



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

Sample Exam B

(Updated October 2006)

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.

1. In order to determine the level of student satisfaction with the cafeteria food at her high school, Mary asked six of her friends for their opinion. What sampling technique did Mary use?
 - A. Random Sampling
 - B. Convenience Sampling
 - C. Questionnaire Sampling
 - D. Stratified Random Sampling

2. You are interested in finding out what percentage of the 900 students at your high school have cell phones. Which of the following samples would give you the best estimate?
 - A. You survey 15 of your friends.
 - B. You survey the 30 students in your math class.
 - C. You survey every tenth student as they leave the school one day.
 - D. You survey every second student entering the library at lunch hour one day.

Use the following information to answer question 3.

A Western Canadian travel magazine has 100 000 readers. In an on-line survey, the readers were asked about the number of trips they took outside Canada last year. Over a three-week period, there was a total of 2250 responses.

Survey Results	
Number of Trips	Number of Responses
0	90
1 or 2	920
3 or 4	830
5 or more	410

3. Which of the following statements can be supported by the information given?

I.	Over 50% of respondents took at least 3 trips outside Canada last year.
II.	Less than 5% of the magazine's 100 000 readers did not leave Canada last year.
III.	Over 15% of Western Canadians will take at least 5 trips outside Canada this year.
IV.	The survey may not be reliable because of the method used.

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

4. Which of the following is a rational number?

- A. $\sqrt{27}$
- B. $\sqrt{16}$
- C. $\sqrt{8}$
- D. $\sqrt{2}$

5. To which set(s) of numbers does $-\sqrt{25}$ belong?

I.	Natural
II.	Integer
III.	Rational
IV.	Irrational

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

Use the following information to answer question 6.

In A-League Soccer a win is worth 3 points, a tie is worth 1 point and a loss is worth 0 points. The team with the most points is in first place. The following table shows the standings.

Team	Wins	Losses	Ties	Points
Seattle	12	10	2	38
Portland	10	7	7	37
Vancouver	11	10	3	36
Calgary	10	9	5	35

6. If a win was worth 2 points (instead of 3 points), which team would be in second place? Assume all else stays the same.

- A. Seattle
- B. Calgary
- C. Portland
- D. Vancouver

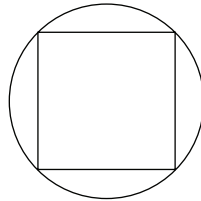
7. Cathy has a fixed-rate investment account that pays interest at an annual rate of 4.5% on the lowest balance in the year. Towards the end of each year, she deposits \$50 into the account as shown below. She makes no withdrawals from this account.

Year	Opening Balance (\$)	Interest Earned (\$)	Annual Deposit (\$)	Closing Balance (\$)
1	385.84	17.36	50.00	
2				

What is the closing balance at the end of year 2? Answer to two decimal places.

Record your answer neatly on the Answer Sheet.

8. Consider the following numbers : 9 , $5\sqrt{3}$, $4\sqrt{5}$, $2\sqrt{19}$, $6\sqrt{2}$
 If the numbers are ranked from smallest to largest, what is the third largest value of the numbers?
- A. 9
 B. $5\sqrt{3}$
 C. $4\sqrt{5}$
 D. $2\sqrt{19}$
9. A square is inscribed in a circle.



The area of the circle is $36\pi\text{cm}^2$. What is the perimeter of the square?

- A. 16.97 cm
 B. 33.94 cm
 C. 50.91 cm
 D. 67.88 cm
10. Simplify : $\sqrt{75} - 2\sqrt{12} + \sqrt{27}$
- A. $4\sqrt{3}$
 B. $6\sqrt{3}$
 C. $26\sqrt{3}$
 D. $6\sqrt{10}$

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

- A. 69
- B. $9 - 30\sqrt{2}$
- C. $81 - 30\sqrt{2}$
- D. $81 - 90\sqrt{2}$

12. Simplify : $\frac{2}{2\sqrt{3} - 1}$

- A. $\frac{1 + \sqrt{3}}{2}$
- B. $\frac{2 + 4\sqrt{3}}{5}$
- C. $\frac{2 + 4\sqrt{3}}{11}$
- D. $\frac{-2 + 4\sqrt{3}}{11}$

13. Place the following exponential expressions in order from the **smallest value** to the **largest value**.

I.	$27^{\frac{1}{3}}$
II.	$\left(16^{\frac{1}{2}}\right)^3$
III.	$81^{-\frac{3}{4}}$
IV.	$\left(\frac{3}{7}\right)^{-2}$

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

14. Which of the following is equivalent to $(-a^3)^{-\frac{2}{3}}$?

A. a^2

B. $-\frac{1}{a^2}$

C. $-a^{\frac{9}{2}}$

D. $\frac{1}{a^2}$

15. What is the value of k if $\sqrt{x^{-\frac{1}{2}}} = x^k$?

Record your answer neatly on the Answer Sheet.

16. Determine t_5 in the following arithmetic sequence.

-1, 2, 5, ...

