



BRITISH
COLUMBIA

Principles of Mathematics 10

August 2005 Examination

Student Booklet Form A

Student Instructions

1. Ensure that in addition to this **Student Booklet**, you have a **Response Form**.
2. **Disqualification** from the examination will result if you bring books, paper, notes or unauthorized electronic devices into the examination room.
3. This examination is designed to be completed in **two hours**. *Students may, however, take up to 30 minutes of additional time to finish.*
4. At the end of the examination, return this **Student Booklet** and the **Response Form** to the supervisor.

PRINCIPLES OF MATHEMATICS 10 PROVINCIAL EXAMINATION

INSTRUCTIONS

1. All answers must be entered on the Response Form using an **HB pencil**.
Answers entered in this examination booklet will **not** be marked.
2. A *Formulae Sheet* is provided at the back of this booklet. *Rough Work for Graphing* and *Rough Work Space* are also located at the back of the examination.
3. Use the value of π programmed in your calculator rather than the approximation of 3.14.
4. When using the calculator, rounding should occur **only in the final step** of the solution.
5. The provincial examination consists of 60 questions worth one mark each. There are **four** types of questions:
 - 4 True-and-False Questions
 - 12 Matching Questions
 - 8 Numerical-Response Questions
 - 36 Multiple-Choice Questions**60 Total**
6. When answering **Numerical-Response** questions, please note the following:

- Find the correct question number on the Response Form and write your answer in the spaces provided, noting proper place value. **Only one digit per box.**
- PRINT your digits **as shown below**. Keep within the box provided.

0	1	2	3	4	5	6	7	8	9
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- Negative answers must include a shaded negative circle. If neither circle is bubbled, the answer will be read as positive.
- Leave unused boxes blank.
- For example, the answer **-70.6** will be written as shown.

+	-								
<input type="radio"/>	<input checked="" type="radio"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	.	<input type="text"/>	<input type="text"/>	<input type="text"/>

You have **Student Booklet Form A**. In the box above #1 on your **Response Form**, fill in the bubble as follows, if it is not already filled in.

Student Booklet/ Cahier d'examen	A	B	C	D
	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

1. What type of number is $-\frac{\sqrt{25}}{4}$?

I.	irrational
II.	rational
III.	integer

- A. I only
B. II only
C. I and III only
D. II and III only
2. Helen's regular wage is \$16.50 per hour for the first eight hours each day. After 8 h she is paid \$33.00 per hour for overtime. The table below shows the hours she worked during one week.

Day	Hours Worked
Monday	8
Tuesday	10
Wednesday	7
Thursday	12
Friday	5

Calculate her wages for the week shown above.

- A. \$693
B. \$726
C. \$792
D. \$1056

3. Which of the following statements is correct about a sweater in Canadian dollars?

	USA	Japan
Regular price of sweater	\$49.99 US	6059 Japanese Yen (¥)
Exchange	\$1.00 US = \$1.462 CDN	1 Yen (¥) = 0.011280 CDN
Price in Canadian dollars		

- A. The price is lower in the USA.
- B. The price is higher in the USA.
- C. The prices are the same in both countries.
- D. The prices cannot be determined from the information given.

4. Which of the following expressions represents the number that appears in Row n , Column **B**?

	Column			
Row	A	B	C	D
1	3	7	11	15
2	19	23	27	31
3	35	39	43	47
4	51	55	59	63
⋮	⋮	⋮	⋮	⋮

- A. $7n$
- B. $7n + 9$
- C. $16n + 7$
- D. $16n - 9$

5. In a random survey of 600 dentists, 450 recommend brushing after every meal. Therefore, it can be concluded that the majority of dentists surveyed recommends brushing after every meal.

- A. True
- B. False

6. Sue wants to survey the students about the food to be sold at next month's school dance. Choose the most random sampling method.
- A. One English class is randomly chosen and every student in that class is surveyed.
 - B. Students are divided by grade and 10 students are selected randomly from every grade.
 - C. Each student in the school is assigned a 4-digit number and then 75 students are randomly selected.
 - D. All students are given a copy of the survey and told that completed surveys can be handed in by the end of the week.

7. The table below represents a \$700.00 loan with fixed annual payments.

Year	Opening Balance (\$)	Annual Interest Rate (%)	Interest (\$)	Annual Payment (\$)	Closing Balance (\$)
1	700.00	5	35.00	60.00	675.00
2	675.00	5	33.75	60.00	648.75
3	648.75	5		60.00	

What is the Closing Balance for Year 3?

Record your answer neatly on the Response Form.

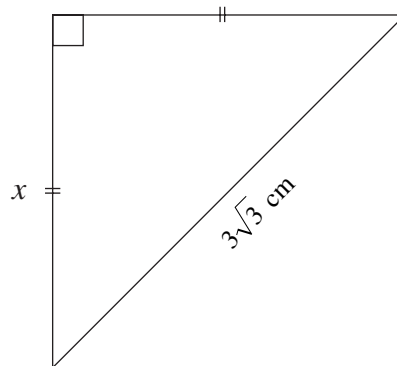
8. Simplify: $4\sqrt{2} - \sqrt{2} + 4\sqrt{2}$

- A. $3\sqrt{2}$
- B. $7\sqrt{2}$
- C. $12\sqrt{2}$
- D. $13\sqrt{2}$

Match each Irrational Expression on the left with the correct Equivalent Form on the right.
Each Equivalent Form may be used once, more than once or not at all.

