

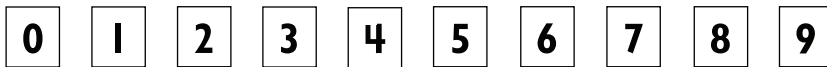
**Principles of Mathematics 10**  
**Examination Booklet**  
**2008/09 Released Exam**  
**October 2008**  
**Form A**

**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  $\pi$  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.

**Contents: 24 pages**

52 multiple-choice questions (52 marks)

8 numerical-response questions (8 marks)

**Examination: 2 hours**

**Additional Time Permitted: 60 minutes**

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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. Which of the following is a natural number?

A.  $\sqrt{25}$

B.  $\frac{1}{4}$

C. 0

D. -8

2. Which of the following statements is always true?

A. All radicals are rational numbers.

B. All rational numbers are integers.

C. The quotient of any two integers is always an integer.

D. The difference of any two whole numbers is always an integer.

3. Simplify:  $(-48x^{-2}y^{-5}) \div (6x^3y^{-3})$

A.  $-\frac{8}{x^5y^2}$

B.  $-\frac{8}{xy^2}$

C.  $-\frac{8}{xy^8}$

D.  $-\frac{8x^5}{y^8}$

4. Simplify :  $(-5x^{-4})^{-3}$

A.  $-5x^{12}$

B.  $15x^{12}$

C.  $-\frac{x^{12}}{125}$

D.  $-\frac{1}{125x^{12}}$

5. Simplify :  $(-27x)^{\frac{2}{3}}$

A.  $9x^{\frac{2}{3}}$

B.  $-9x^{\frac{2}{3}}$

C.  $-18x^{\frac{2}{3}}$

D.  $-27x^{\frac{2}{3}}$

6. Simplify :  $\left(a^{\frac{1}{2}} \times a^{\frac{3}{2}}\right)^3$

A.  $a^{\frac{9}{4}}$

B.  $a^5$

C.  $a^6$

D.  $a^8$

7. Determine the value of  $k$  when  $\sqrt[4]{a^8}$  is written as  $a^k$ .

**Record your answer neatly on the Answer Sheet.**

8. Simplify :  $\frac{x^4 + x^2}{\sqrt{x^3}}$ ;  $x > 0$

A.  $x^{\frac{9}{2}}$

B.  $x^{\frac{7}{2}}$

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

D.  $x^{\frac{5}{2}} + x^{\frac{1}{2}}$

9. Simplify :  $9\sqrt{6} - 4\sqrt{5} - (7\sqrt{5} + 4\sqrt{6})$

A.  $5\sqrt{6} - 11\sqrt{5}$

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

C.  $13\sqrt{6} - 11\sqrt{5}$

D.  $13\sqrt{6} + 3\sqrt{5}$

10. Simplify :  $3\sqrt{75} - \sqrt{48}$

- A.  $7\sqrt{3}$
- B.  $9\sqrt{3}$
- C.  $11\sqrt{3}$
- D.  $59\sqrt{3}$

11. Simplify :  $(\sqrt{20} - \sqrt{15})^2$

- A. 5
- B.  $5 - 10\sqrt{3}$
- C.  $35 - 10\sqrt{3}$
- D.  $35 - 20\sqrt{3}$

12. Simplify :  $\frac{\sqrt{10}}{\sqrt{24}}$

- A.  $\frac{\sqrt{5}}{2}$
- B.  $\frac{\sqrt{5}}{6}$
- C.  $\frac{\sqrt{15}}{6}$
- D.  $\frac{\sqrt{15}}{18}$

13. Simplify:  $\frac{\sqrt{6}}{2\sqrt{2}-\sqrt{6}}$

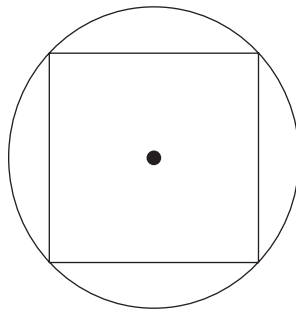
A.  $\sqrt{3}-3$

B.  $2\sqrt{3}+3$

C.  $2\sqrt{3}+6$

D.  $4\sqrt{3}+3$

14. A square is inscribed in a circle as shown. The area of the square is  $12 \text{ cm}^2$ . What is the area of the circle?



A.  $3\pi \text{ cm}^2$

B.  $6\pi \text{ cm}^2$

C.  $2\sqrt{3}\pi \text{ cm}^2$

D.  $2\sqrt{6}\pi \text{ cm}^2$

15. Evaluate  $\sqrt[3]{6} + \sqrt[4]{7}$  to two decimal places.

**Record your answer neatly on the Answer Sheet.**

16. Determine  $t_{42}$ .

57, 63, 69, ...

