



Please note that the 2007/08 exams for this course will follow the content and the format of the Sample Examination for 2007/08. The following exam is for reference only and is not necessarily representative of the exams for the 2007/08 school year.



Principles of Mathematics 10

Examination Booklet

August 2006

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	<input checked="" type="radio"/> A	<input type="radio"/> B	<input type="radio"/> C	<input type="radio"/> D	<input type="radio"/> E	<input type="radio"/> F	<input type="radio"/> G	<input type="radio"/> H
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1. Which of the following numbers are irrational?

I.	$\sqrt{12}$
II.	$\sqrt{\frac{9}{12}}$
III.	$\sqrt{1.21}$
IV.	$\sqrt{1}$

- A. I and II only
B. II and III only
C. I, II and III only
D. I, II, III and IV
2. Howard's regular wage is \$13.60 per hour for the first eight hours each day. After 8 h, he is paid \$20.40 per hour for overtime. The table below shows the number of hours he worked one week.

Day	Hours Worked
Monday	6
Tuesday	9
Wednesday	8
Thursday	10
Friday	11

Calculate his wages for the week shown above.

- A. \$598.40
B. \$625.60
C. \$639.20
D. \$897.60

3. Which of the following statements is correct about the sales tax?

	Province I	Province II
Regular Price	\$129.50	\$125.50
Sale Price	\$97.13	\$87.85
Sales Tax	\$7.77	\$7.91
Final Price	\$104.90	\$95.76

- A. The sales tax rate is higher in Province I.
- B. The sales tax rate is higher in Province II.
- C. The sales tax rates are the same in both provinces.
- D. The sales tax rate cannot be determined from the information given.

4. Which of the following are the numbers in **Row 10**?

	Column			
Row	A	B	C	D
1	4	7	10	13
2	16	19	22	25
3	28	31	34	37
4	40	43	46	49
⋮	⋮	⋮	⋮	⋮

- A.

100	103	106	109
-----	-----	-----	-----
- B.

108	111	114	117
-----	-----	-----	-----
- C.

112	115	118	121
-----	-----	-----	-----
- D.

114	117	120	123
-----	-----	-----	-----

5. The government wants to improve education for students in BC, so they conduct a study of schools in Vancouver. This will result in a selection bias.
- A. True
 - B. False
6. The teachers in a school district want to know how many hours students spend each week watching TV. If the district has 10 elementary schools and 6 secondary schools, which one of the following types of samples should be taken?
- A. Stratified Sample
 - B. Clustered Sample
 - C. Systematic Sample
 - D. Convenience Sample
7. A bank account pays an annual interest rate of 6.2% on the lowest balance in the year. Towards the end of each year, \$800 is deposited into the account. No withdrawals are made. Data for this account is shown below.

Year	Opening Balance (\$)	Interest Earned (\$)	Annual Deposit (\$)	Closing Balance (\$)
3	2777.44	172.20	800.00	
4				

How much interest is earned in Year 4? Answer to two decimal places.

Record your answer neatly on the Answer Sheet.

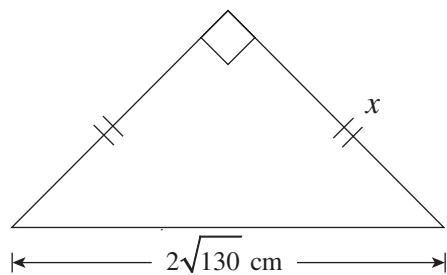
8. Simplify: $-5\sqrt{3} - \sqrt{3} + 8\sqrt{3}$

- A. $\sqrt{3}$
- B. $2\sqrt{3}$
- C. $3\sqrt{3}$
- D. $14\sqrt{3}$

**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. $(\sqrt{2} + \sqrt{3})(2\sqrt{2} + \sqrt{3})$	A. $6 + 3\sqrt{6}$
10. $3\sqrt{24} + \sqrt{54} + 7$	B. $7 + 3\sqrt{6}$
11. $\frac{3\sqrt{2}}{\sqrt{3} - \sqrt{2}}$	C. $12 + 3\sqrt{6}$
	D. $17 + 3\sqrt{6}$
	E. $7 + 9\sqrt{6}$
	F. $7 + 15\sqrt{6}$

12. Determine the length of side x .



- A. 11.4 cm
- B. 16.1 cm
- C. 20.3 cm
- D. 22.8 cm

13. Which of the following is equivalent to $(4x)^{-2}$?

- A. $-8x^{-2}$
- B. $4x^{-2}$
- C. $-\frac{1}{8x^2}$
- D. $\frac{1}{16x^2}$

14. Simplify: $\sqrt{x^3} \times \sqrt{x^5}$

A. $x^{\frac{1}{4}}$

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

C. x^4

D. x^{-8}

15. If the Wolverines had lost one of the games it won against the Jaguars, what would be the Jaguars' 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
Wolverines	4	1	1	9
Jaguars	2	2	2	6
Daisies	1	4	1	3

Record your answer neatly on the Answer Sheet.

