BRITISH COLUMBIA
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Principles of Mathematics 10
Examination Booklet
2007/08 Released Exam
Form A

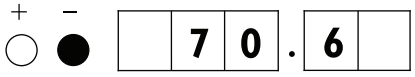
DO NOT OPEN ANY EXAMINATION MATERIALS UNTIL INSTRUCTED TO DO SO.

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.

Contents: 23 pages
52 multiple-choice questions (52 marks)
8 numerical-response questions (8 marks)

Examination: 2 hours
Additional Time Permitted: 60 minutes

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
	●	○	○	○	○	○	○	○

1. Simplify : $7\sqrt{12}$

   A. $9\sqrt{3}$
   B. $14\sqrt{3}$
   C. $28\sqrt{3}$
   D. $\sqrt{84}$

2. Simplify : $\sqrt{80} - 2\sqrt{45} + 5\sqrt{20}$

   A. $6\sqrt{5}$
   B. $8\sqrt{5}$
   C. $18\sqrt{5}$
   D. $20\sqrt{5}$

3. Simplify : $\left(3\sqrt{7} + \sqrt{6}\right)^2$

   A. 69
   B. $27 + 6\sqrt{42}$
   C. $69 + 3\sqrt{42}$
   D. $69 + 6\sqrt{42}$

4. Simplify : $\left(2\sqrt{x}+3\right)\left(3\sqrt{x}-4\right)$

A. $5\sqrt{x}-1$
B. $6x-12$
C. $6x-\sqrt{x}-12$
D. $6x+\sqrt{x}-12$

5. Simplify : $\dfrac{3\sqrt{6}}{\sqrt{11}-\sqrt{2}}$

A. $\sqrt{6}$
B. $\dfrac{\sqrt{66}+2\sqrt{3}}{3}$
C. $\dfrac{\sqrt{66}+4\sqrt{3}}{3}$
D. $\dfrac{3\sqrt{66}+3\sqrt{12}}{13}$

6. Determine the area of a circle with a diameter of $\sqrt{24}$ cm.

A. $75.40\ \text{cm}^2$
B. $30.78\ \text{cm}^2$
C. $18.85\ \text{cm}^2$
D. $15.39\ \text{cm}^2$

7. Evaluate $\frac{\sqrt[3]{729}}{4\sqrt{2}}$ to two decimal places.

Record your answer neatly on the Answer Sheet.

8. To which set of numbers does $-\sqrt{36}$ belong?

   A. integers
   B. whole numbers
   C. natural numbers
   D. irrational numbers

9. If x is a non-zero integer and y is an even whole number, which of the following will always result in a whole number?

   A. $x + y$

   B. $x - y$

   C. x^y

   D. $\frac{x}{y}$

10. Simplify : $\left(-\frac{2x^4}{3y^6}\right)^{-2}$

A. $\frac{9y^{12}}{4x^8}$

B. $\frac{9y^8}{4x^6}$

C. $\frac{4y^{12}}{9x^8}$

D. $-\frac{4x^8}{9y^{12}}$

11. Simplify : $\left(-7a^{-2}b^3c^{-1}\right)^{-3}$

A. $\frac{a^6c^3}{343b^9}$

B. $-\frac{a^6c^3}{343b^9}$

C. $-\frac{1}{343a^6c^9}$

D. $-\frac{343a^6c^3}{b^9}$

12. Which of the following expressions is equivalent to $\frac{1}{\sqrt[5]{a^4}}$?

A. $a^{-\frac{5}{4}}$

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

C. $-a^{\frac{4}{5}}$

D. $a^{\frac{4}{5}}$

13. Simplify : $\left(\sqrt[6]{y^7}\right) \div \left(\sqrt[8]{y^3}\right)$

A. $y^{\frac{19}{24}}$

B. $y^{\frac{37}{24}}$

C. $y^{\frac{7}{16}}$

D. $y^{\frac{28}{9}}$

14. Simplify : $\left[\left(a^{\frac{5}{4}}\right)\left(a^{\frac{7}{3}}\right)\right]^{-\frac{1}{2}}$

A. $-a^{\frac{43}{24}}$

B. $a^{-\frac{43}{24}}$

C. $a^{-\frac{35}{24}}$

D. $a^{\frac{37}{12}}$

15. Determine the value of k:

$$\sqrt[3]{x^{18}} = x^k$$

Record your answer neatly on the Answer Sheet.