- A. 291
- B. 297
- C. 303
- D. 309

17. In a certain arithmetic sequence,  $t_6 + t_{15} = -141$  and the common difference is  $-7$ .  
What is the first term of the sequence?

- A. 3
- B.  $-1$
- C.  $-4$
- D.  $-39$

18. What is the sum of the following arithmetic series?

$(-28) + (-32) + (-36) + \dots + (-92)$

- A.  $-544$
- B.  $-960$
- C.  $-1020$
- D.  $-1080$

19. A stack of cans is made with 798 cans in 19 rows. If the cans are placed so that each row has 3 fewer cans than the row below it, how many cans are in the bottom row?

- A. 15
- B. 42
- C. 57
- D. 69

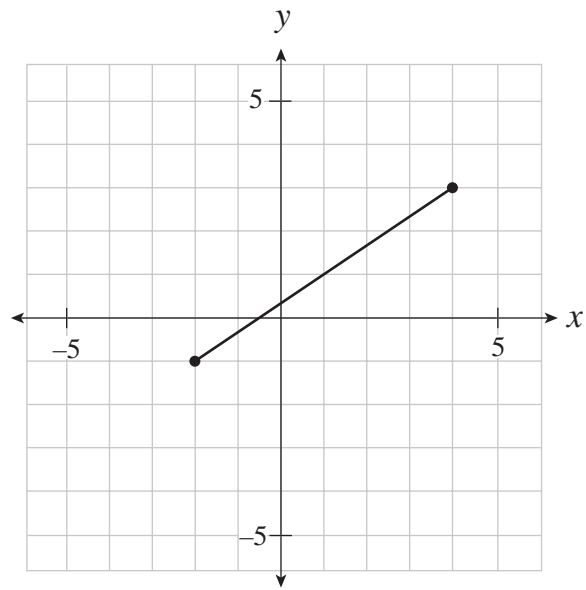


20. Determine the common difference in the following arithmetic sequence.

$7, 11, 15, 19, \dots$
------------------------

**Record your answer neatly on the Answer Sheet.**

21. Determine the range of the following graph.



- A.  $-1 \leq y \leq 3$
- B.  $-2 \leq y \leq 4$
- C.  $y \leq -1$  or  $y \geq 3$
- D. all real numbers

