B. $\frac{6(x+2)}{(x-2)^2}$
- C. $\frac{6}{(x-2)^2}$
- D. $\frac{6}{x-2}$
43. Determine the lowest common denominator of $\frac{1}{x}$ and $\frac{1}{2x}$.
- A. x
- B. $2x$
- C. $3x$
- D. $2x^2$

44. Simplify: $\frac{x}{x+2} - \frac{x}{x+4}$; $x \neq -2, -4$

A. 0

B. $\frac{x}{x+4}$

C. $\frac{2x}{(x+2)(x+4)}$

D. $\frac{6x}{(x+2)(x+4)}$

45. Simplify for all permissible values of x : $\frac{9x^2 - 1}{6x^2 - 17x + 5} \div \frac{x+2}{8x-20}$

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

B. $\frac{2(3x+1)}{x}$

C. $\frac{4(3x-1)}{x+2}$

D. $\frac{4(3x+1)}{x+2}$

46. Determine the value(s) for $\angle A$ if $\sin A = 0.5$; $0^\circ \leq A \leq 180^\circ$.

A. 30°

B. 60°

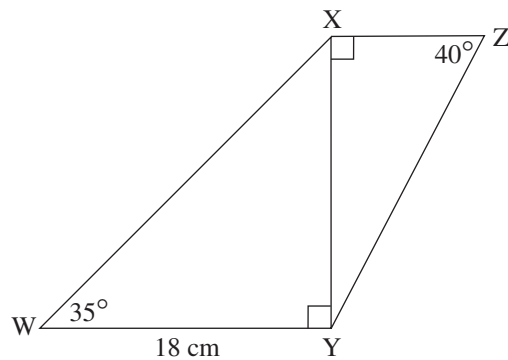
C. $30^\circ, 150^\circ$

D. $60^\circ, 120^\circ$

47. If $\sin \theta = \frac{2}{3}$ and $\angle \theta$ is an obtuse angle, what is the value of $\cos \theta$?

- A. -0.7454
- B. -0.3333
- C. 0.3333
- D. 0.7454

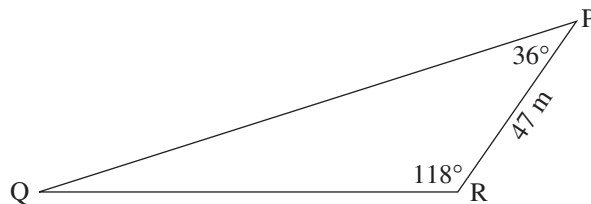
Use the following diagram to answer question 48.



48. Calculate the length of YZ.

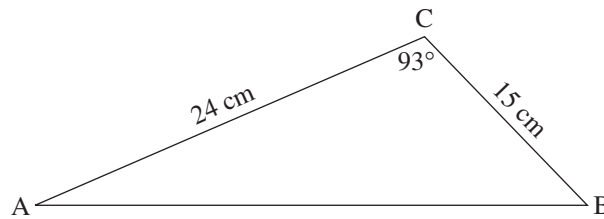
- A. 16.06 cm
- B. 16.45 cm
- C. 19.61 cm
- D. 22.94 cm

49. Determine the length of QR to the nearest metre.



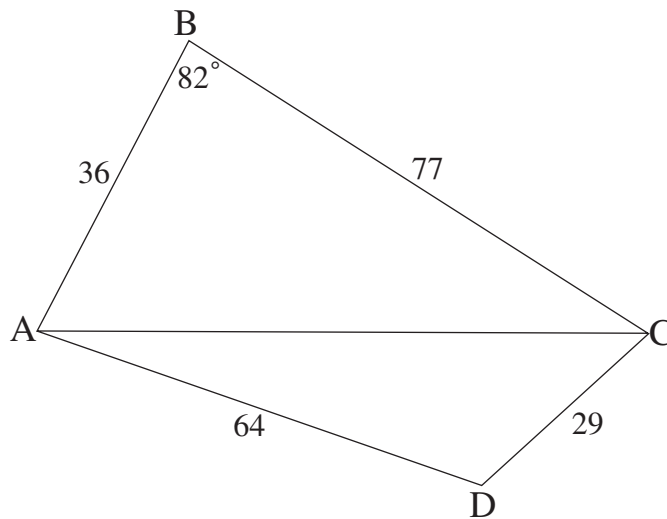
Record your answer neatly on the Answer Sheet.