16. Which of the following sequences represents an arithmetic sequence?

A. $1, 1, 2, 3, 5, \ldots$
B. $8, 9, 11, 14, 18, \ldots$
C. $10, 6, 2, -2, -6, \ldots$
D. $3, 6, 12, 24, 48, \ldots$

17. What is the value of t_{76} in the following arithmetic sequence?

$$-24, -17, -10, \ldots$$

A. 487
B. 494
C. 501
D. 508

18. Determine the sum the following arithmetic series :

$$399 + 393 + 387 + \ldots + 45$$

A. 13 320
B. 13 275
C. 13 224
D. 13 098

19. For a certain arithmetic sequence, $S_{21} = 546$, $S_{22} = 660$ and $d = 8$; determine S_{23}.

A. 122
B. 668
C. 774
D. 782

20. What is the slope of the graph of $y = 38 - 12x$?

Record your answer neatly on the Answer Sheet.

21. The graph of $y = 4x + k$ has an x-intercept of -20. Determine the value of k.

A. –20
B. –5
C. 16
D. 80

22. Consider the graphs of the following lines :

Line A	$2x - 3y - 18 = 0$
Line B	$4x - 6y - 6 = 0$

Which of the following statements is true?

A. The slopes are the same.
B. The x-intercepts are the same.
C. The y-intercepts are the same.
D. The slopes are different and the x-intercepts are different.

23. Which of the following statements are true about the graph of the function $5y + 40 = 0$?

I.	The slope is zero.
II.	The y-intercept is -8.
III.	The domain is the set of all real numbers.
IV.	The range is the set of all real numbers.

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

24. Given the equation $Ax + By + C = 0$, which of the following must be true for the graph of the line to have a positive slope and a negative y-intercept?

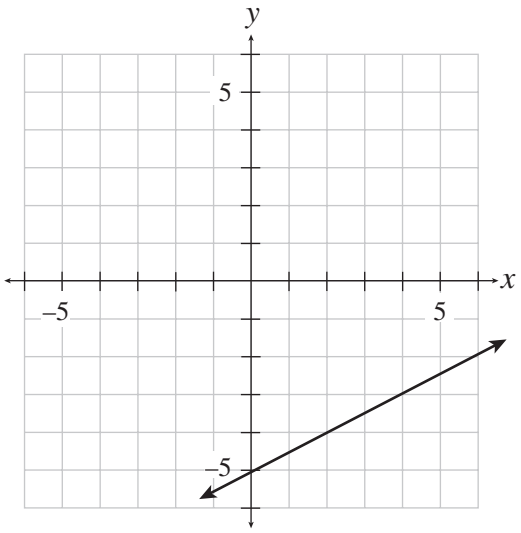
A. $A > 0,\ B > 0,\ C > 0$
B. $A > 0,\ B < 0,\ C < 0$
C. $A > 0,\ B < 0,\ C > 0$
D. $A > 0,\ B > 0,\ C < 0$

25. Which of the following ordered pairs can be found on the graph of the line $4x + 3y = 36$?

I.	$(-9,\ 24)$
II.	$(-3,\ 8)$
III.	$(0,\ 12)$
IV.	$(12,\ 4)$

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

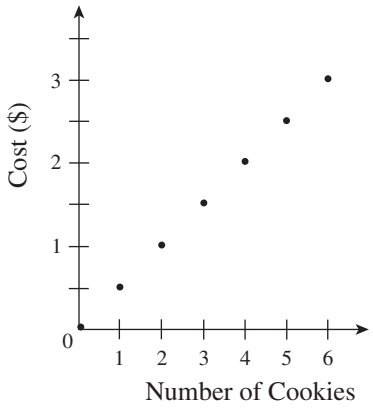
26. Which of the following relations can be used to represent the same function?

I.	$y = 5 - \frac{1}{2}x$
II.	$\{(-6,-8), (-4,-7), (-2,-6), (0,-5)\}$
III.	One number is 5 less than half the other number.
IV.	

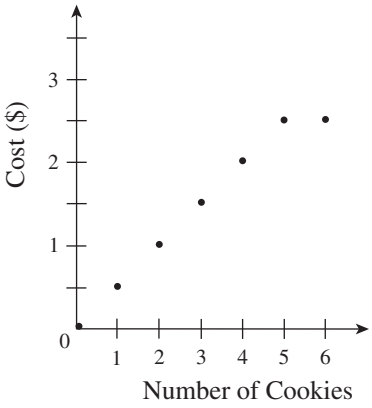
A. I and III only
B. II and IV only
C. I, III and IV only
D. II, III and IV only

27. Cayley's Bakery sells cookies at 50¢ each or $2.50 for 6 cookies. Which graph can be used to best describe this situation?