22. Determine the slope of the graph of  $2x + 3y = 8$ .

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

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

C.  $\frac{2}{3}$

D.  $\frac{8}{3}$

23. Which of the following equations has a graph with a slope of  $\frac{3}{2}$  and a y-intercept of  $-\frac{2}{3}$ ?

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

B.  $y = \frac{3}{2}x + \frac{2}{3}$

C.  $y = -\frac{2}{3}x - \frac{3}{2}$

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

24. Which of the following describes the graph of  $3x - 4y + 4 = 0$ ?

I.	The y-intercept is 1.
II.	The slope is $\frac{3}{4}$ .
III.	The domain is the set of all real numbers.

A. I and II only

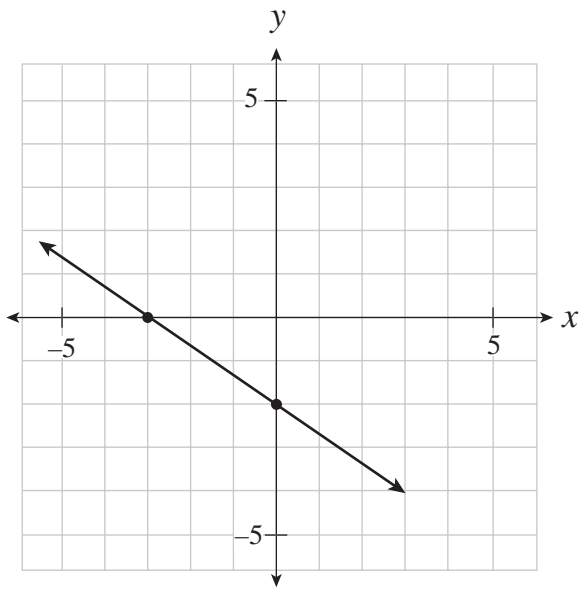
B. I and III only

C. II and III only

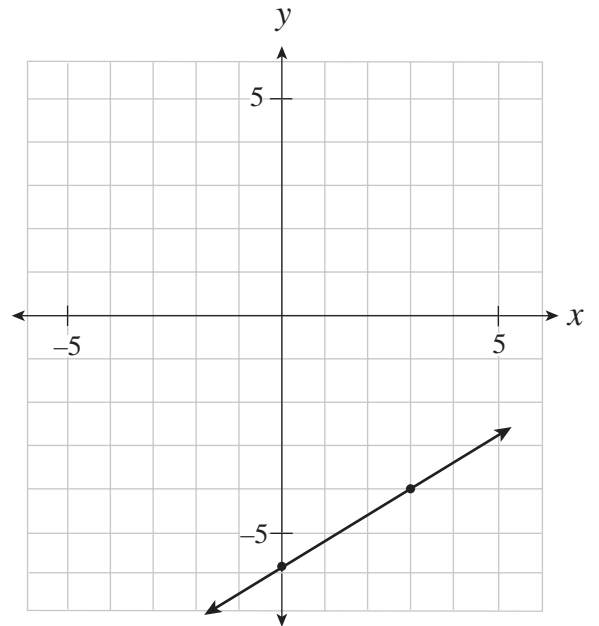
D. I, II and III

25. Which of the following graphs represents the equation  $2x - 3y - 6 = 0$ ?

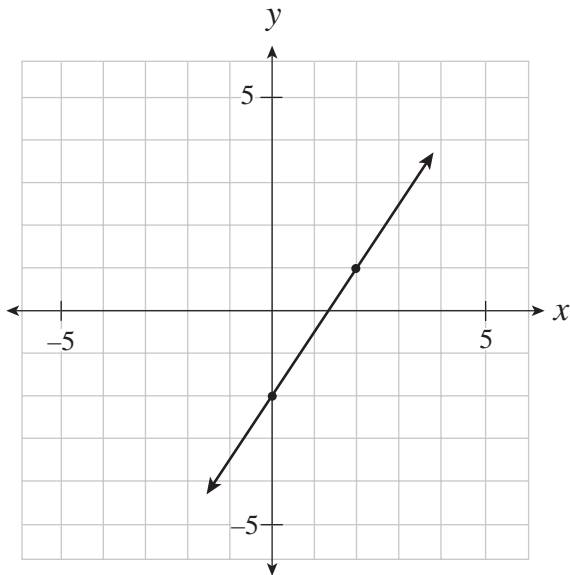
A.



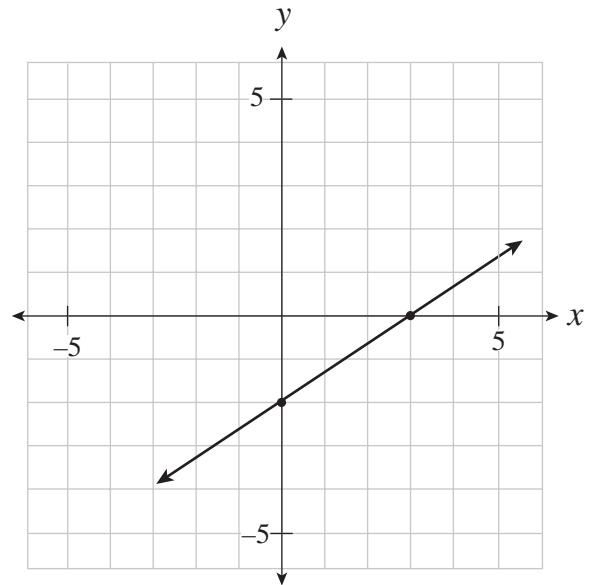
B.



C.



D.



26. If  $f(x) = 5x + 6$ , determine  $f(-3)$ .

A.  $-9$

B.  $-\frac{9}{5}$

C.  $3$

D.  $21$

27. If  $f(x) = -3x - 5$ , which of the following represents  $f(3x - 2)$ ?

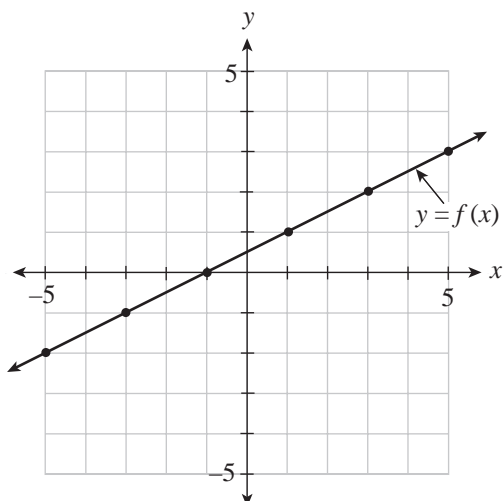
A.  $-9x - 11$

B.  $-9x - 7$

C.  $-9x - 1$

D.  $-9x + 1$

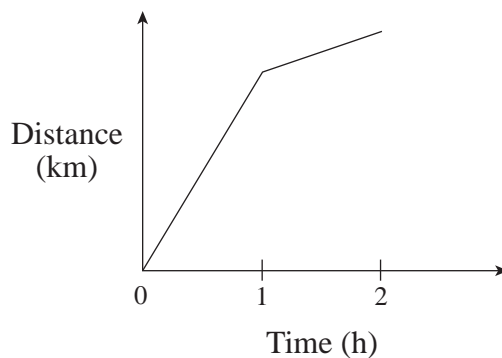
Use the following graph to answer question 28.