A. 3

B. 5

C. 8

D. 11

Use the following information to answer question 17.

Arithmetic Sequence I	Arithmetic Sequence II
2, 9, 16, ...	4, 10, 16, ...

17. Which of the following statements is correct?

A. t_{17} is greater in Sequence I.

B. t_{17} is greater in Sequence II.

C. t_{17} is the same in both sequences.

D. There is not enough information given to determine t_{17} .

18. Helen's starting salary is \$35 000 per year. If she receives a raise of \$2000 every year after that, how much will she have earned in total after working 11 years?
- A. \$395 000
 - B. \$405 000
 - C. \$440 000
 - D. \$495 000
19. A cabin by a lake is purchased for \$35 000. If it increases in value by 8.5% each year, what is its value at the beginning of the 15th year?
- A. \$93 159.02
 - B. \$101 077.53
 - C. \$109 669.13
 - D. \$118 991.00
20. What is the sum of the following arithmetic series : $(-20) + (-17) + (-14) + \dots + 52$?

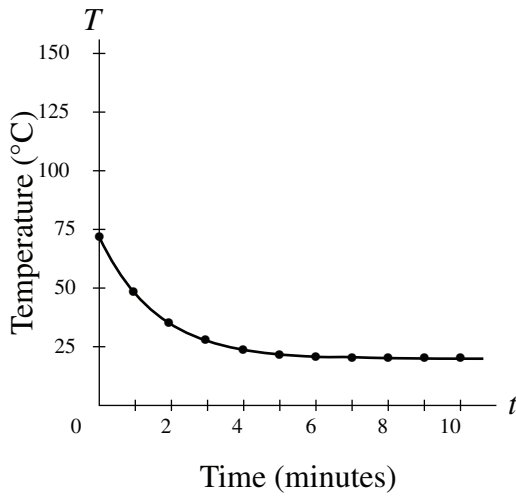
Record your answer neatly on the Answer Sheet.

21. A cup of hot water is left to cool on the table. The temperature is recorded, to the nearest degree, at regular time intervals as shown by the following data.

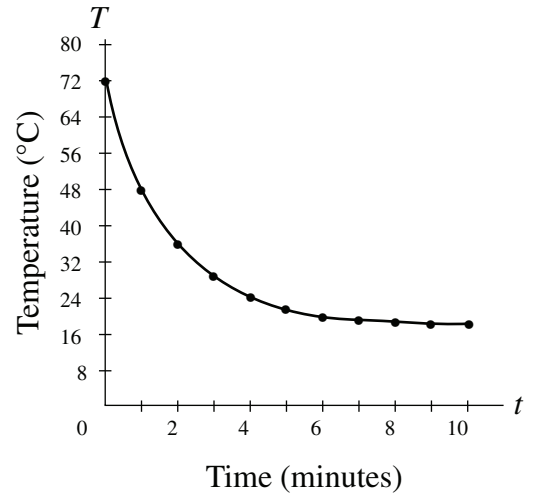
Time (minutes)	0	1	2	3	4	5	6	7	8	9	10
Temperature ($^{\circ}\text{C}$)	72	48	35	28	24	22	21	21	20	20	20

Which graph **best** represents the data?

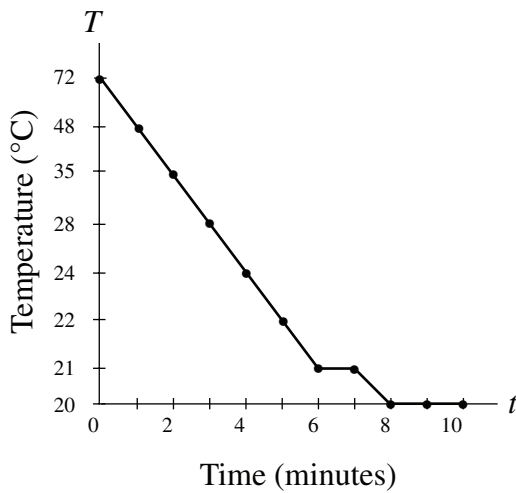
A.



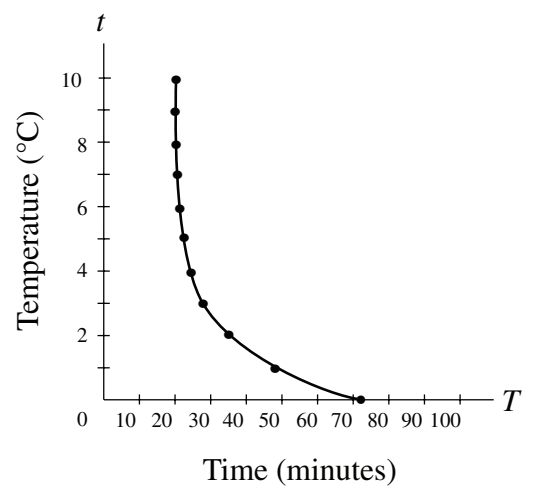
B.



C.