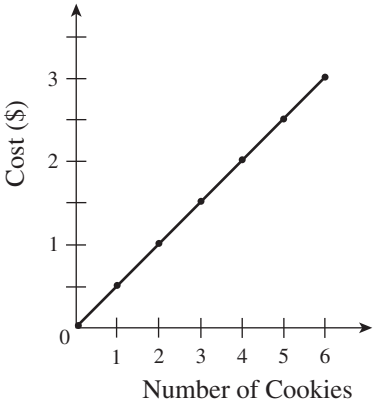
A.



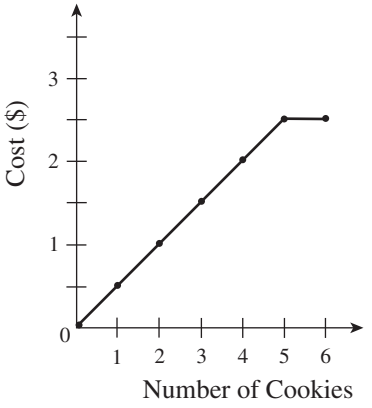
B.



C.



D.



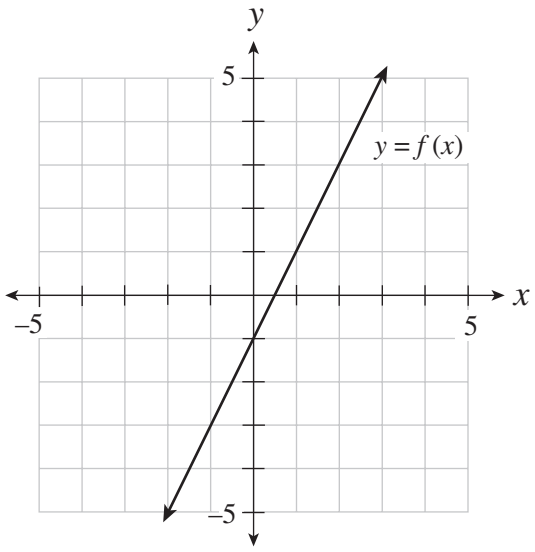
28. For the grad banquet, there is a fixed cost of $250 for the room rental plus a cost per person. If it costs $3276 for 89 people, what is the cost for 110 people?

A. $4299
B. $4049
C. $3990
D. $3740

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

A. $x + 5$
B. $-2x + 3$
C. $-2x + 5$
D. $-2x + 9$

30. If $f(x) = -1$, determine the value of x.



Record your answer neatly on the Answer Sheet.

31. Which of the following expressions is a factor of $6x^2 - 19x - 7$?

A. $3x - 7$
B. $3x - 1$
C. $2x - 7$
D. $2x - 1$

32. Which of the following expressions is a common factor of $12x^2 + 7x - 10$ and $9x^2 - 4$?

A. $3x + 2$
B. $3x - 2$
C. $4x + 5$
D. $4x - 5$

33. Determine the value of k:

$$121x^2 - k = (11x + 8)(11x - 8)$$

Record your answer neatly on the Answer Sheet.

34. Expand: $(x + 5)(x - 4)(2x + 9)$

A. $2x^3 - 180$
B. $2x^3 + 9x^2 - 41x - 180$
C. $2x^3 + 11x^2 - 31x - 180$
D. $2x^3 + 11x^2 + 49x - 180$

35. Simplify: $(4x + 1)(2x + 3) - (3x - 7)(2x - 5)$

A. $2x^2 - 15x + 38$
B. $2x^2 - 15x - 32$
C. $2x^2 + 43x + 38$
D. $2x^2 + 43x - 32$

36. Marco was asked to perform the following division :

$$\frac{2x^3 + x^2 - 13x + 6}{2x - 1}$$

The following steps show Marco's attempt to solve this problem. If he has made a mistake, identify the first line in which this occurs.

$$\begin{array}{rl} & x^2 + x - 6 \\ 2x - 1 \overline{)} & 2x^3 + x^2 - 13x + 6 \\ & \underline{2x^3 - x^2} \\ & 2x^2 - 13x \qquad \text{I} \\ & \underline{2x^2 - x} \\ & 12x + 6 \qquad \text{II} \\ & \underline{12x + 6} \\ & 12 \qquad \text{III} \end{array}$$