28. Determine the value of :  $2f(3) - f(-1)$

- A. 2
  - B. 4
  - C. 7
  - D. 13
- 

29. Which situation is **best** represented by the following graph?



- A. Dawn cycles for an hour and then stops for lunch for a second hour.
- B. Dawn cycles for an hour and then walks her bicycle for a second hour.
- C. Dawn walks for an hour and then gets on her bicycle and rides for a second hour.
- D. Dawn cycles up a steep hill for an hour then cycles up a less steep hill for a second hour.

30. A landscaper charges \$37 per hour plus a fixed rate for travelling to the worksite. If the total bill for 14 h is \$544, what is the total bill for 20 h?

**Record your answer neatly on the Answer Sheet.**

31. Which factor is common to both of the following polynomials?

$8x^2 - 2x - 1$
$4x^2 - 1$

- A.  $2x - 1$   
B.  $2x + 1$   
C.  $4x - 1$   
D.  $4x + 1$
32. What value of  $k$  will make the following trinomial a perfect square?

$$x^2 + 8x + k$$

- A. 4  
B. 16  
C. 32  
D. 64
33. Determine the value of B if the product of  $(2x + 1)(3x^2 + 4x - 3)$  is  $Ax^3 + Bx^2 + Cx + D$ .

**Record your answer neatly on the Answer Sheet.**

34. Expand and simplify  $(x - 5)(x - 5)$ . How many terms are in the simplified product?

- A. 1
- B. 2
- C. 3
- D. 4

35. 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.  $36x^4 + 81x^2 - x + 4$

36. Simplify for all permissible values :  $\frac{2x^2 + 9x - 5}{2x^2 - 3x + 1}$

- A.  $\frac{x - 5}{x - 1}$
- B.  $\frac{x + 5}{x - 1}$
- C.  $\frac{x + 5}{x + 1}$
- D.  $\frac{(2x + 1)(x - 5)}{(2x - 1)(x - 1)}$

37. Simplify for all permissible values :  $\frac{2x^3 - 5x^2}{4x^3 - 25x}$

A.  $\frac{x}{2x + 5}$

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

C.  $\frac{2x - 5}{2x + 5}$

D.  $\frac{2x - 5}{4x - 25}$

38. Simplify for all permissible values :  $\frac{x^2 - 10x - 24}{x^2 - 16x + 48} \div \frac{x^2 + 5x + 6}{x^2 + 4x + 3}$

A.  $\frac{x + 3}{x - 12}$

B.  $\frac{x + 1}{x - 4}$

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

D.  $\frac{(x + 2)(x + 3)}{(x - 4)(x - 6)}$



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

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

B.  $\frac{5x+4}{x^2+2x+1}$

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

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

40. Solve for  $x$  :  $\frac{6}{x+2} = \frac{4}{x-4}$

A. -8

B. 3

C. 13

D. 16

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. How many non-permissible values for  $x$  are in the following expression?

$$\frac{2x}{x+3} + \frac{1}{x^2+6x+9}$$

- A. 1
- B. 2
- C. 3
- D. 4

43. For what values of  $x$  is the following expression undefined?

$$\frac{x^2+3x+2}{x^3-4x}$$

- A. -2, 2
- B. 0, 4
- C. -1, 0, 2
- D. -2, 0, 2

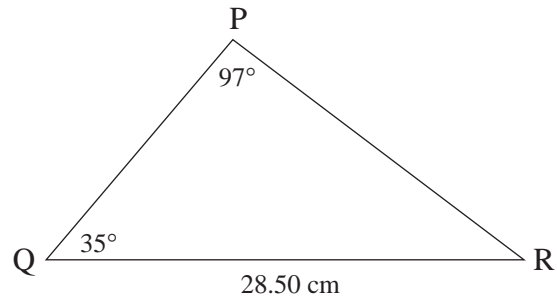
44. What is the quotient when  $x^3 + 3x^2 + 2x - 1$  is divided by  $x + 3$ ?