Irrational Expression	Equivalent Form
9. $2\sqrt{12} + \sqrt{48} - \sqrt{75}$	A. $3\sqrt{3}$
10. $(\sqrt{2} - \sqrt{3})^2$	B. $3\sqrt{6}$
11. $\frac{\sqrt{3}}{\sqrt{2} + \sqrt{3}}$	C. $3 - \sqrt{6}$
	D. $5 - 2\sqrt{6}$
	E. $5 - \sqrt{3}$
	F. $\frac{\sqrt{2}}{2}$

12. Find the length of side x .



- A. 3.67 cm
- B. 2.59 cm
- C. 2.12 cm
- D. 1.50 cm

13. Which of the following is equivalent to $x^{\frac{3}{4}}$?

A. $\sqrt[3]{x^4}$

B. $\sqrt[4]{x^3}$

C. $\frac{3}{4}x$

D. $\frac{4}{3}x$

14. Which of the following is equivalent to $\left(\frac{8}{27}\right)^{-\frac{4}{3}}$?

A. $-\frac{81}{16}$

B. $-\frac{16}{81}$

C. $\frac{16}{81}$

D. $\frac{81}{16}$

15. If the Cougars had lost one of the games it won against the Ducks, what would be the Cougars' point total? (Note: a Win is worth 2 points, a Loss is worth 0 points and a Tie is worth 1 point.)

	Win	Loss	Tie	Points
Cougars	4	1	1	9
Ducks	2	2	2	6
Pigeons	1	4	1	3

Record your answer neatly on the Response Form.

16. In the arithmetic sequence $-4, 2, 8, 14, \dots$, the common difference is 4.

- A. True
- B. False

17. What is the sum of the arithmetic series $4 + 11 + 18 + \dots + 109$?

- A. 142
- B. 791
- C. 904
- D. 1808

18. Determine the value of x in the geometric sequence $20.25, -13.5, x, -6$.

- A. 0.25
- B. 1
- C. 3.375
- D. 9

19. What is the common difference for the following arithmetic sequence?

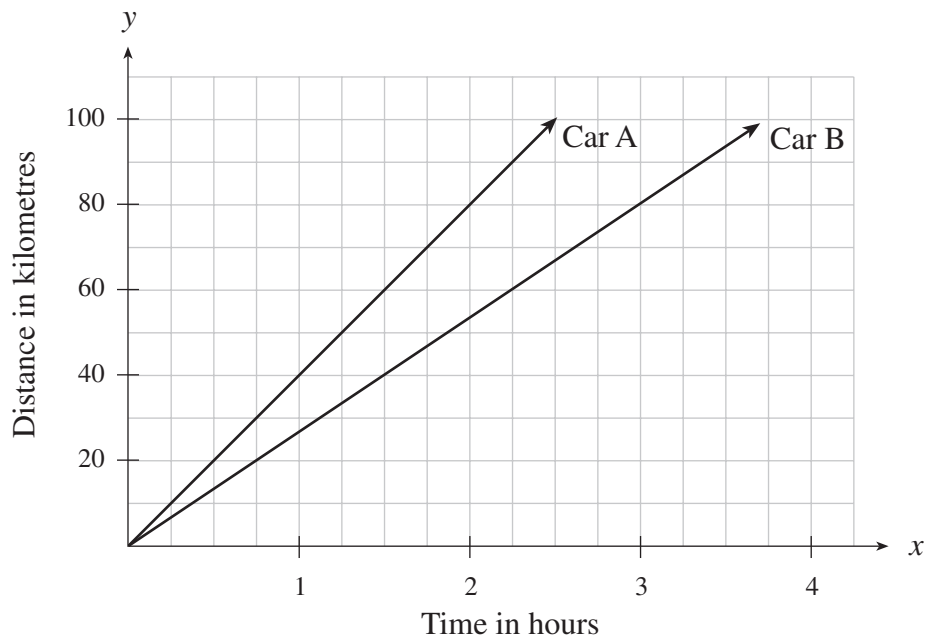
6, _____, _____, _____, 18

- A. 2.4
- B. 3
- C. 4
- D. 12

20. Bill earns a base salary of \$400 per week plus \$12 for each pair of shoes he sells. What is his salary if he sells 35 pairs of shoes one week? Answer to the nearest dollar.

Record your answer neatly on the Response Form.