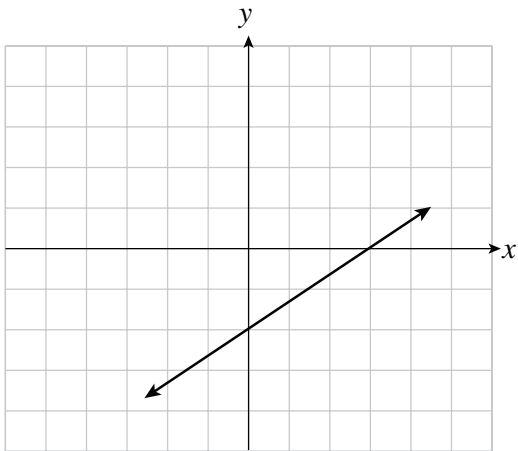


D.

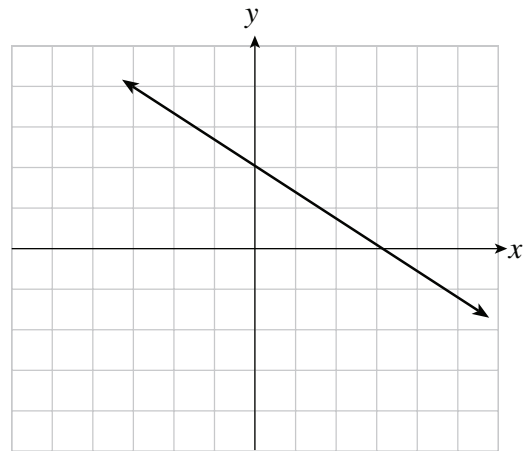


22. Given $f(x) = mx + b$, where m and b are positive real numbers, which of the following graphs best represents $f(x)$?

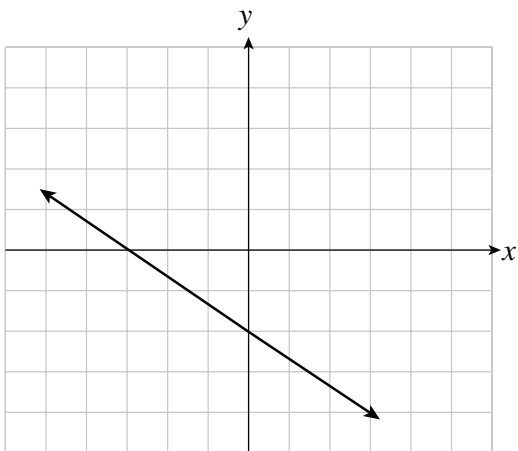
A.



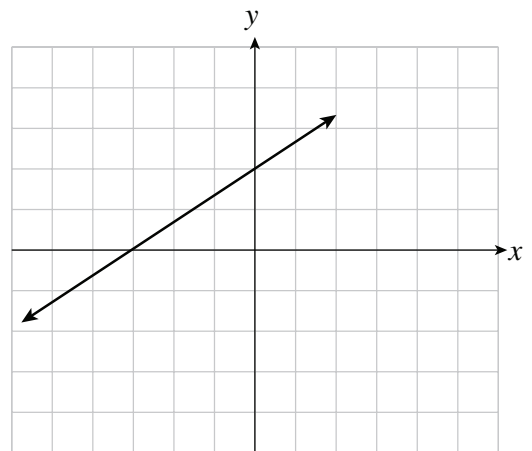
B.



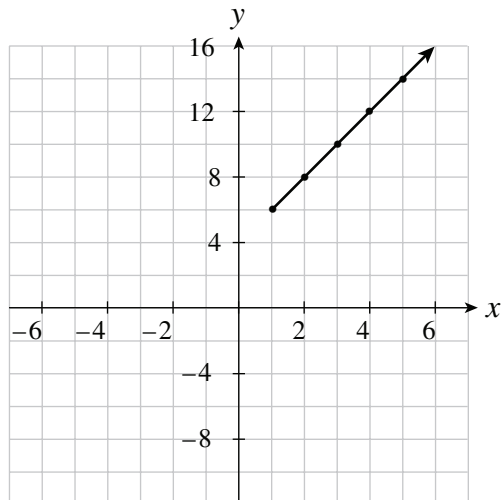
C.



D.

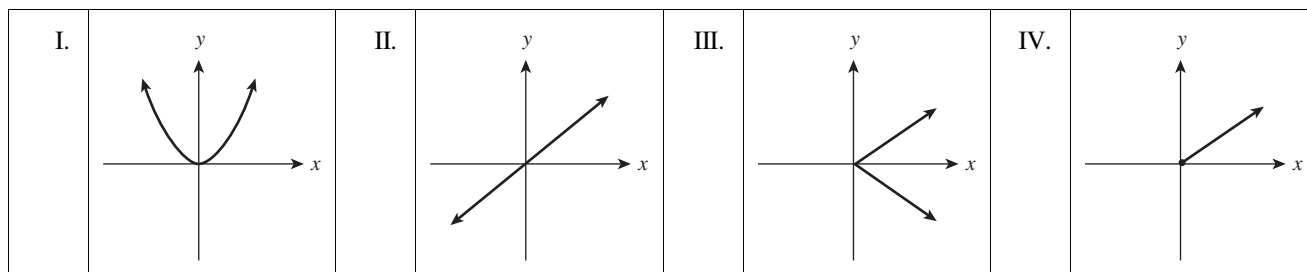


23. Determine the range for the following graph.



- A. $y \geq 1$
- B. $y \geq 6$
- C. $\{6, 8, 10, 12, 14\}$
- D. all real numbers