- A. -7
- B.  $x^2 + 2$
- C.  $x^2 + 2x - 7$
- D.  $x^2 + 6x + 20$

45. What is the remainder when  $4x^3 - 5x + 2$  is divided by  $2x - 3$ ?

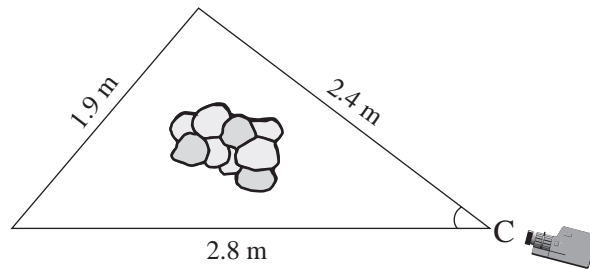
- A. -4
- B. 3.5
- C. 4
- D. 8

46. Determine the length of side PQ.



- A. 38.06 cm
- B. 21.34 cm
- C. 21.02 cm
- D. 16.47 cm

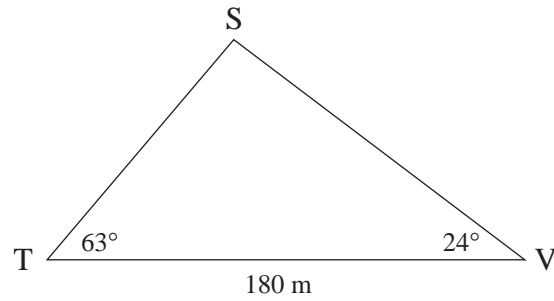
47. To display a valuable specimen of moon rock, staff at the Space Centre roped off a triangular area and installed a security camera, as shown below.



The security camera was installed so that it scanned continually between the two longest ropes through the angle C. Determine the measure of  $\angle C$ .

- A.  $32^\circ$
- B.  $42^\circ$
- C.  $48^\circ$
- D.  $58^\circ$

48. Determine the area of the triangle shown below.

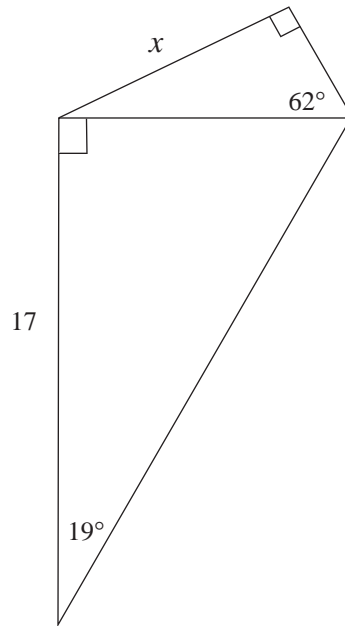


- A.  $5\,879\text{ m}^2$
- B.  $11\,758\text{ m}^2$
- C.  $13\,204\text{ m}^2$
- D.  $35\,537\text{ m}^2$

49. Determine the measure of  $\angle A$  if  $0^\circ < A < 90^\circ$  and  $\cos 125^\circ = -\cos A$  ?

**Record your answer neatly on the Answer Sheet.**

50. Solve for  $x$  :



- A. 2.75
- B. 4.89
- C. 5.17
- D. 6.63

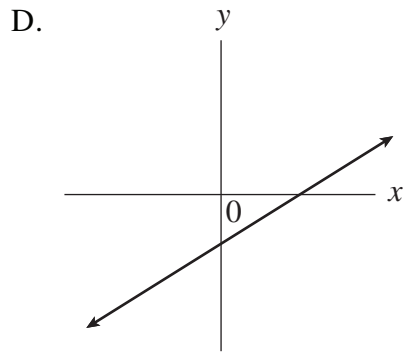
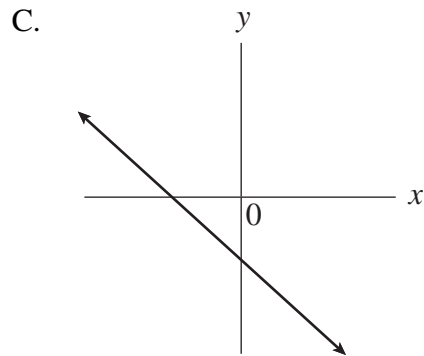
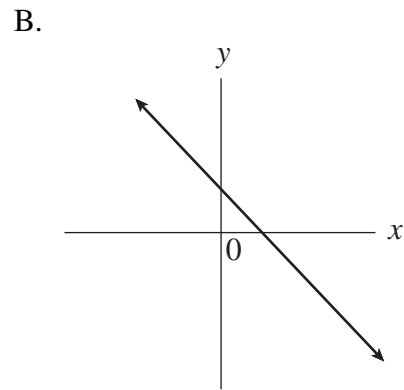
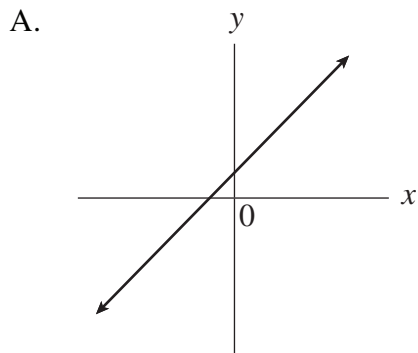
51. From where she parked her car, Jade observed that the angle of elevation to the top of a building was  $25^\circ$ . When she walked 50 m closer to the building, the angle of elevation became  $60^\circ$ . Determine the distance from the base of the building to her car.