21. The distance travelled by two cars is shown in the graph below.



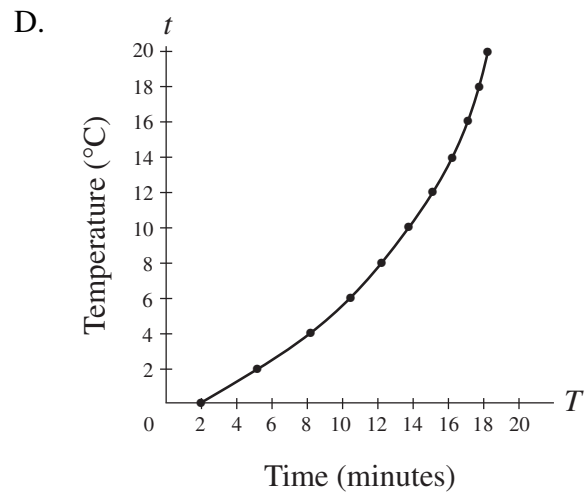
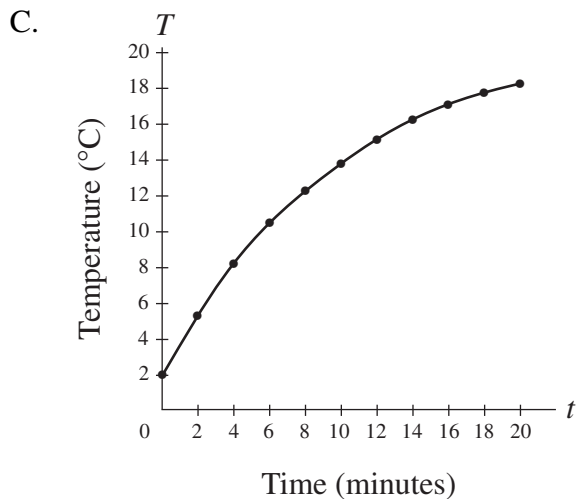
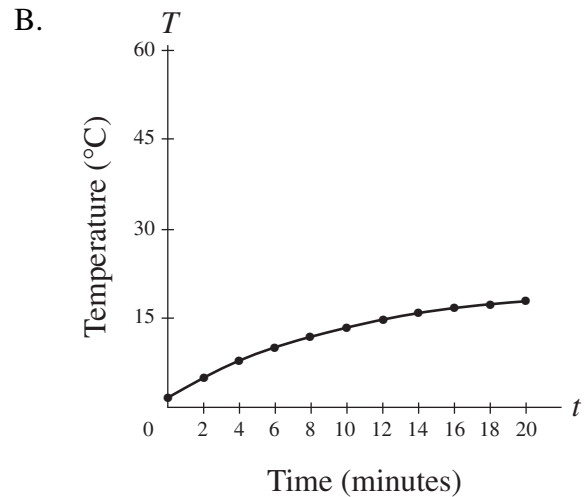
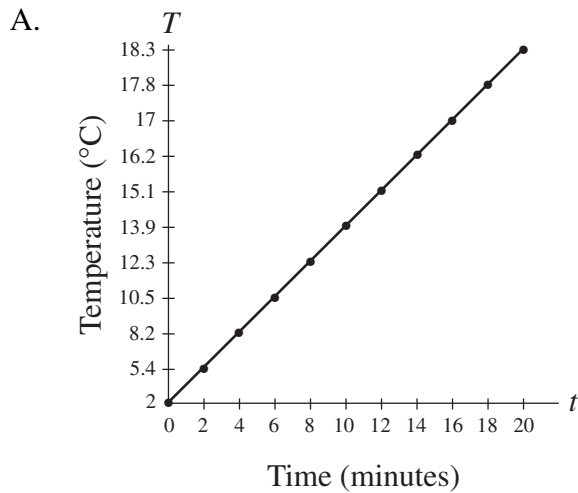
How much farther did Car A go than Car B in the first 2 h 15 min?

- A. 30 km
- B. 45 km
- C. 60 km
- D. 90 km

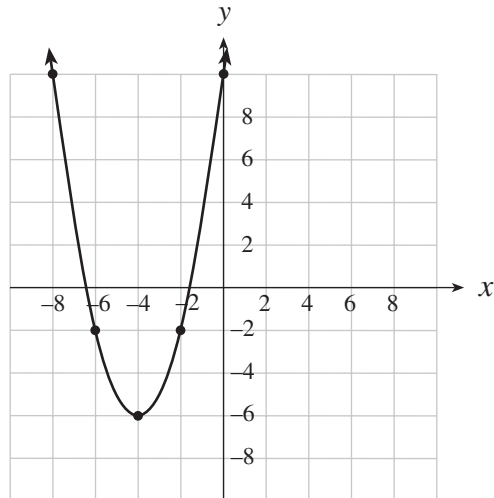
22. The temperature of a cup of ice water is recorded at regular time intervals as shown by the following data:

Time (minutes)	0	2	4	6	8	10	12	14	16	18	20
Temperature ($^{\circ}\text{C}$)	2	5.4	8.2	10.5	12.3	13.9	15.1	16.2	17	17.8	18.3

Which of the following is the **best** graph of the data?



Use the following graph to answer question 23.