50. Determine the length of AB.



- A. 27.63 cm
- B. 28.63 cm
- C. 28.96 cm
- D. 39.24 cm

51. Determine the measure of $\angle ADC$.

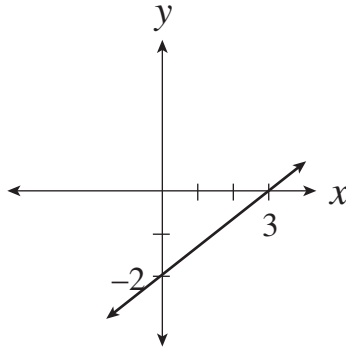


- A. 66°
- B. 114°
- C. 121°
- D. 146°

52. Determine the equation of the line that has a slope of -2 and an x -intercept of $\frac{3}{2}$.

- A. $y = -2x - 3$
- B. $y = -2x + 3$
- C. $y = -2x + 7$
- D. $y = 3x - 2$

Use the following graph to answer question 53.



53. Which of the following equations is represented by the line shown above?

- A. $2x - 3y - 6 = 0$
 - B. $2x - 3y - 2 = 0$
 - C. $2x - 3y + 9 = 0$
 - D. $3x - 2y - 4 = 0$
-

54. What is the equation of the line that passes through the point $(6, -3)$ and is parallel to the line $y = \frac{2}{3}x + 4$?

- A. $y = \frac{2}{3}x - 7$
- B. $y = -\frac{3}{2}x - 6$
- C. $y = -\frac{3}{2}x + 6$
- D. $y = \frac{3}{2}x - 12$

55. Determine the slope of the line perpendicular to the line $y = -\frac{1}{2}x + 3$.

Record your answer neatly on the Answer Sheet.

56. The line ℓ_1 passes through the point $(-4, -4)$ and has an x -intercept of 4. Which of the following statements are true?

I.	ℓ_1 has a y -intercept of -2
II.	ℓ_1 passes through the point $(8, 2)$
III.	ℓ_1 is perpendicular to $y = -2x - 2$

- A. I and II only
C. I and III only
B. II and III only
D. I, II and III
57. A line segment has endpoints $A(8, -3)$ and $B(-5, 7)$. Determine the x -coordinate of the midpoint of \overline{AB} .
- A. $\frac{2}{3}$
B. $\frac{3}{2}$
C. 2
D. $\frac{13}{2}$

58. The point $M(1, 2)$ is the midpoint of the line segment \overline{VW} with point $V(-2, -5)$ and point $W(x, y)$. Determine the y -coordinate of W .

- A. -1.5
- B. -0.5
- C. 4
- D. 9

59. A line segment has endpoints $A(-7, 3)$ and $B(8, -2)$. Determine the slope of AB .

- A. 5
- B. 3
- C. 1
- D. $-\frac{1}{3}$

60. The point $(2, -1)$ is on the circumference of a circle with centre $(-4, 3)$. Determine the area of the circle.
- A. 25.1
 - B. 43.3
 - C. 163.4
 - D. 182.2