- A. 18.42 m
- B. 36.84 m
- C. 68.42 m
- D. 75.49 m

52. The point  $(7, b)$  is the midpoint of the line segment JK with  $J(-5, 2)$  and  $K(a, -6)$ . Determine the value of  $a - b$ .

- A. 7
- B. 11
- C. 17
- D. 21

53. Which line has a positive slope and a negative  $x$ -intercept?



54. A line passes through the points  $(3n, 4)$  and  $(-6, 4n)$ . The slope of the line is  $-\frac{2}{3}$ .

Determine the value of  $n$ .

- A. 4
- B.  $\frac{5}{8}$
- C. 0
- D. -26

55. Determine the length of the line segment joining A(1, 3) and B(2, 0).

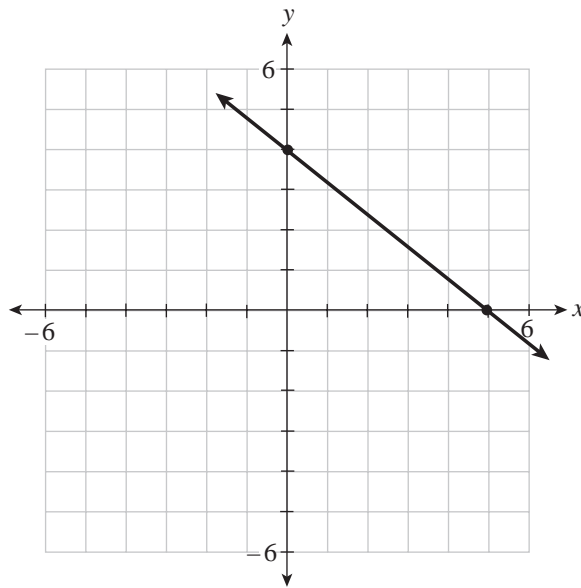
Answer to two decimal places.

**Record your answer neatly on the Answer Sheet.**

56. Determine an equation of a line which has a slope of  $\frac{1}{3}$  and passes through the point  $(6, 0)$ .

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

57. Determine an equation of the following line :



A.  $y = -\frac{4}{5}x + 4$

B.  $y = -\frac{4}{5}x + 5$

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

D.  $y = \frac{4}{5}x + 4$

58. Which of the following lines passes through the points  $(3, -1)$  and  $(10, -4)$ ?

A.  $y = \frac{3}{7}x - \frac{16}{7}$

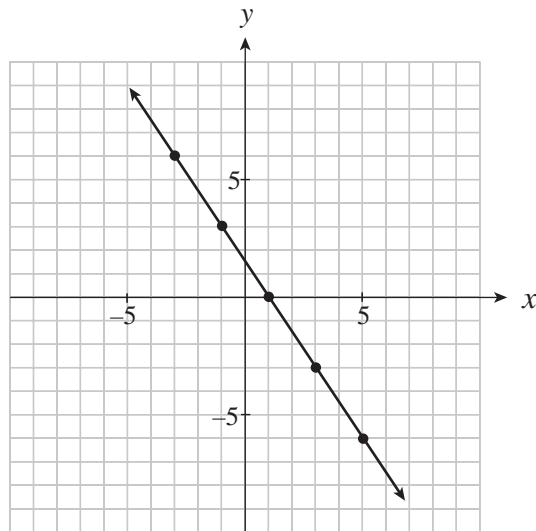
B.  $y = \frac{3}{7}x - \frac{58}{7}$

C.  $y = -\frac{3}{7}x - \frac{16}{7}$

D.  $y = -\frac{3}{7}x + \frac{2}{7}$



59. Which of the following equations represents a line that is perpendicular to the line shown below and passes through the point  $(-2, -6)$ ?



- A.  $y = \frac{2}{3}x + 2$   
B.  $y = \frac{2}{3}x - \frac{14}{3}$   
C.  $y = -\frac{3}{2}x - 9$   
D.  $y = -\frac{2}{3}x - \frac{22}{3}$

60. The equation of a line is  $4x - 3y - 12 = 0$ . Determine an equation of a parallel line that intersects the  $y$ -axis 6 units above the given line.