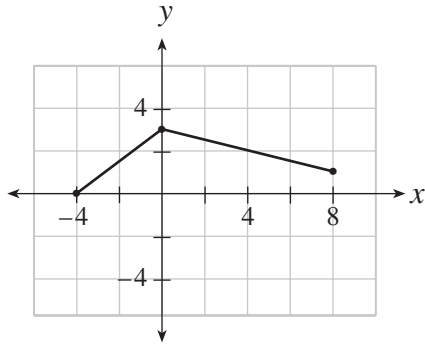
23. What is the value of $f(-6)$?

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

24. If $f(x) = 4x^2 - 5x + 3$, which of the following expressions is equal to $f(x - 1)$?

- A. $4x^2 - 13x + 2$
- B. $4x^2 - 13x + 12$
- C. $4x^2 - 5x + 2$
- D. $4x^2 - 5x + 4$

25. Consider the following graph.



Determine the domain.

- A. all real numbers
- B. $0 \leq x \leq 3$
- C. $1 \leq x \leq 3$
- D. $-4 \leq x \leq 8$

26. Which of the following represent(s) the function $y = \frac{2}{3}x - 4$?

I.	A second number is 4 less than $\frac{2}{3}$ of a first number.
II.	$2x - 3y + 12 = 0$
III.	

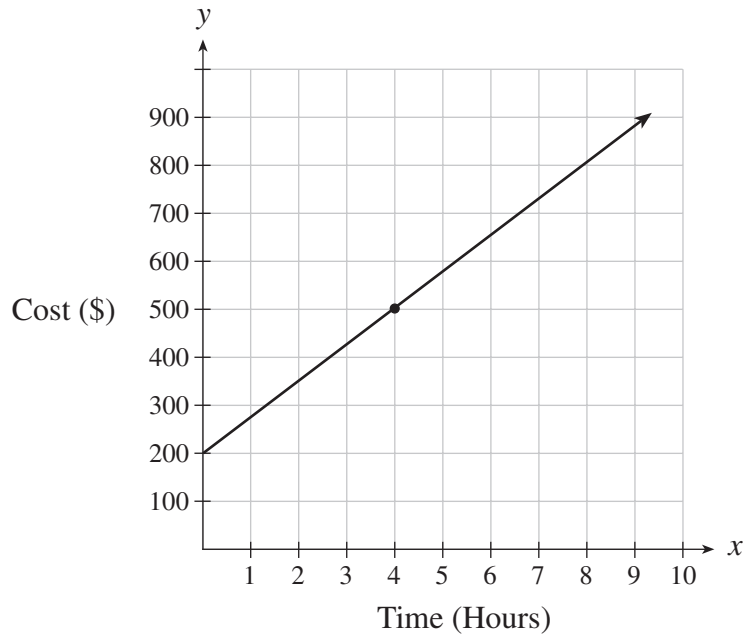
- A. I only
- B. II only
- C. I and II only
- D. I, II and III

Use the following equation to answer questions 27 to 29.

$$y = -\frac{2}{3}x + 6$$

Match each Graph Characteristic on the left with the correct Value(s) on the right. Each Value(s) may be used once, more than once or not at all.	
Graph Characteristic	Value(s)
27. x -intercept(s)	A. $y \geq 6$
28. domain	B. all real numbers
29. range	C. -9
	D. 9
	E. 6
	F. $-\frac{2}{3} \leq x \leq 6$

30. The following graph represents the cost for a mechanic to fix a car.



How much does the mechanic charge per hour? Answer to the nearest dollar.

Record your answer neatly on the Response Form.

31. Simplify: $(2a + 3)(3a^2 - 2a + 1)$

- A. $6a^3 + 2a^2 - 4a + 3$
- B. $6a^3 - 5a^2 + 4a + 3$
- C. $6a^3 + 5a^2 + 8a + 3$
- D. $6a^3 + 5a^2 - 4a + 3$

32. Simplify: $(5x - 1)(2x + 1) - (3x + 4)$

- A. $10x^2 + 3$
- B. $10x^2 - 5$
- C. $10x^2 + 6x + 3$
- D. $10x^2 + 6x - 5$

33. What value of k would make $25x^2 - 60xy + ky^2$ a perfect square trinomial?

Record your answer neatly on the Response Form.

Match each Expression on the left with one of its Factors on the right. Each Factor may be used once, more than once or not at all.	
Expression	Factor
34. $x^2 + 7x + 10$	A. $x + 2$
35. $4x^2 + 20x + 25$	B. $x - 2$
36. $2x^2 - 25x + 50$	C. $2x + 5$
	D. $x - 5$
	E. $2x - 5$
	F. $x + 10$

37. The following expression is undefined when $x = -3$.

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

- A. True
- B. False

38. What is the remainder when $2x^3 - 5x^2 - 12$ is divided by $x - 3$?

- A. -21
- B. -9
- C. -3
- D. 3

39. Simplify: $\frac{6n^2 - 24n}{6n}$; $n \neq 0$

- A. $n - 4$
- B. $n - 24$
- C. $6n - 4$
- D. $6n - 24$

40. Simplify: $\frac{x^2 + 2x - 24}{x^2 + 14x + 48}$; for all permissible values of x .

- A. $\frac{x - 4}{x - 8}$
- B. $\frac{x + 4}{x - 8}$
- C. $\frac{x - 4}{x + 8}$
- D. $\frac{x + 4}{x + 8}$

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

$$\frac{2x^2 + 3x - 20}{3x^2 + 16x + k} = \frac{2x - 5}{3x + 4}$$

Record your answer neatly on the Response Form.