16. In the arithmetic sequence $-4, 2, 8, 14, \dots, t_3 = 8$.

A. True

B. False

17. Determine the sum of the arithmetic series $8 + 14 + 20 + \dots + 104$.

A. 146

B. 896

C. 952

D. 1904

18. Determine the value of x in the geometric sequence 34.56, x , 24, 20.

- A. 30.92
- B. 30.56
- C. 29.28
- D. 28.80

19. Determine the common difference for the following arithmetic sequence.

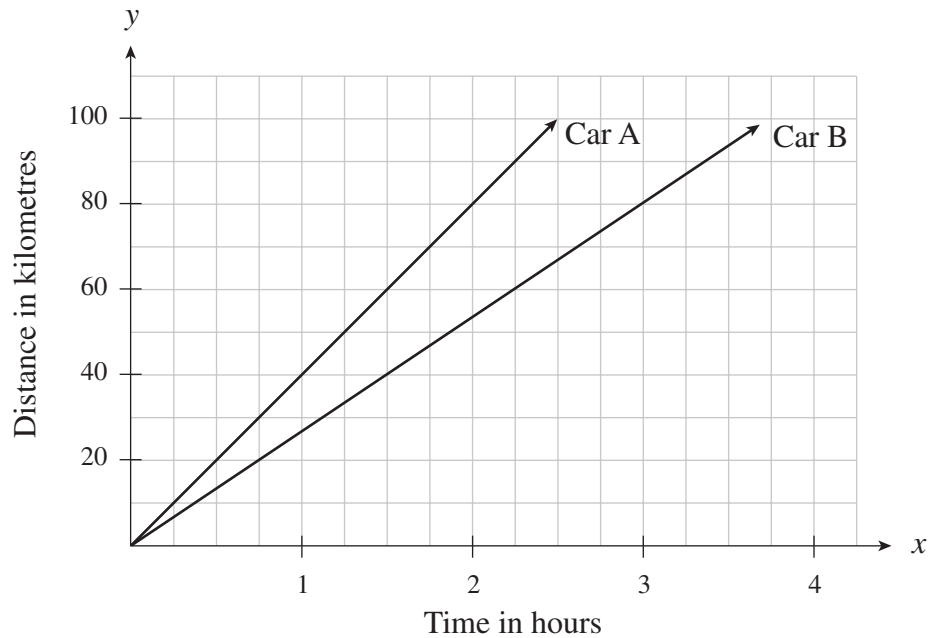
7, _____, _____, _____, 27

- A. 4
- B. 5
- C. 6.8
- D. 20

20. Bill earns a base salary of \$600 per week plus \$26 for each TV he sells.
What does he earn if he sells 12 TVs one week? Answer to the nearest dollar.

Record your answer neatly on the Answer Sheet.

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



How much longer does it take Car B to go 80 km than it takes Car A to go 80 km?

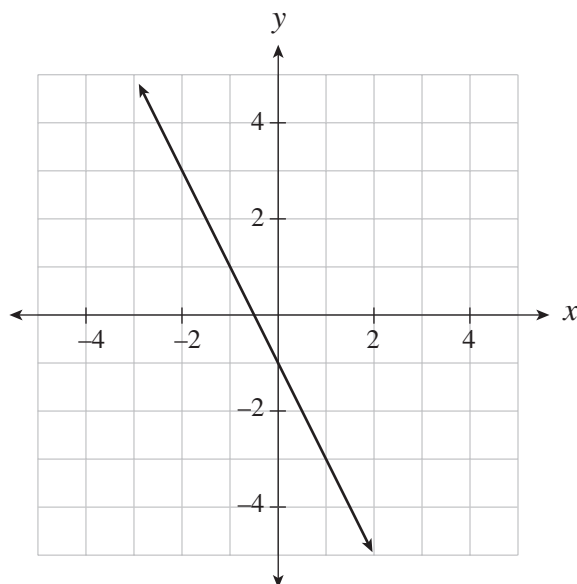
- A. 1 h
- B. 2 h
- C. 3 h
- D. 4 h

22. Which of the following functions represents the data in the table of values shown below?

x	$f(x)$
1	25
2	45
3	65
4	85

- A. $f(x) = 25x$
- B. $f(x) = x + 24$
- C. $f(x) = 5x + 20$
- D. $f(x) = 20x + 5$

Use the following graph to answer question 23.