A.  $y = -\frac{3}{4}x + 2$

B.  $y = -\frac{4}{3}x + 2$

C.  $y = \frac{4}{3}x + 10$

D.  $y = \frac{4}{3}x + 2$

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

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

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

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

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

**NOTE:** Use the value of  $\pi$  programmed in your calculator rather than the approximation of 3.14.

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

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

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

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

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

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

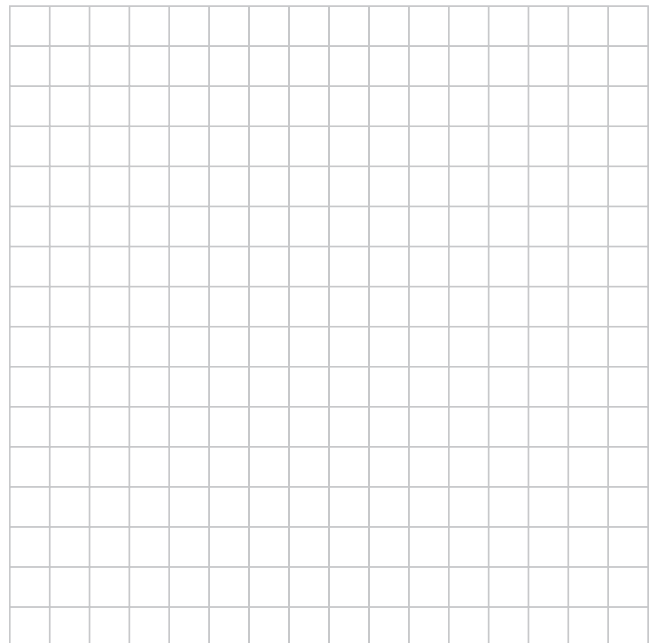
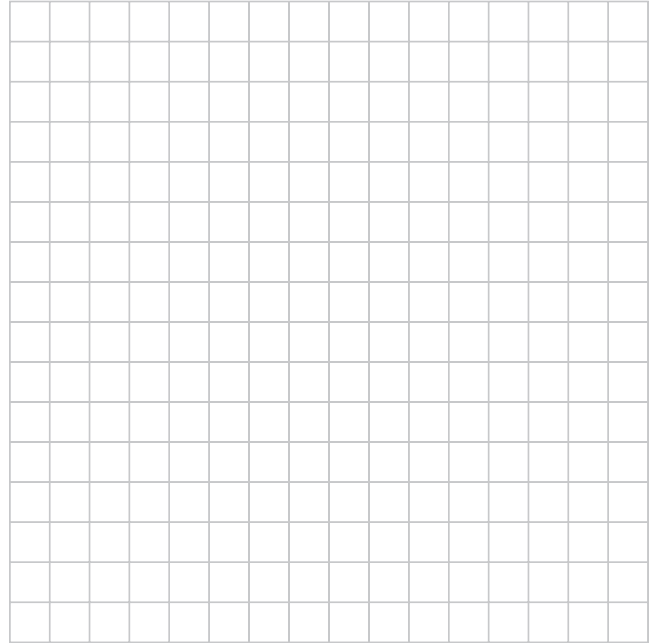
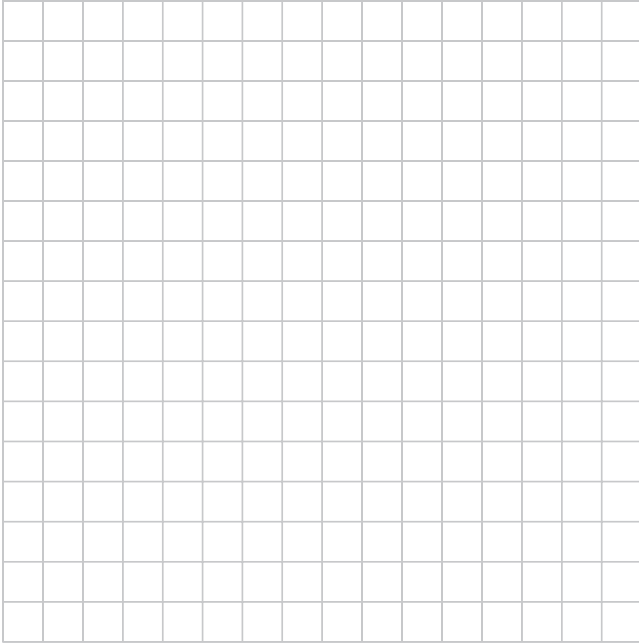
$$S_n = \frac{n}{2}[2a + (n-1)d]$$