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

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

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

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

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

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

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

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

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

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

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

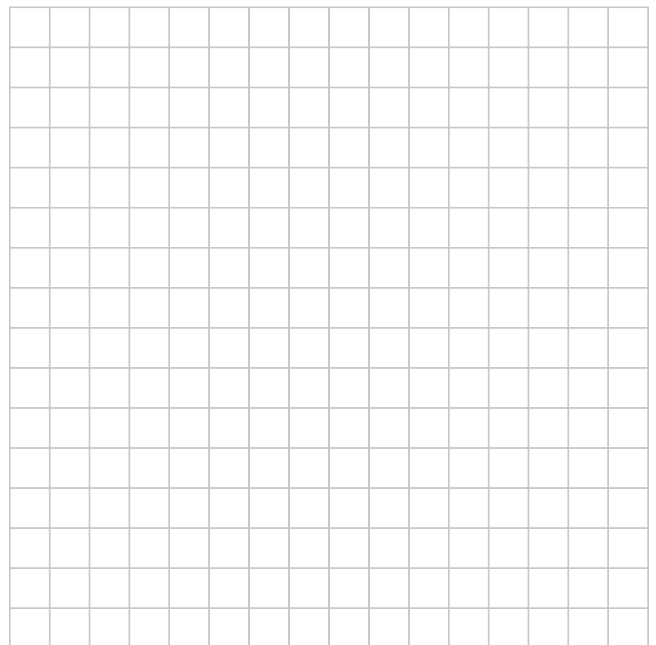
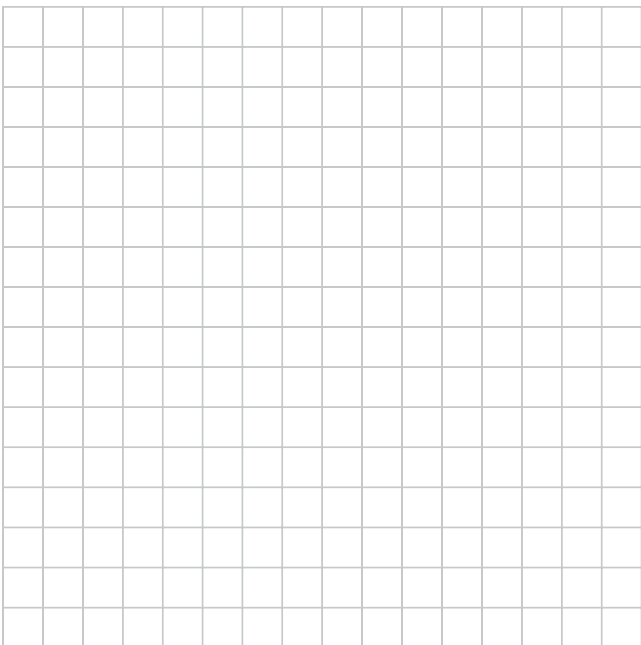
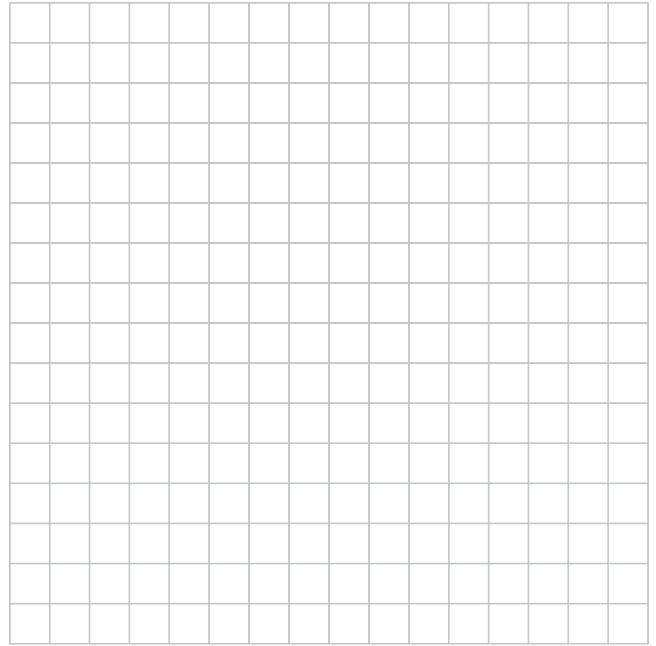
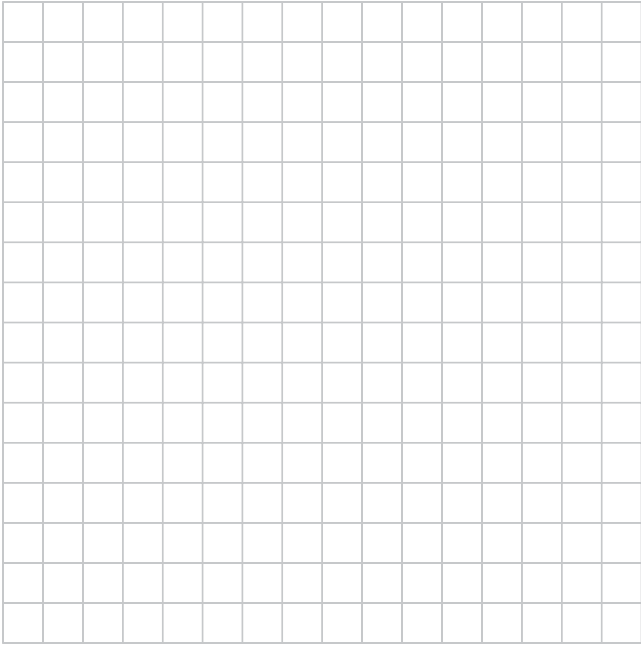
$$S_n = \frac{n}{2}[2a + (n - 1)d]$$