42. Simplify:

$$\frac{6x}{x+7} - \frac{2x}{x-4}; \quad x \neq -7, 4$$

A. $\frac{4x}{(x+7)(x-4)}$

B. $\frac{4x^2 - 10x}{(x+7)(x-4)}$

C. $\frac{8x^2 - 10x}{(x+7)(x-4)}$

D. $\frac{4x^2 - 38x}{(x+7)(x-4)}$

43. Simplify:

$$\frac{x^2 + x - 6}{2x^2 + 5x - 3} \div \frac{x+2}{2x-1}; \quad \text{for all permissible values of } x.$$

A. -1

B. $\frac{x-3}{x+3}$

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

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

44. Solve for n :

$$\frac{5}{2n} + \frac{11}{12} = \frac{2}{3n}; \quad n \neq 0$$

A. 3

B. 2

C. 0

D. -2

45. Three more than four times a number, divided by twice the number has the same result as seven less than the number, divided by six times the number. Which equation can be written to represent the above statement?

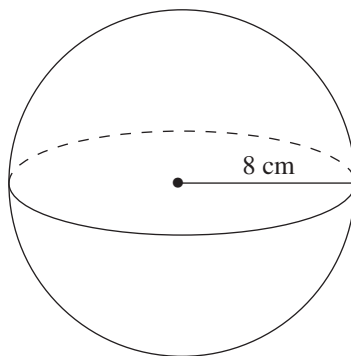
A. $\frac{3+4x}{2x} = \frac{7-x}{6x}$

B. $\left(\frac{4x+3}{2}\right) = \left(\frac{x-7}{6x}\right)$

C. $\frac{4x+3}{2x} = \left(\frac{7-x}{6}\right)$

D. $\frac{3+4x}{2x} = \frac{x-7}{6x}$

46. Which of the following expressions represents the volume of the sphere below?



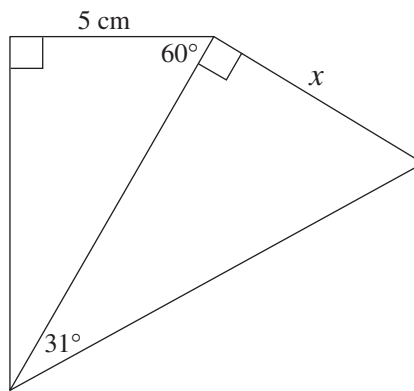
A. $4\pi(24) \text{ cm}^3$

B. $4\pi(8)^3 \text{ cm}^3$

C. $\frac{4}{3}\pi(24) \text{ cm}^3$

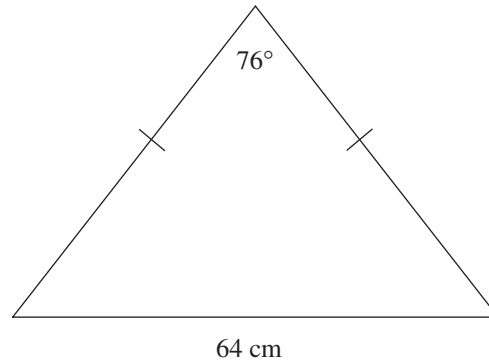
D. $\frac{4}{3}\pi(8)^3 \text{ cm}^3$

47. The side length of a cube is tripled. By what factor has the surface area increased?
- A. 3
 - B. 6
 - C. 9
 - D. 27
48. A skateboarding ramp rises 6 m in a horizontal distance of 8 m. What is the slope of the ramp?
- A. 0.50
 - B. 0.75
 - C. 0.80
 - D. 1.33
49. What is the length of side x , in centimetres? Answer to two decimal places.



Record your answer neatly on the Response Form.

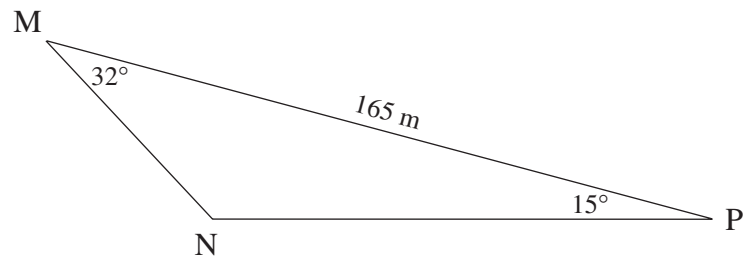
50. An isosceles triangle has a base of 64 cm with an opposite angle of 76° .