24. Which of the following relations has a domain of $x \geq 0$?



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

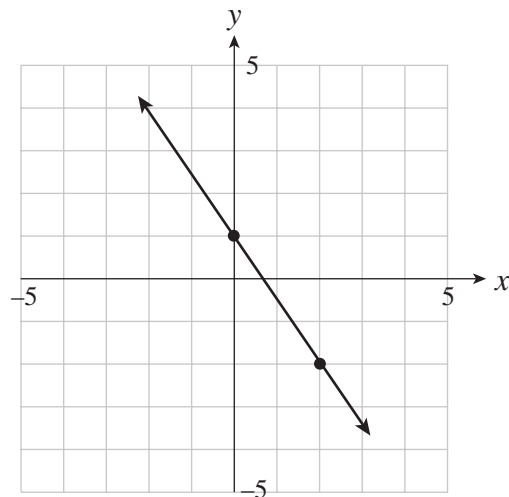
25. Consider the following statements concerning the graph of $x + 2y - 6 = 0$.

I.	The y -intercept is 6.
II.	The x -intercept is -6 .
III.	The slope is $\frac{1}{2}$.
IV.	The domain and range are all real numbers.

Which of the following is true?

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

26. Determine the slope of the following line.



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

27. Determine the x -intercept for the graph of $5x - 2y - 40 = 0$.

- A. -20
- B. -8
- C. 8
- D. 20

28. If $f(x) = \frac{x}{2+x}$, determine $f(3) + f(3^{-1})$.

- A. $\frac{1}{4}$
- B. $\frac{5}{11}$
- C. $\frac{16}{35}$
- D. $\frac{26}{35}$

29. A banquet room has been rented for a retirement dinner for math teachers. It costs \$200 to rent the room and \$15 for every person who attends. Which of the following statements are true?

I.	The function for total cost can be represented by an arithmetic sequence.
II.	The function representing total cost is a direct variation.
III.	The equation representing total cost is the linear function $C = 15n + 200$, where C is the total cost and n is the number of people.

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

30. There is a fixed cost of \$250 to design a flyer plus 80¢ for each flyer printed. How many flyers can be designed and printed for a total cost of \$650?

Record your answer neatly on the Answer Sheet.

31. Which of the following has $x - 3$ as a factor?

I.	$2x^2 - 5x - 3$
II.	$2x^2 - 18$
III.	$x^2 + x - 6$

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

32. For which integral values of k can $6x^2 + kx + 1$ be factored?

- A. 5, 7 only
- B. $\pm 5, \pm 7$ only
- C. $-5, -7$ only
- D. all integers between -7 and 5 , inclusive

33. What value of k will make $4n^2 + 36n + k$ a perfect square trinomial?

Record your answer neatly on the Answer Sheet.

34. Simplify : $(4n + 1)(2n - 3)$

- A. $8n^2 - 5n - 3$
- B. $8n^2 - 10n - 3$
- C. $8n^2 - 14n - 3$
- D. $8n^2 - 11n + 3$

35. Simplify : $(n - a)^2$

- A. $n^2 - a^2$
- B. $n^2 - an + a^2$
- C. $n^2 - 2an + a^2$
- D. $n^2 + 2an - a^2$

36. Simplify : $(5n - 2)(2n^2 + 3n - 1)$

- A. $10n^3 - 19n^2 + 11n + 2$
- B. $10n^3 + 19n^2 + n + 2$
- C. $10n^3 - 11n^2 - n + 2$
- D. $10n^3 + 11n^2 - 11n + 2$

37. For what value(s) of x is the following expression undefined?

$$\frac{4x^2 - 25}{4x^2 - 10x - 50}$$

- A. $x = 5$
- B. $x = \frac{5}{2}, 5$
- C. $x = -\frac{5}{2}, 5$
- D. $x = 0, -\frac{5}{2}, 5$

38. Simplify : $\frac{8x^2 - 12x + 16}{-4}$

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

39. Simplify for all permissible values : $\frac{2x^2 - 8x + 6}{x - 3}$

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

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

$$\frac{2n^2 + kn - 35}{3n^2 - 22n + 7} = \frac{2n + 5}{3n - 1}$$

- A. -22
- B. -19
- C. -11
- D. -9

41. Solve for x : $\frac{50}{x} = \frac{30}{x+2}$

Record your answer neatly on the Answer Sheet.