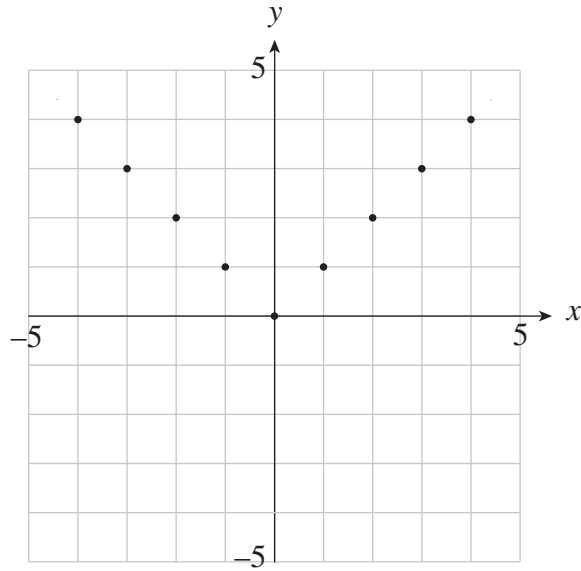
23. Determine the value of $f(-1)$.

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

24. If $f(x) = 3x^2 - 2x + 6$, which of the following expressions is equal to $f(2x + 3)$?

- A. $12x^2 - 4x + 18$
- B. $12x^2 + 8x + 9$
- C. $12x^2 + 32x + 27$
- D. $12x^2 + 32x + 39$

25. Determine the domain of the following graph.



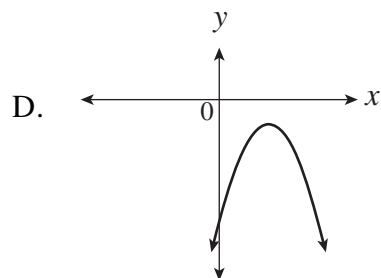
- A. all $x \geq 0$
- B. all integers
- C. all real numbers
- D. all positive integers

26. Which of the following is **not** a function?

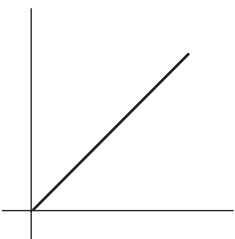
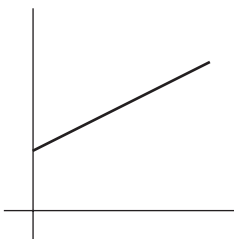
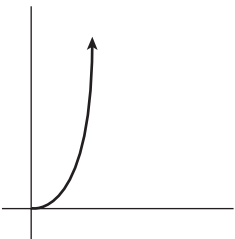
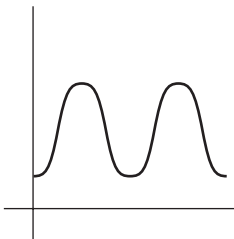
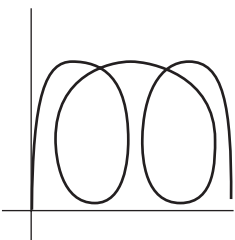
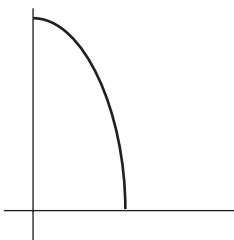
A. Multiply the number by 3 and subtract 5.

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

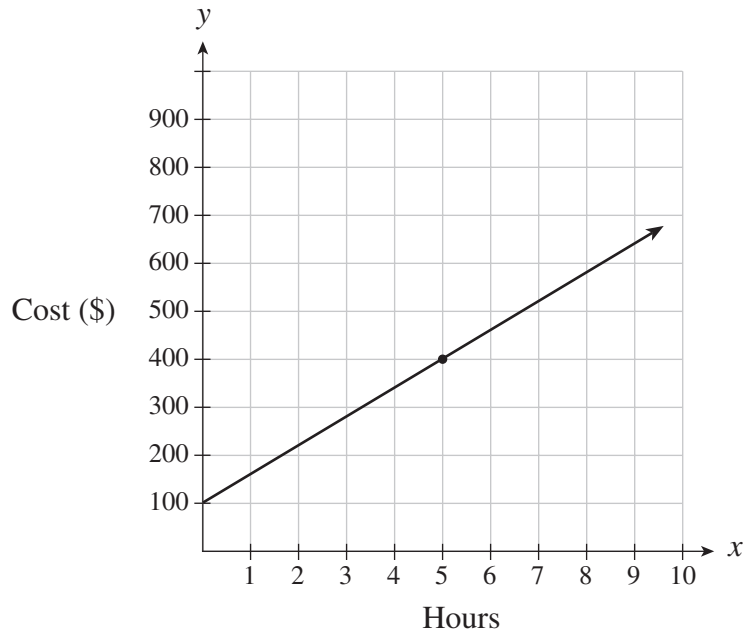
C. $\{(-2, 4), (-1, 3), (-1, 1), (0, 2), (2, 6)\}$