What is the approximate perimeter of the triangle?

- A. 139 cm
 - B. 168 cm
 - C. 192 cm
 - D. 222 cm
51. What is the value of $\cos A$ if $\sin A = 0.9063$ and $\angle A$ is an **obtuse** angle?
- A. -0.4226
 - B. -0.0158
 - C. 0.0158
 - D. 0.4226

52. Find the length of side NP in $\triangle MNP$.

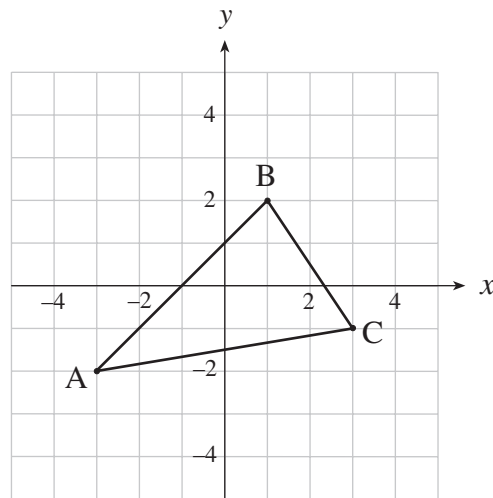


- A. 58.39 m
- B. 87.44 m
- C. 119.55 m
- D. 227.72 m

53. In $\triangle ABC$, if $a = 25$, $b = 30$, $\angle C = 40^\circ$ then $\angle B$ is 56° .

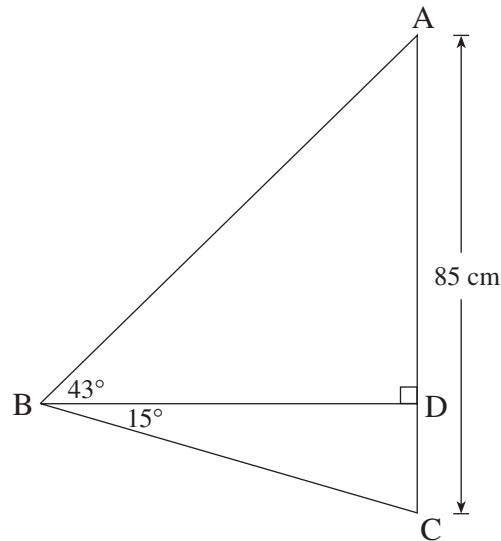
- A. True
- B. False

54. Which of the following formulae would be used in determining the perimeter of $\triangle ABC$ on the graph below?



- A. $\frac{y_2 - y_1}{x_2 - x_1}$
- B. $\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$
- C. $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$
- D. $a^2 = b^2 + c^2 - 2bc \cos A$

55. Find the length of DB in centimetres. Answer to two decimal places.



Record your answer neatly on the Response Form.

56. Consider the following line segments:

For \overline{AB} , A(4, 7) and B(-4, 4)

For \overline{CD} , C(-2, 9) and D(3, 2)

Which of the following statements is correct?

- A. \overline{AB} is longer than \overline{CD}
- B. \overline{CD} is longer than \overline{AB}
- C. \overline{AB} is the same length as \overline{CD}
- D. The lengths of the line segments cannot be determined from the given information.

Match each Line on the left with the correct Equation on the right.
Each Equation may be used once, more than once or not at all.

Line	Equation
<p>Consider the following coordinates: A (-2, 6) B (4, -3)</p> <p>57. line containing points A and B</p> <p>58. line perpendicular to \overline{AB}</p> <p>59. line with x-intercept = -2</p>	<p>A. $y = -\frac{3}{2}x$</p> <p>B. $y = \frac{3}{2}x + 3$</p> <p>C. $y = -\frac{3}{2}x + 3$</p> <p>D. $y = \frac{2}{3}x - \frac{1}{2}$</p> <p>E. $y = -\frac{2}{3}x - \frac{1}{2}$</p>

60. $(4.5, -3)$ is the midpoint of \overline{KL} , and point K is at $(7, 2.5)$. What is the **y-coordinate** of point L?
- A. -8.5
 B. -0.25
 C. 2
 D. 5.75

You have **Student Booklet Form A**. In the box below #60 on your **Response Form**, fill in the bubble as follows, if it is not already filled in.