42. Solve: $\frac{3x+1}{2x} = \frac{6x-5}{4x-3}$

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

43. Simplify: $\frac{1}{x} + \frac{3}{x}$ where $x \neq 0$

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

44. Simplify for all permissible values : $\frac{a^2 + 7a + 10}{a^2 - 2a - 35} \div \frac{a^2 + a - 2}{a^2 - 10a + 21}$

A. $\frac{a-1}{a-3}$

B. $\frac{a-3}{a-1}$

C. $\frac{a+1}{a-3}$

D. $\frac{a+3}{a-1}$

45. When $6y^3 + 2y^2 - 5$ is divided by $3y + 1$, the quotient is $2y^2$ and the remainder is -5 . Which of the following represents these results?

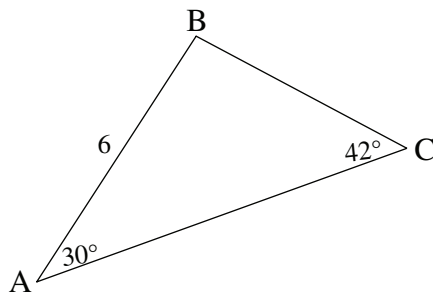
A. $\frac{6y^3 + 2y^2 - 5}{2y^2} = (3y + 1) - 5$

B. $\frac{6y^3 + 2y^2 - 5}{3y + 1} = (3y + 1)(2y^2) - 5$

C. $6y^3 + 2y^2 - 5 = 2y^2 - \frac{5}{3y + 1}$

D. $6y^3 + 2y^2 - 5 = (3y + 1)(2y^2) - 5$

Use the following diagram to answer question 46.



46. Which of the following is used to find the length of side BC?

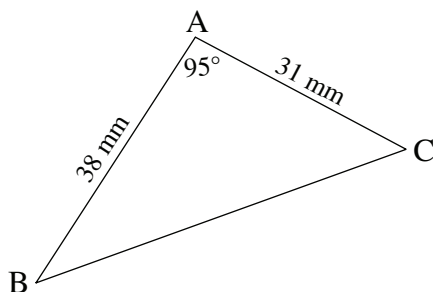
A. sine law

B. cosine law

C. distance formula

D. pythagorean theorem

Use the following diagram to answer questions 47 and 48.



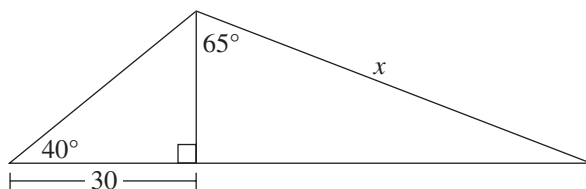
47. What is the length of \overline{BC} ?

- A. 37 mm
- B. 38 mm
- C. 51 mm
- D. 58 mm

48. What is the measure of $\angle B$?

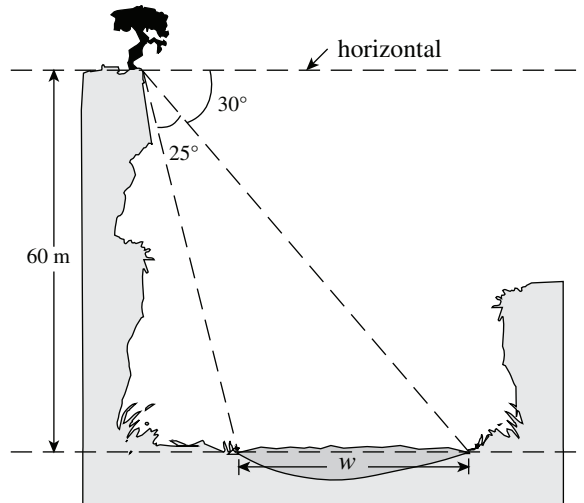
- A. 27°
- B. 37°
- C. 48°
- D. 58°

49. Determine the value of x . Answer to two decimal places.



Record your answer neatly on the Answer Sheet.

50. From the top of a cliff 60 m above a river, angles are measured as shown in the diagram below.



Calculate the width, w , of the river.

- A. 28 m
- B. 62 m
- C. 73 m
- D. 104 m

51. The rounded value 0.6820 is a trigonometric ratio for an angle A ($0^\circ \leq A \leq 180^\circ$). Which of the following has the given value?

I.	$\cos 133^\circ$
II.	$\sin 43^\circ$
III.	$\sin 137^\circ$
IV.	$\cos 47^\circ$

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

Use the following information to answer question 52.

Line Segment UV	Line Segment XY
U(2, 5), V(6, 8)	X(-3, 4), Y(-7, 1)

52. Which of the following statements is correct?
- A. The length of line segment UV is greater.
 - B. The length of line segment XY is greater.
 - C. The lengths of the two line segments are the same.
 - D. There is not enough information given to determine the lengths of the line segments.
53. The midpoint of line segment AB is M(5, -3). If the coordinates of B are (-1, -7) and the coordinates of A are (x, y), what is y?
- A. -5
 - B. 1
 - C. 2
 - D. 11
54. Determine the equation of the line with slope of $-\frac{2}{3}$ and passes through (6, -2).
- A. $2x - 3y + 6 = 0$
 - B. $2x - 3y - 6 = 0$
 - C. $2x + 3y + 6 = 0$
 - D. $2x + 3y - 6 = 0$
55. Determine the value of x if the slope of a line is $\frac{1}{2}$ and the line passes through the points (-6, 2) and (x, 10).