A. I
B. II
C. III
D. There is no mistake.

37. Determine the remainder when $3x^4 - x^2 + 24x - 9$ is divided by $x + 2$.

A. 83
B. −5
C. −13
D. −85

38. Simplify for all permissible values : $\frac{16x^2 - 32x}{4x}$

A. $-28x$
B. $4x - 8$
C. $4x - 32$
D. $16x^2 - 8$

39. Simplify for all permissible values : $\frac{x^2 + 2x - 24}{x^2 - 2x - 48}$

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

40. Simplify for all permissible values : $\frac{2x^2 + 9x - 18}{3x^2 + 23x + 30}$

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

41. Determine the number of non-permissible values : $\frac{5x}{x(x+4)(x-7)}$

Record your answer neatly on the Answer Sheet.

42. Simplify for all permissible values : $\frac{x^2-4x+4}{x-6} \div \frac{x^2-8x+12}{x^2-36}$

A. $\frac{x+6}{x-6}$

B. $\frac{x+2}{x-6}$

C. $\frac{x-2}{x+6}$

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

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

A. $\frac{x^2+2x+4}{(x-2)(x+1)}$

B. $\frac{x^2+4x+4}{(x-2)(x+1)}$

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

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

44. Simplify for all permissible values : $\frac{5}{x-1}+\frac{7}{x}-1$

A. $\frac{11}{x(x-1)}$

B. $\frac{12x-8}{x(x-1)}$

C. $\frac{-x^2+12x-2}{x(x-1)}$

D. $\frac{-x^2+13x-7}{x(x-1)}$

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

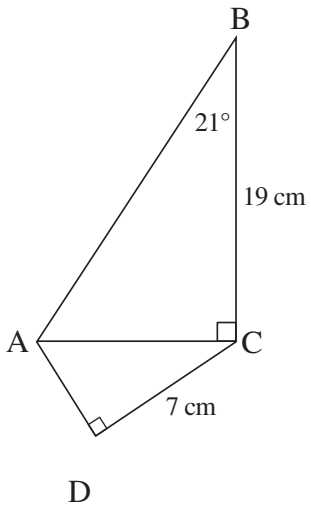
A. $\frac{55}{52}$

B. $\frac{55}{8}$

C. $\frac{55}{2}$

D. $\frac{7}{44}$

46. In the following diagram $\angle B = 21°$, $BC = 19$ cm and $CD = 7$ cm. Determine $\angle CAD$.

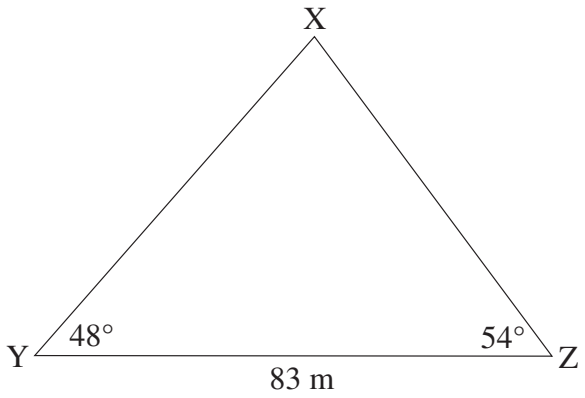


A. 16°
B. 23°
C. 67°
D. 74°

47. Which of the following expressions has the same value as $\cos(180° - X)$, $0° < X < 90°$?

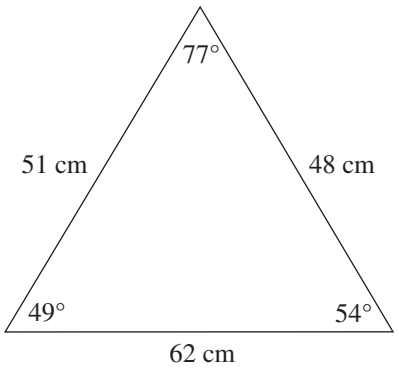
A. $\cos X$
B. $-\cos X$
C. $\sin X$
D. $-\sin(180° - X)$