**Match each Description on the left with the best Graph on the right.
Each Graph may be used once, more than once or not at all.**

Description	Graph
27. Volume of a sphere as a function of its diameter.	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>A. </p> </div> <div style="text-align: center;"> <p>D. </p> </div> </div>
28. The cost of filling a gas tank as a function of the number of litres bought.	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>B. </p> </div> <div style="text-align: center;"> <p>E. </p> </div> </div>
29. The height of a bicycle pedal as a function of time.	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>C. </p> </div> <div style="text-align: center;"> <p>F. </p> </div> </div>

30. The following graph represents the cost of hiring a plumber to fix your leaky sink.



What hourly rate does the plumber charge? Answer to the nearest dollar.

Record your answer neatly on the Answer Sheet.

31. Simplify: $(2x - 3)^2$

- A. $4x^2 + 9$
- B. $4x^2 - 9$
- C. $2x^2 - 12x + 9$
- D. $4x^2 - 12x + 9$

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

- A. $8x^2 - 9x - 5$
- B. $8x^2 + 9x - 1$
- C. $8x^2 + 15x - 1$
- D. $8x^2 + 15x - 5$

33. What value of k would make $kx^2 + 24xy + 16y^2$ a perfect square trinomial?

Record your answer neatly on the Answer Sheet.

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. $2x + 5$
35. $4x^2 + 20x + 25$	B. $x + 2$
36. $10x^2 - 21x - 10$	C. $x - 2$
	D. $x + 5$
	E. $5x - 2$
	F. $2x - 5$

37. The following expression is undefined when $x = 5$.

$$\frac{(x-5)(x-2)}{x(x+5)(x-2)}$$

- A. True
- B. False

38. Determine the remainder when $-2x^3 - 7x^2 + 11$ is divided by $x + 3$.

- A. -106
- B. -28
- C. 2
- D. 14

39. Simplify: $\frac{12a^3 - 18a^2}{3a}$; for all permissible values of a .

A. $4a^2 - 6a$

B. $4a^2 + 6a$

C. $4a^3 - 6a^2$

D. $9a^2 - 15a$

40. Simplify: $\frac{x^2 - 15x + 44}{x^2 + 4x - 32}$; for all permissible values of x .

A. $\frac{x-11}{x-8}$

B. $\frac{x+11}{x-8}$

C. $\frac{x-11}{x+8}$

D. $\frac{x+11}{x+8}$

41. Given that both rational expressions are defined, determine the value of k .

$$\frac{2x^2 - 9x + k}{3x^2 - 22x + 7} = \frac{2x + 5}{3x - 1}$$

Record your answer neatly on the Answer Sheet.

42. Simplify: $\frac{x}{x+3} + \frac{5x}{x-7}$; $x \neq -3, 7$

A. $\frac{6x}{(x+3)(x-7)}$

B. $\frac{6x^2 + 8x}{(x+3)(x-7)}$

C. $\frac{-6x^2 + 20x}{(x+3)(x-7)}$

D. $\frac{6x^2 + 22x}{(x+3)(x-7)}$

43. Simplify: $\frac{5x+10}{25x^2} \div \frac{x+2}{-5x}$; $x \neq 0, -2$

A. $\frac{x+10}{2}$

B. $\frac{(x+2)^2}{-25x}$

C. $-\frac{10}{x+2}$

D. $-\frac{1}{x}$

44. Solve for m : $\frac{m-2}{m} - \frac{11}{6} = \frac{4}{3m}$; $m \neq 0$

A. -4

B. -2

C. $-\frac{12}{5}$

D. 4

45. Solve: $\frac{5x-7}{3x+2} = \frac{15x+1}{9x-4}$

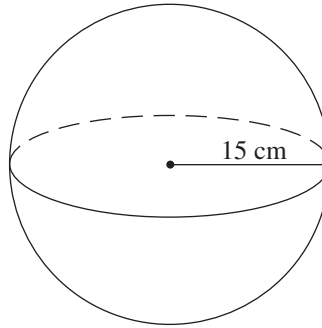
A. $-\frac{9}{10}$

B. $-\frac{4}{5}$

C. $\frac{13}{58}$

D. $\frac{41}{45}$

46. Which of the following expressions represents the surface area of the sphere below?



- A. $\frac{4}{3}\pi(15)^3$
- B. $4\pi(30)$
- C. $4\pi(15)^2$
- D. $4\pi(15)^3$

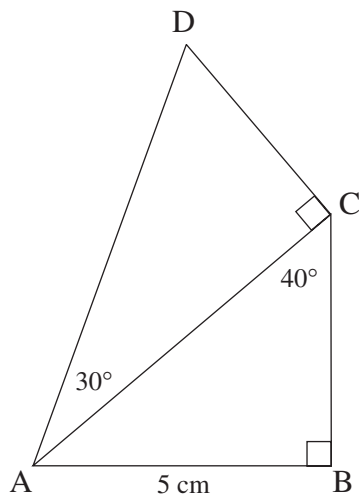
47. The side length of a cube is tripled. By what factor has the volume increased?

