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.

BRITISH COLUMBIA
The Best Place on Earth

Principles of Mathematics 10
Sample Exam A

(Updated October 2006)

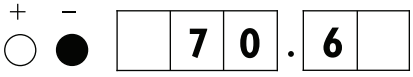
DO NOT OPEN ANY EXAMINATION MATERIALS UNTIL INSTRUCTED TO DO SO.

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:

0	1	2	3	4	5	6	7	8	9

   - 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: 20 pages
60 selected-response questions (maximum of 60 marks)

Examination: 2 hours
Additional Time Permitted: 60 minutes

1. A total of 8000 surveys were placed at gas stations asking whether gas prices should be raised. Of the 6978 replies, 6492 were not in favour of raising prices. Which type of bias is present in this survey?

   A. no bias
   B. question bias
   C. selection bias
   D. non-response bias

2. 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

3. Which of the following numbers are irrational?

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

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

4. Howard's regular wage is $13.60 per hour for the first eight hours each day. After eight hours, he is paid $20.40 per hour for overtime. The table below shows the number of hours he worked in one week.

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

How much did he earn for the week?

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

5. 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.

6. 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 |

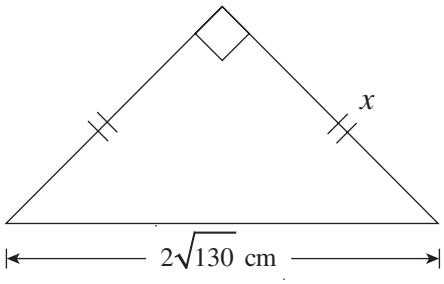
7. A bank account pays an annual interest rate of 6.2% on the lowest balance in the year. Towards the end of each year, $800 is deposited into the account as shown below. No withdrawals are made.

Year	Opening Balance ($)	Interest Earned ($)	Annual Deposit ($)	Closing Balance ($)
1	2777.44	172.20	800.00	
2				

How much interest is earned in Year 2? Answer to two decimal places.

Record your answer neatly on the Answer Sheet.

8. Determine the length of side x.



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

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

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

10. Simplify : $\left(\sqrt{2}+\sqrt{3}\right)\left(2\sqrt{2}+\sqrt{3}\right)$

A. $5+2\sqrt{6}$
B. $5+3\sqrt{6}$
C. $7+2\sqrt{6}$
D. $7+3\sqrt{6}$

11. Simplify : $\left(4\sqrt{3}-\sqrt{5}\right)^2$

A. 43
B. $17-8\sqrt{15}$
C. $53-4\sqrt{15}$
D. $53-8\sqrt{15}$

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

A. $3\sqrt{6}+6$

B. $3\sqrt{6}-6$

C. $\sqrt{6}-2$

D. $\sqrt{6}+2$

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. $x^{\frac{16}{15}}$

C. $x^{\frac{15}{4}}$

D. x^4

15. When $\left(x^6\right)^{\frac{2}{3}}$ is simplified, what is the value of the exponent?

Record your answer neatly on the Answer Sheet.

16. Determine the common difference for the following arithmetic sequence :

$$-3, -11, -19, \ldots$$

A. 8
B. –3
C. –8
D. –14

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

A. 146
B. 896
C. 952
D. 1904

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

$$7, \_\_\_\_, \_\_\_\_, \_\_\_\_, 27$$

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

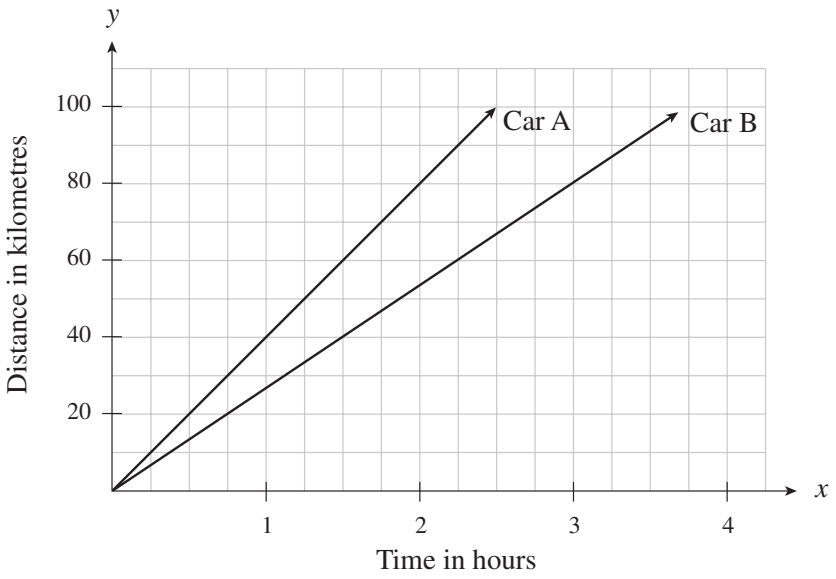
19. Determine the value of x in the geometric sequence $34.56, x, 24, 20$.