48. Determine the length of side XY.



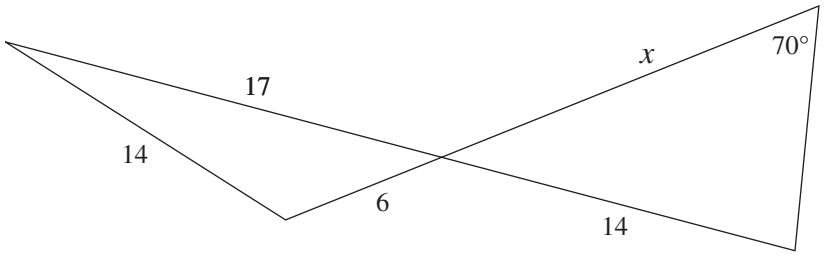
A. 63 m
B. 67 m
C. 69 m
D. 76 m

49. Use the following diagram to determine a, where $a^2 = 51^2 + 62^2 - 2(51)(62)\cos 49°$. Answer to the nearest cm.



Record your answer neatly on the Answer Sheet.

50. Solve for x.



A. 17.0
B. 14.9
C. 12.8
D. 11.5

51. The endpoints of a diameter of a circle are located at $(-3, 9)$ and $(6, -4)$. What is the length of the diameter?

A. 5.8
B. 7.9
C. 15.8
D. 16.6

52. Determine the shortest distance between the x-intercept and y-intercept for the graph of $y = \frac{2}{3}x - 6$.

A. 6.7
B. 7.2
C. 9.0
D. 10.8

53. Determine the slope of the line joining P(–5, 9) and Q(3, –7).

A. -2

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

C. $\frac{1}{2}$

D. 2

54. A line passes through the points $(-8,\ 24)$ and $(4a,\ 9)$. The slope of the line is $-\frac{1}{2}$. Determine the value of a.

A. $-\frac{29}{2}$

B. $-\frac{1}{8}$

C. $\frac{11}{2}$

D. $\frac{19}{2}$

55. The line segment joining R(k, 6) and S(– 4, k) has a midpoint at (–11, – 6). Determine the value of k.

Record your answer neatly on the Answer Sheet.

56. Which equation represents a line with a y-intercept of -5 and a slope of $\frac{2}{3}$?

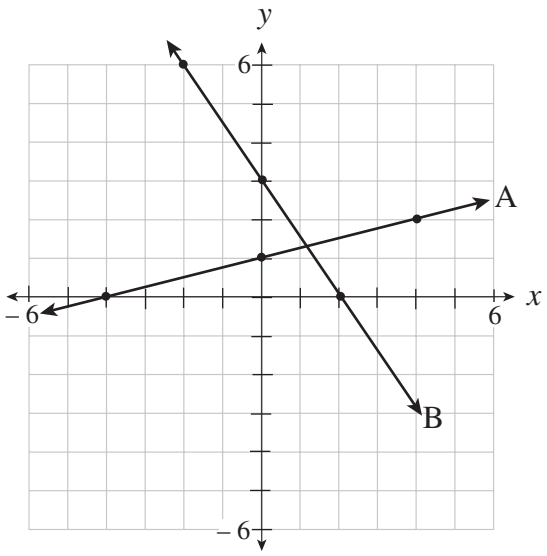
A. $y = \frac{2}{3}x - 5$

B. $y = \frac{2}{3}x + 5$

C. $y = -5x + \frac{2}{3}$

D. $y = 5x + \frac{2}{3}$

57. Which equation represents a line with the same slope as line A and the same y-intercept as line B?



A. $4x - y + 3 = 0$

B. $3x + 2y - 2 = 0$

C. $x - 4y + 12 = 0$

D. $x + 4y - 12 = 0$

58. Determine the value of A, if the lines $y = 2x + 5$ and $Ax - 3y + 30 = 0$ intersect on the x-axis.

A. 12
B. 6
C. -6
D. -12

59. Which equation represents a line that is perpendicular to $2x + 3y - 18 = 0$?

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

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

C. $y = \frac{2}{3}x - 5$

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

60. Determine an equation of the line passing through the point $(-4, 3)$ and parallel to the line segment joining $A(5, -2)$ and $B(3, 4)$.

A. $y = 3x + 15$
B. $y = 3x - 9$
C. $y = -3x + 15$
D. $y = -3x - 9$

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
	●	○	○	○	○	○	○	○

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

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

Circumference of a circle: $= 2\pi r$

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

Volume of rectangular prism: $= l\,w\,h$

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

(No marks will be given for work done on this page.)

ROUGH WORK FOR GRAPHING

(No marks will be given for work done on this page.)

ROUGH WORK SPACE