- A. 3
- B. 6
- C. 9
- D. 27

48. A straight road up a hill has a slope of $\frac{1}{4}$. From the bottom of the hill to the top of the hill, the horizontal change is 80 m. Determine the height of the hill.

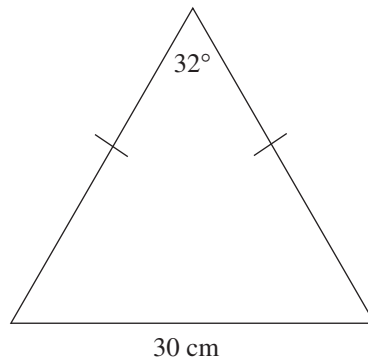
- A. 10 m
- B. 20 m
- C. 25 m
- D. 40 m

49. Determine the length of DC in centimetres. Answer to two decimal places.



Record your answer neatly on the Answer Sheet.

50. An isosceles triangle has a base of 30 cm with an opposite angle of 32° .



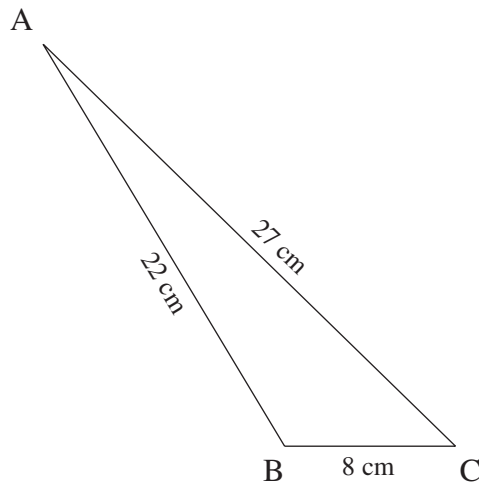
Determine the approximate perimeter of the triangle.

- A. 84 cm
- B. 109 cm
- C. 139 cm
- D. 169 cm

51. Determine the value of $\cos A$ if $\sin A = 0.6428$ and $\angle A$ is an **obtuse** angle.

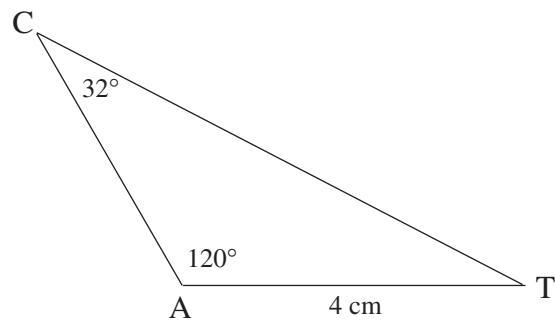
- A. -0.7660
- B. -0.0112
- C. 0.0112
- D. 0.7660

52. Determine the measure of $\angle B$.



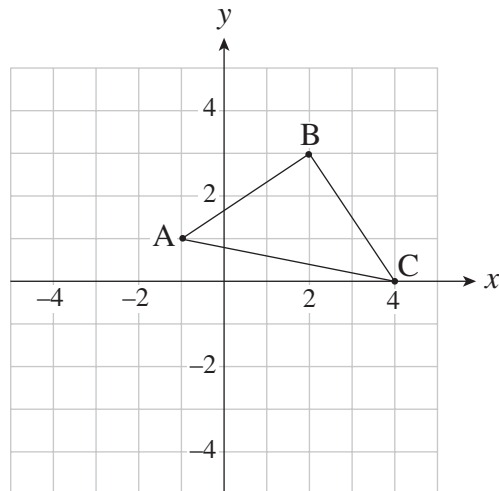
- A. 118.12°
- B. 120.94°
- C. 135.67°
- D. 151.38°