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

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

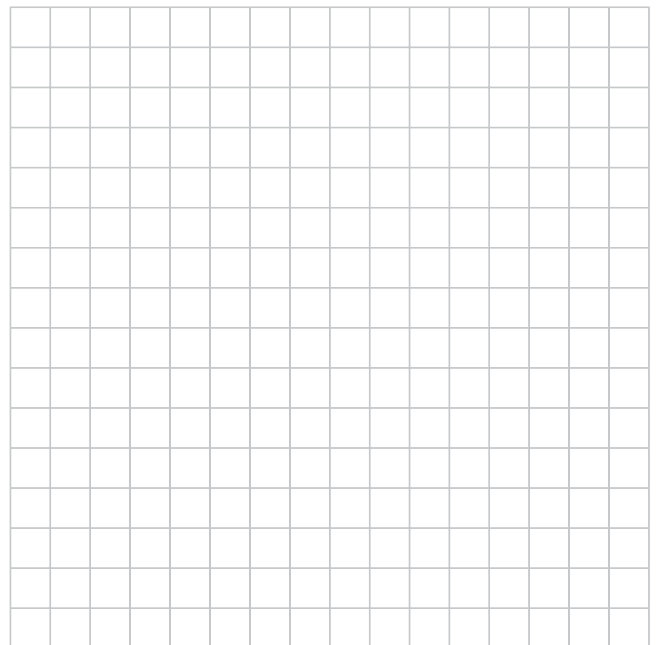
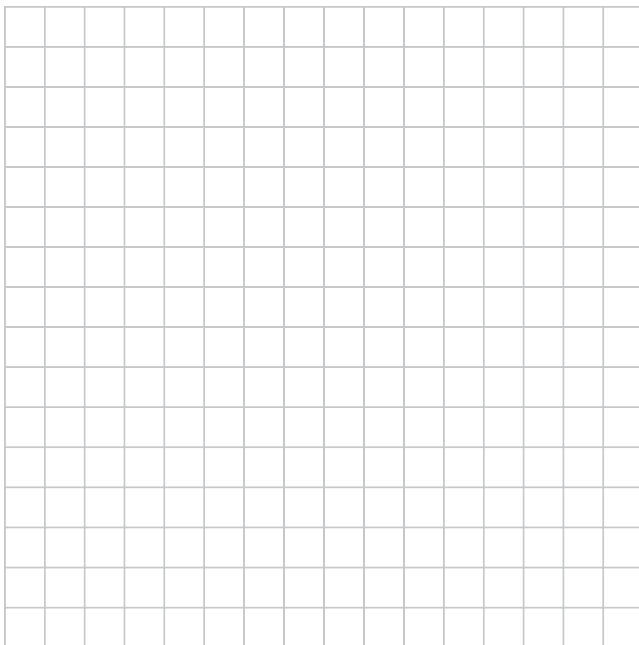
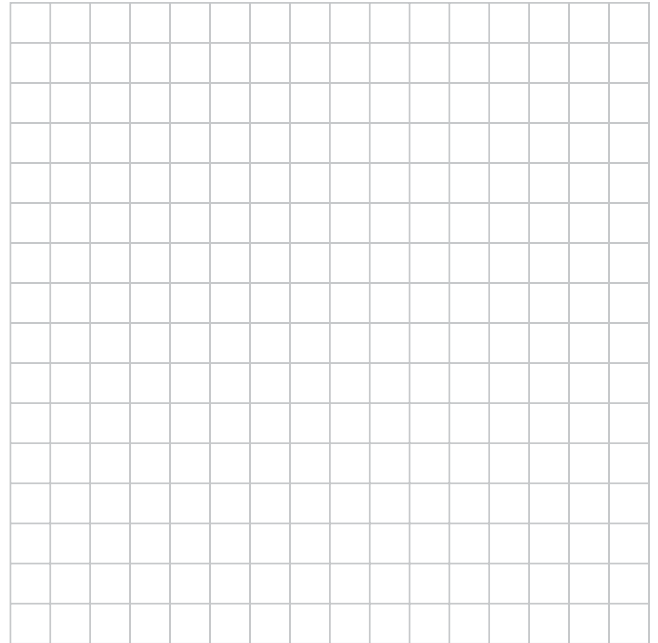
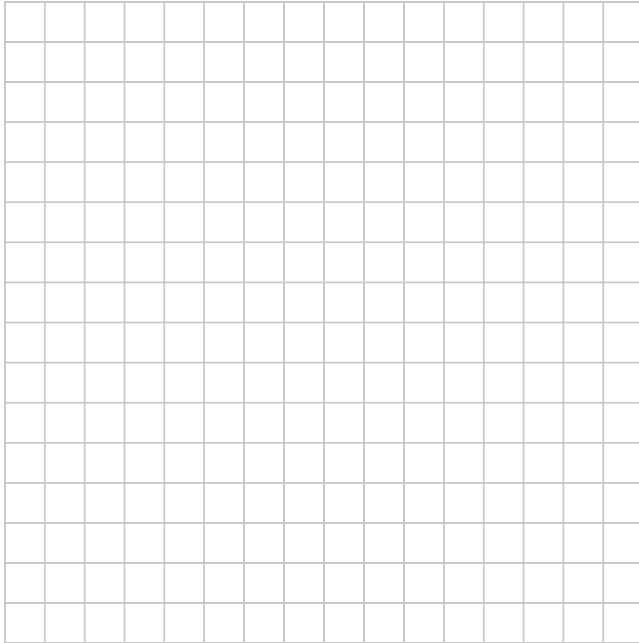
ROUGH WORK FOR GRAPHING

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ROUGH WORK FOR GRAPHING

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ROUGH WORK SPACE