Record your answer neatly on the Answer Sheet.

56. Determine the equation of the line that passes through (3, -1) and (-3, 3).
- A. $2x + 3y - 15 = 0$
 - B. $2x + 3y - 3 = 0$
 - C. $2x + 3y + 9 = 0$
 - D. $3x + 2y - 7 = 0$

57. Determine the equation of a line that is parallel to the line $3x + 2y - 15 = 0$ and has an x -intercept of -6 .

A. $y = -\frac{3}{2}x - 9$

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

C. $y = -\frac{3}{2}x + 9$

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

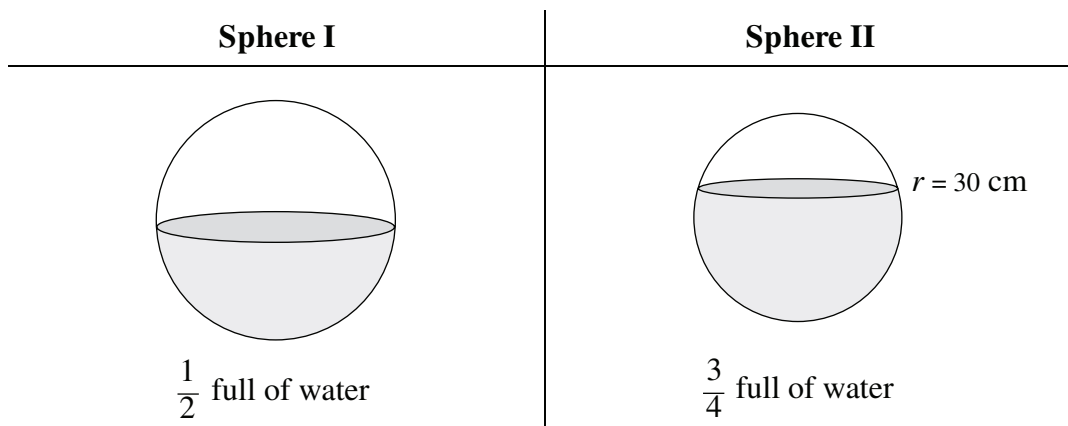
58. Line ℓ contains points $P(3, -9)$ and $Q(-3, -5)$. Choose the equations of the lines that are parallel and perpendicular to line ℓ .

	Parallel to line ℓ	Perpendicular to line ℓ
A.	$y = -\frac{2}{3}x - 10$	$y = \frac{3}{2}x + 12$
B.	$y = -\frac{2}{3}x - 8$	$y = -\frac{3}{2}x - 12$
C.	$y = -\frac{3}{2}x + 10$	$y = \frac{3}{2}x - 4$
D.	$y = \frac{3}{2}x - 9$	$y = -\frac{2}{3}x + 17$

59. When the radius of a sphere is doubled, how is the volume changed?

- A. The volume is increased by a factor of 2.
- B. The volume is increased by a factor of 4.
- C. The volume is increased by a factor of 6.
- D. The volume is increased by a factor of 8.

Use the following information to answer question 60.



60. What must the radius be, in centimetres, of Sphere I in order for there to be an equal volume of water in each sphere? Answer to two decimal places.