53. The length of CT, to the nearest tenth of a centimetre, is 6.5 cm.



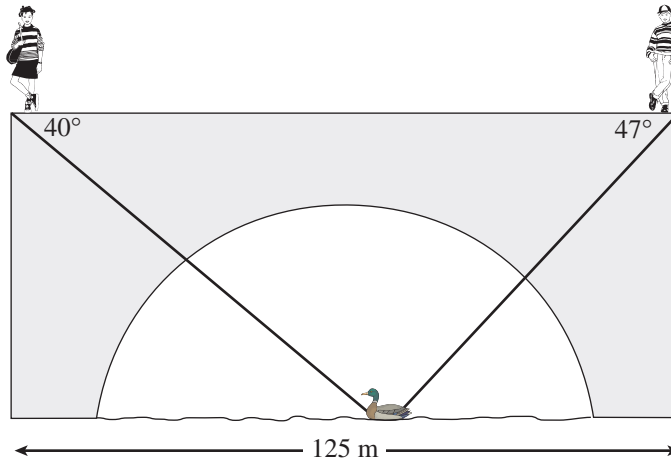
- A. True
- B. False

54. Which of the following formulae would be used in determining if $\triangle ABC$ is an equilateral triangle?



- A. $\frac{1}{2}bh$
- B. $\frac{y_2 - y_1}{x_2 - x_1}$
- C. $\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$
- D. $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

55. Sue and Tony are standing on a bridge. From where Sue is standing, the angle of depression to the duck is 40° . From where Tony is standing, the angle of depression to the duck is 47° . How high is the bridge, in metres, above the water? Answer to two decimal places.



Record your answer neatly on the Answer Sheet.

56. Consider the following line segments.

For \overline{AB} , $A(3, -1)$, and $B(8, 3)$

For \overline{CD} , $C(-2, 7)$, and $D(4, 9)$

Which of the following statements is correct about the lengths of the line segments?

- 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 parallel to \overline{AB}</p> <p>58. line joining the midpoint of \overline{AB} to the origin</p> <p>59. line with x-intercept = -3</p>	<p>A. $y = -\frac{2}{3}x$</p> <p>B. $y = \frac{3}{2}x$</p> <p>C. $y = \frac{3}{2}x + \frac{9}{2}$</p> <p>D. $y = -\frac{3}{2}x + \frac{9}{2}$</p> <p>E. $y = \frac{2}{3}x - \frac{1}{2}$</p>

60. $(-7.5, 3)$ is the midpoint of a line segment \overline{KL} with K at $(-3, -1)$.

Determine the **x -coordinate** of L.

- A. -12.00
- B. -5.25
- C. -2.50
- D. -2.25

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
	<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"/>

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 this 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 a student breaks any of the following rules:
 - Candidates 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.
 - Candidates 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.
 - Candidates 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.
 - Candidates must not communicate with another student during the examination.
 - Candidates must not remove any piece of the examination materials from the examination room, including work pages.
 - Candidates must not take or knowingly use any secure examination materials prior to the examination session.
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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