Student Booklet/ Cahier d'examen	A	B	C	D
	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

END OF EXAMINATION

Formulae Sheet

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

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

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

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

$$t_n = ar^{n-1}$$

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

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

$$\text{Volume of pyramid:} = \frac{1}{3}(\text{Base Area})(h)$$

$$\text{Volume of prism:} = (\text{Base Area})(h)$$

$$\text{Volume of a cylinder:} = \pi r^2 h$$

$$\text{Surface area of a cylinder:} = 2\pi r^2 + 2\pi r h$$

$$\text{Volume of a cone:} = \frac{1}{3}\pi r^2 h$$

$$\text{Surface area of a cone:} = \pi r^2 + \pi r s$$

$$\text{Volume of a sphere:} = \frac{4}{3}\pi r^3$$

$$\text{Surface area of a sphere:} = 4\pi r^2$$

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

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

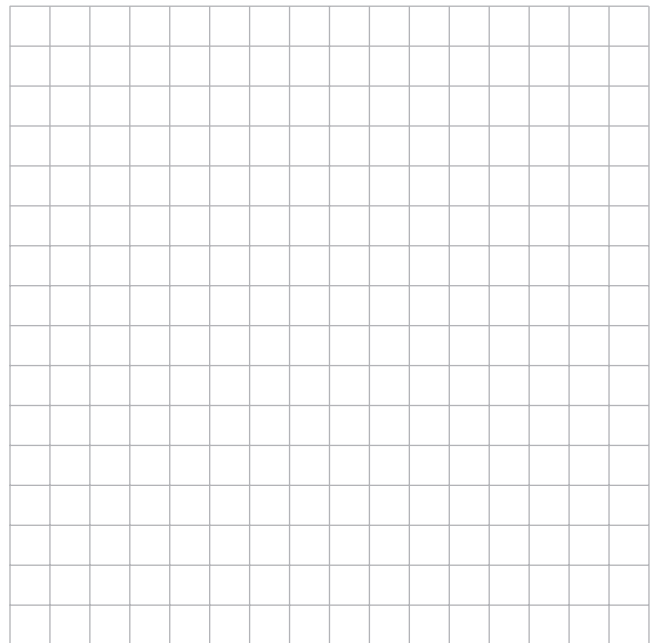
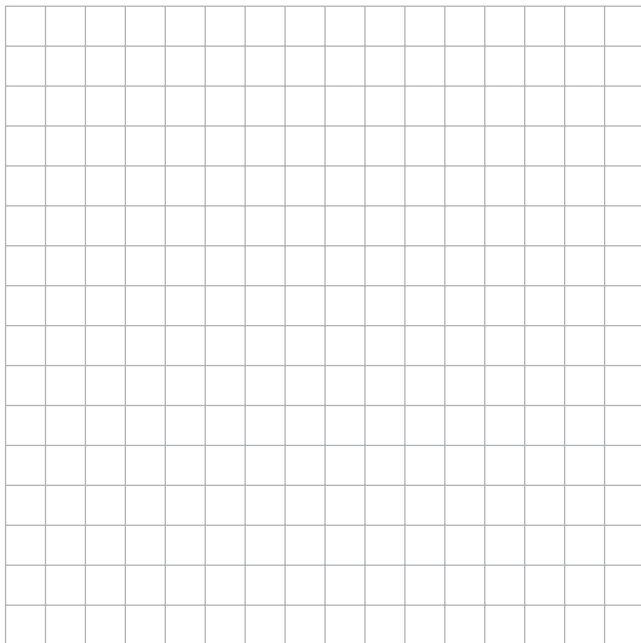
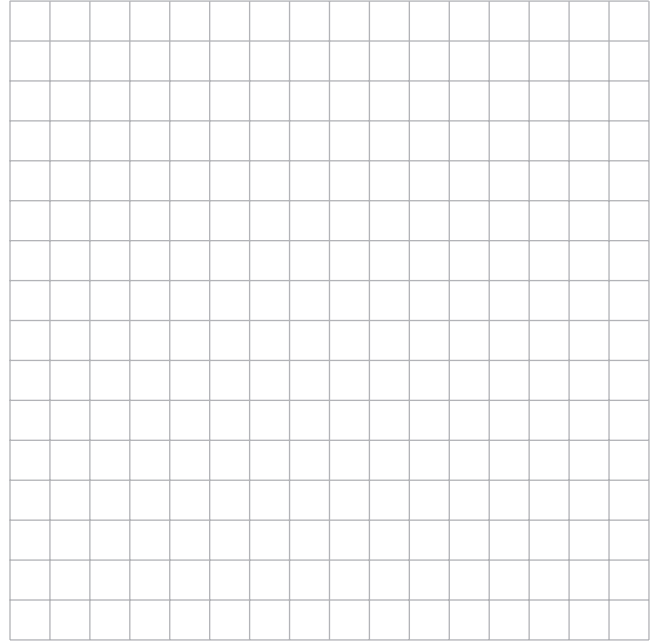
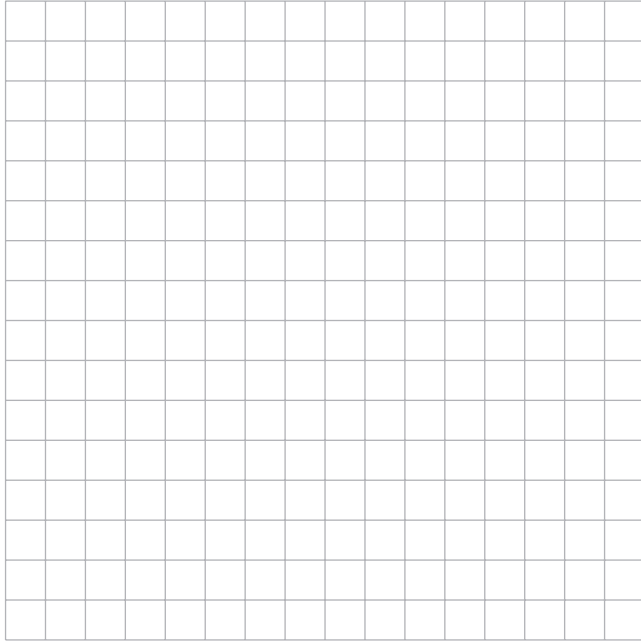
NOTE: Use the value of π programmed in your calculator rather than the approximation of 3.14.