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

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 in one week?

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

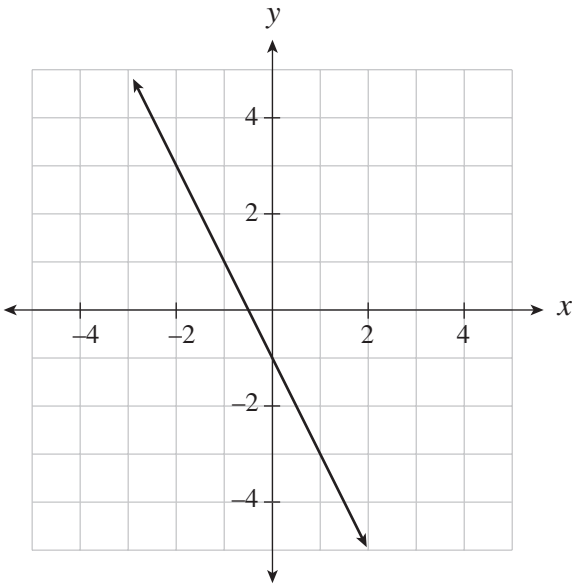
A. $f(x) = 25x$

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 $f(2x + 3)$?

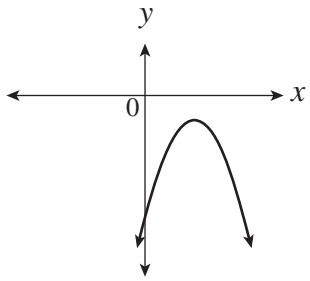
A. $12x^2 - 4x + 18$
B. $12x^2 + 8x + 9$
C. $12x^2 + 32x + 27$
D. $12x^2 + 32x + 39$

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

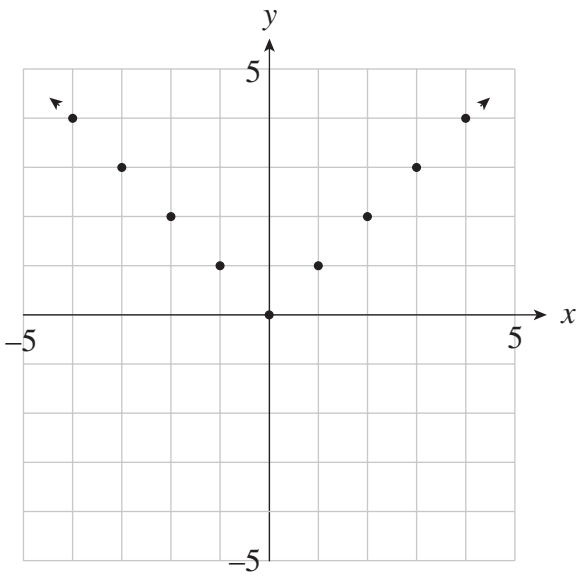
A. Multiply the number by 3 and subtract 5.

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

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

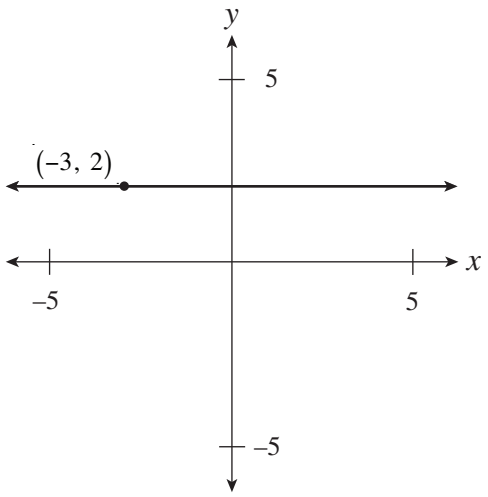
D. 