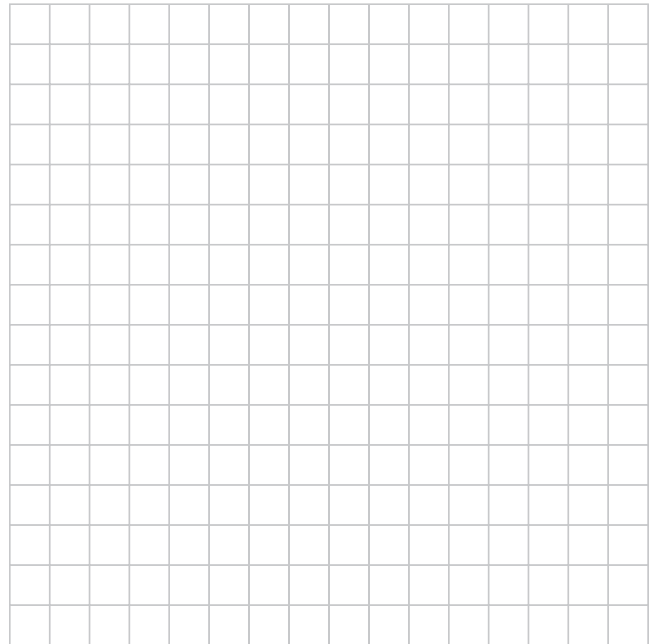
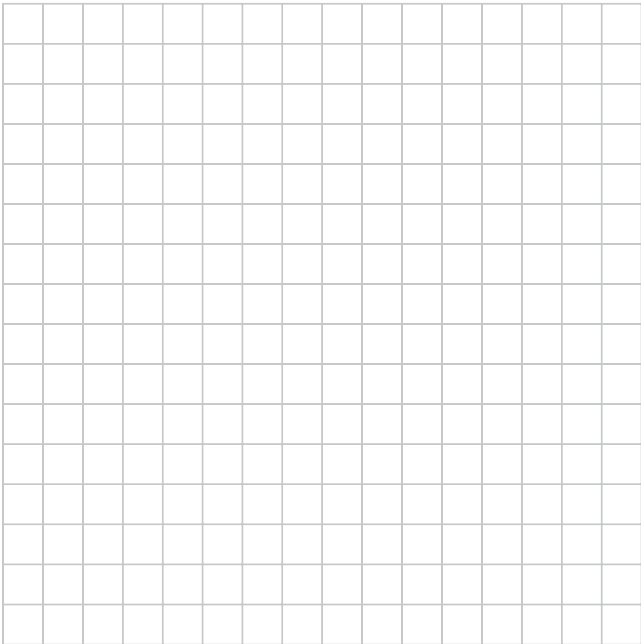
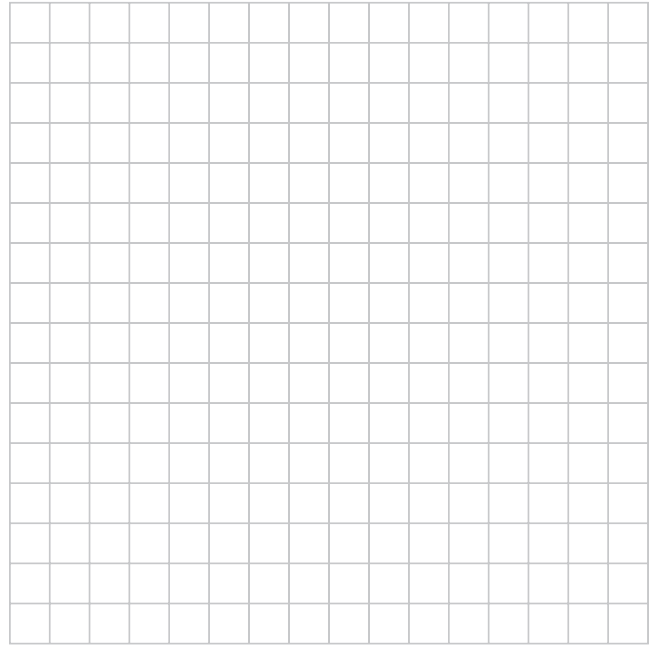
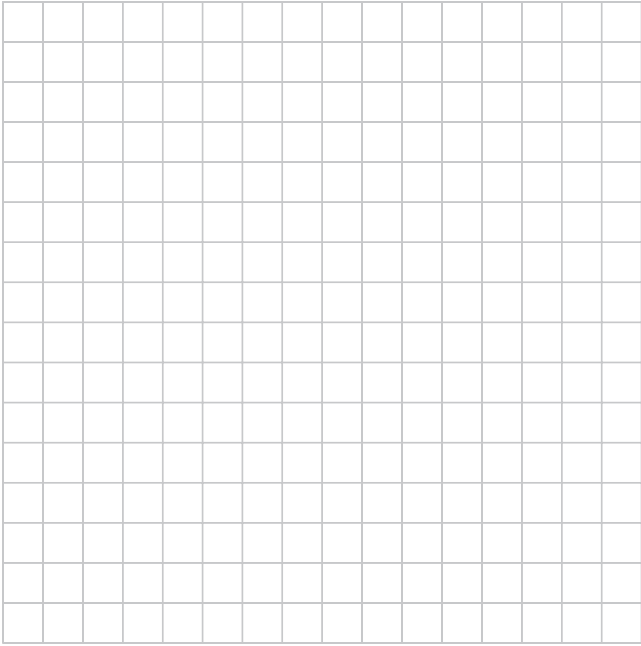
NOTE: Use the value of π programmed in your calculator rather than the approximation of 3.14.