- A. 21.63 cm
- B. 31.68 cm
- C. 34.34 cm
- D. 37.80 cm

END OF EXAMINATION

Formulae Sheet

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

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

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

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

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

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

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

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

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

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

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

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

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

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

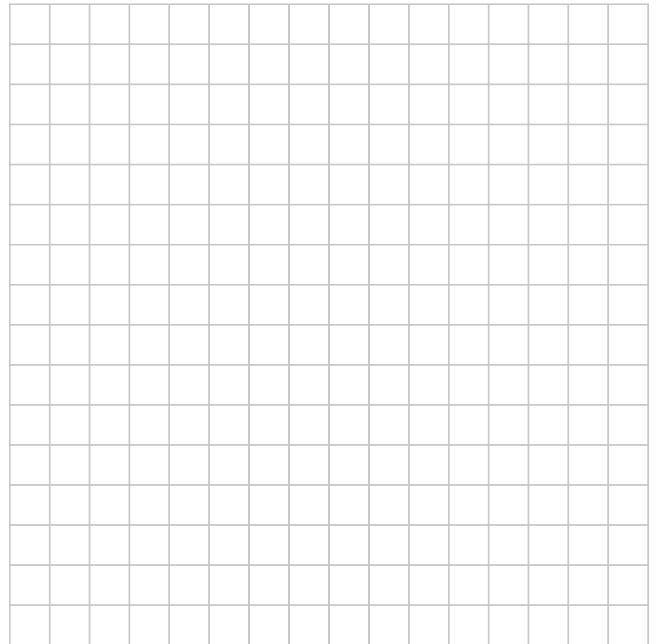
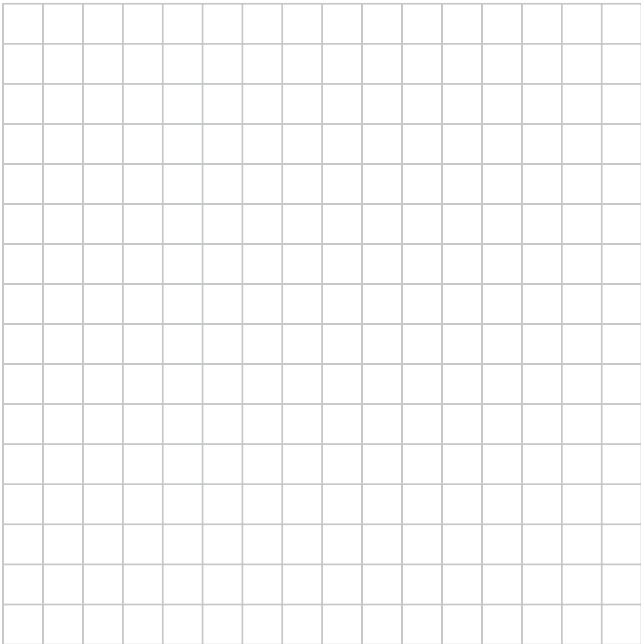
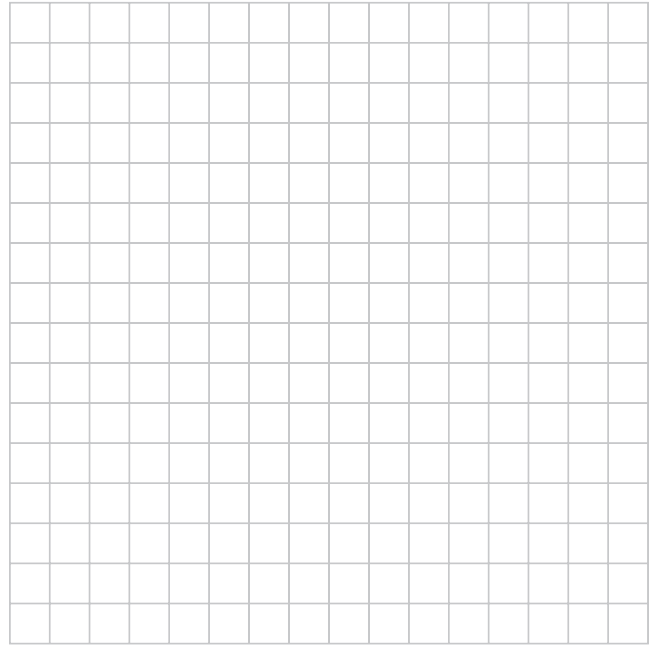
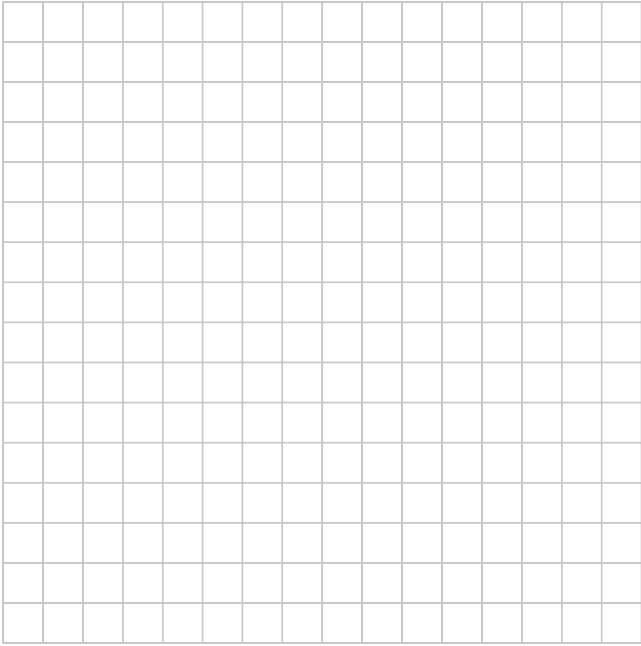
NOTE: Use the value of π programmed in your calculator rather than the approximation of 3.14.