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

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

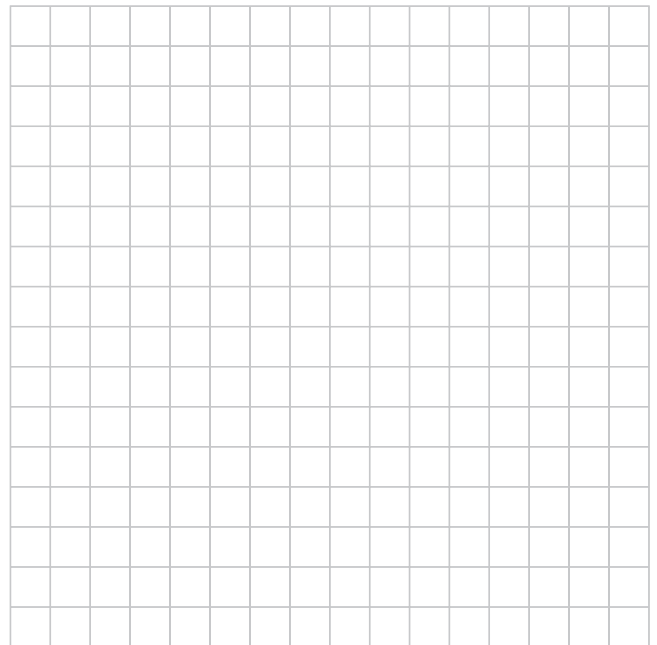
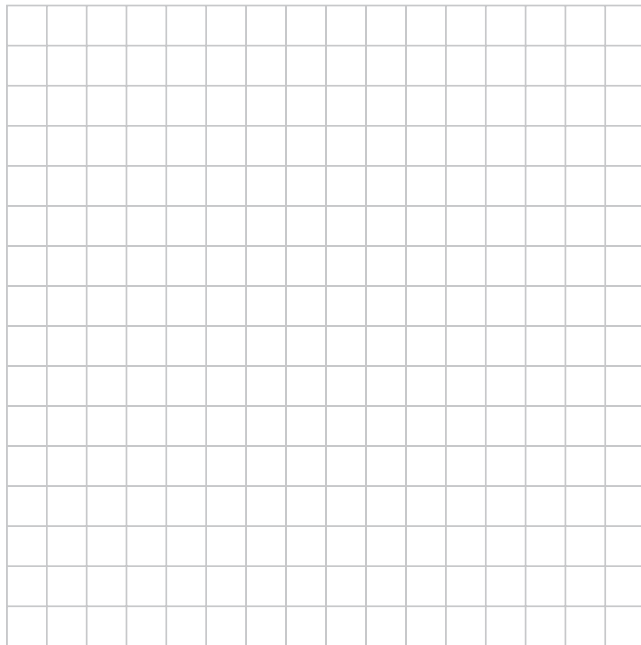
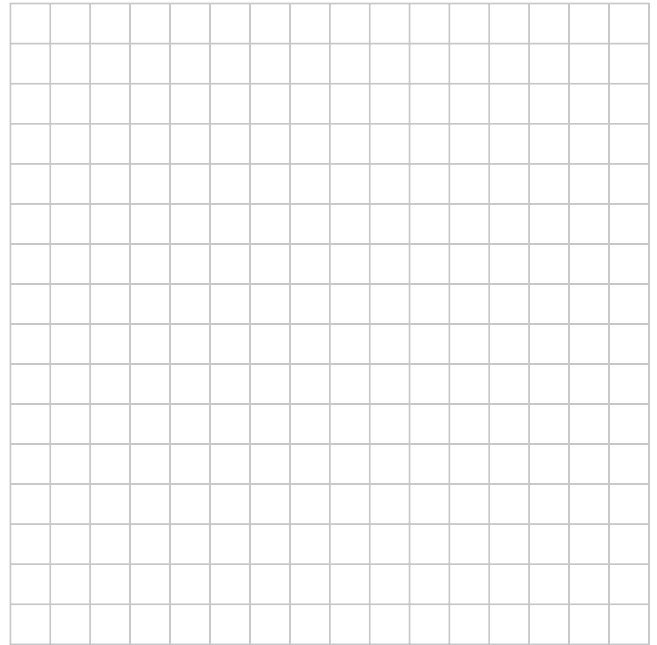
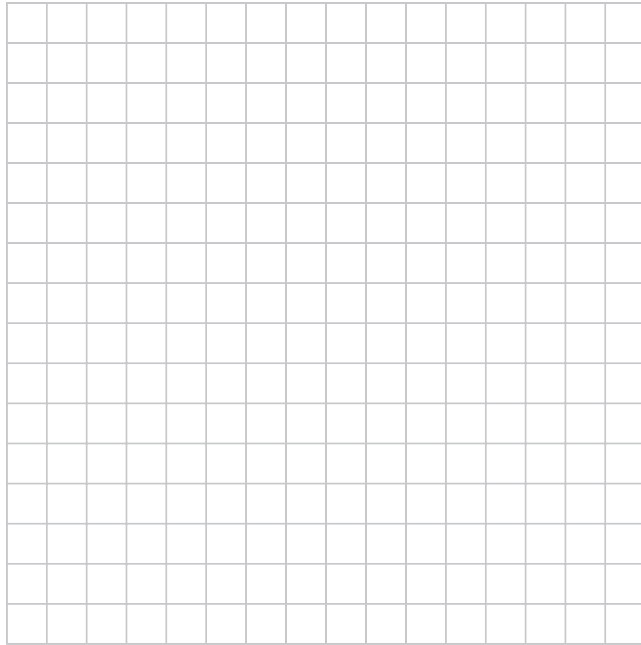
# ROUGH WORK FOR GRAPHING

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# ROUGH WORK FOR GRAPHING

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## **ROUGH WORK SPACE**