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

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

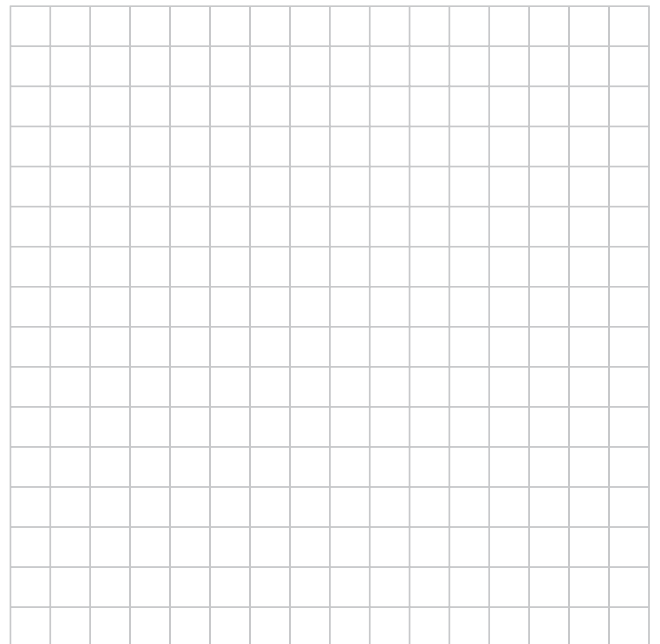
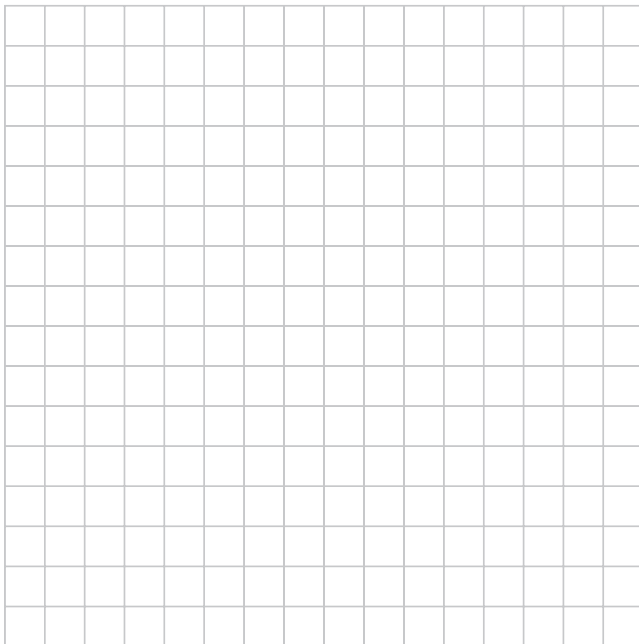
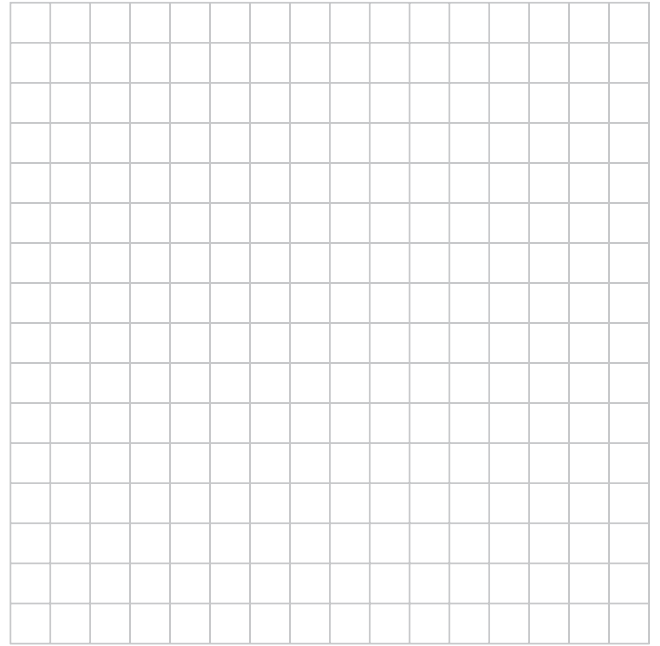
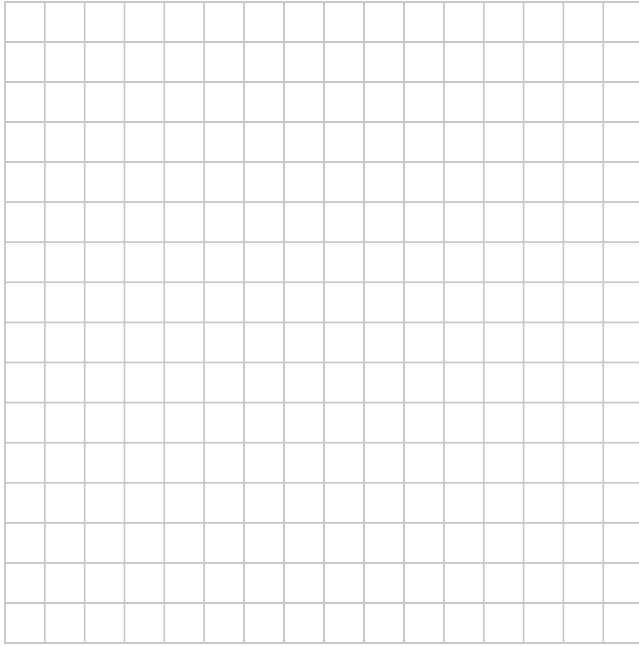
ROUGH WORK FOR GRAPHING

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ROUGH WORK SPACE