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

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

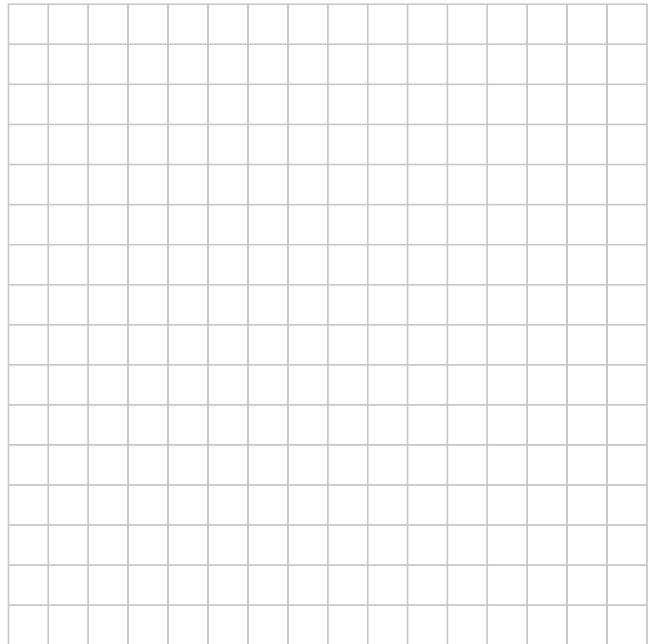
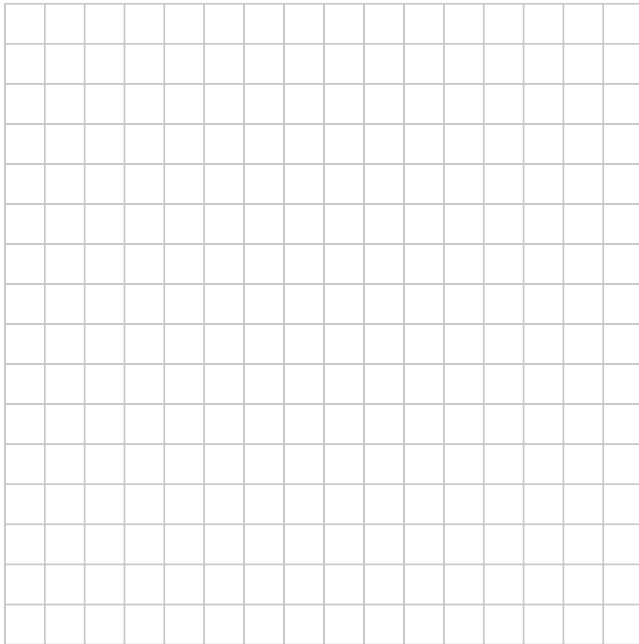
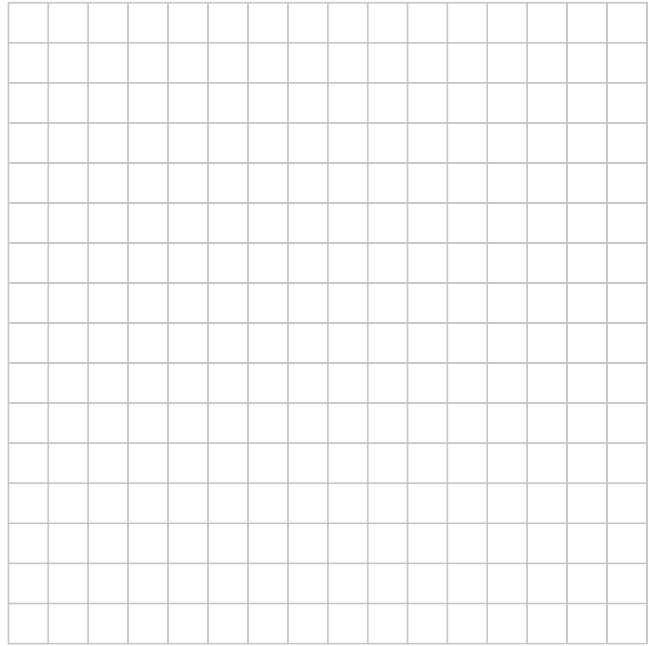
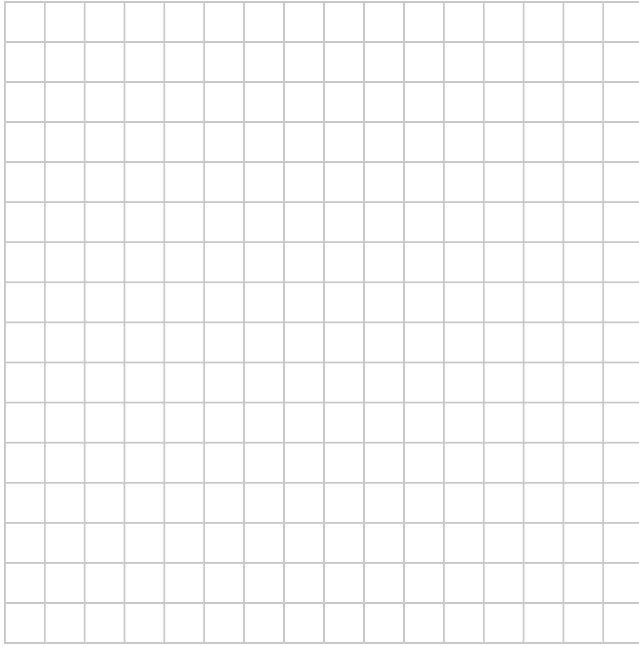
ROUGH WORK FOR GRAPHING

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ROUGH WORK FOR GRAPHING

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ROUGH WORK SPACE