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Exercise care when tearing along perforations.**

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ROUGH WORK FOR GRAPHING

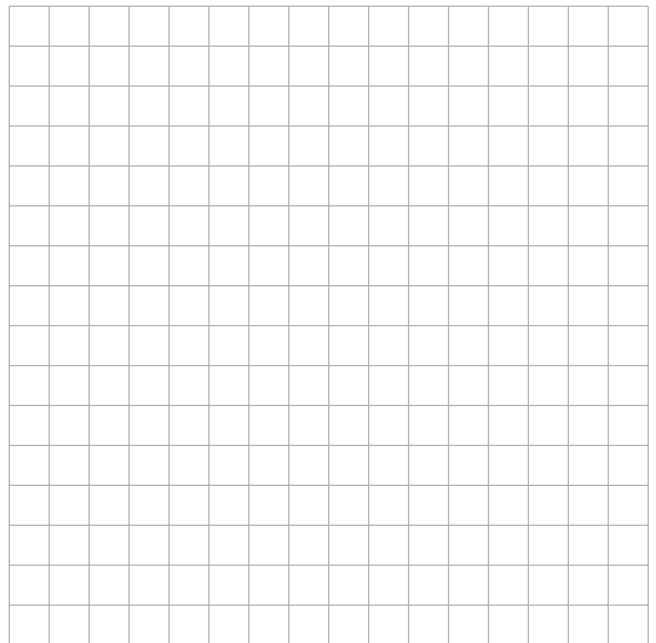
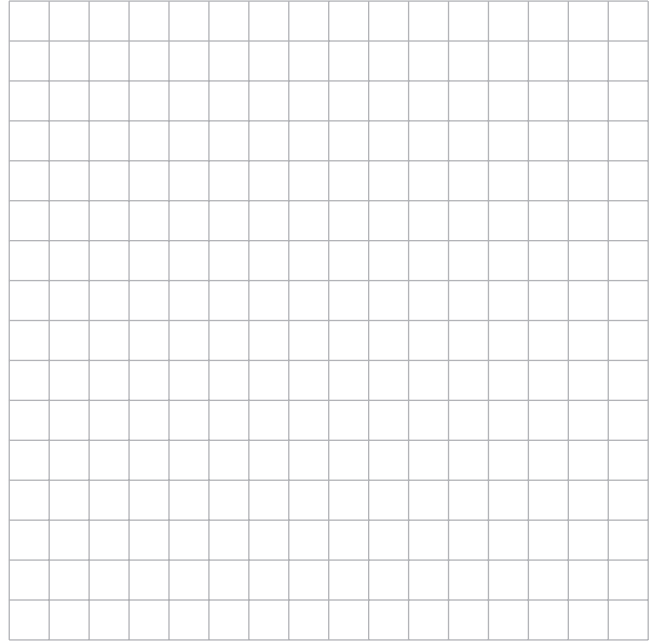
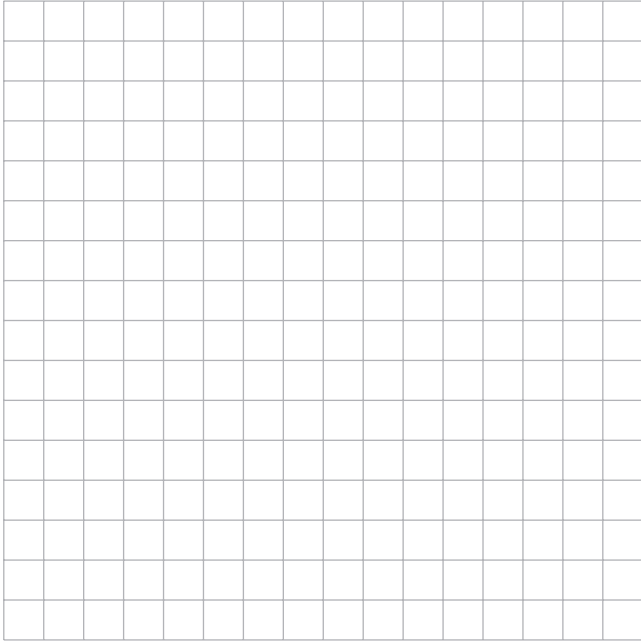
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ROUGH WORK FOR GRAPHING

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ROUGH WORK SPACE

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Exercise care when tearing along perforations.**

ROUGH WORK SPACE