26. Determine the domain of the following graph.



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

27. Determine the range of the following graph.



A. $y = 2$

B. $y = -3$

C. undefined

D. all real numbers

28. Determine the x-intercept of the graph of $2x - 3y + 9 = 0$

A. 3

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

C. $\frac{9}{2}$

D. $-\frac{9}{2}$

29. The slope of the line represented by $6x - ky + 1 = 0$ is $\frac{2}{3}$. Determine the value of k.

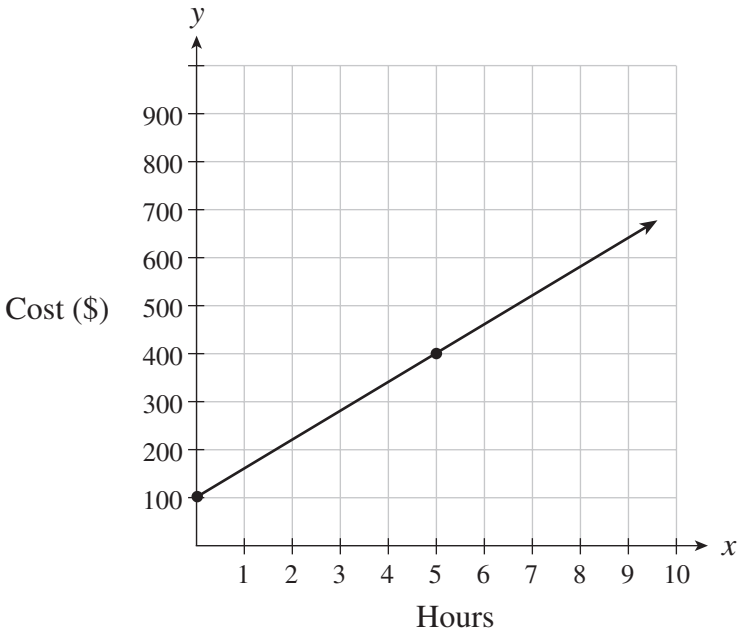
A. 9

B. 4

C. 3

D. –9

30. The following graph represents the cost of hiring a plumber to fix a 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 $9x^2+42x+k$ a perfect square trinomial?

Record your answer neatly on the Answer Sheet.

34. Which of the following is a factor of $x^3 - 7x^2 - 18x$?

A. $x - 9$
B. $x - 3$
C. $x - 2$
D. $x + 6$

35. Which of the following is a factor of $10x^2 - 21x - 10$?

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

36. Which of the following is a factor of $75(x + y)^2 - 108$?

A. $x + y - 6$
B. $x + y + 6$
C. $5x - 5y - 6$
D. $5x + 5y + 6$

37. For how many values of x is the following expression undefined?

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

A. 5
B. 4
C. 3
D. 2

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 for all permissible values : $\frac{12a^3 - 18a^2}{3a}$

A. $4a^2 - 6a$

B. $4a^2 + 6a$

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

D. $9a^2 - 15a$

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

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.

$$\frac{x(x+k)}{x^2 + 2x - 3} = \frac{x}{x - 1}$$

Record your answer neatly on the Answer Sheet.

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

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 : $\frac{5x+10}{25x^2} \div \frac{x+2}{-5x}$ where $x \neq 0,\ -2$

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

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

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

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

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

A. -4

B. -2

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

D. 4

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

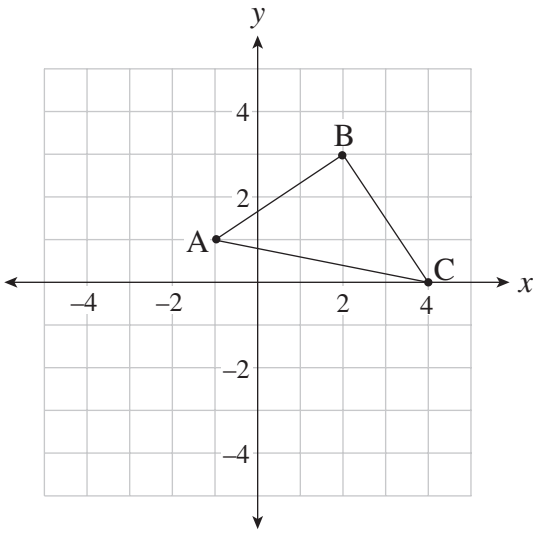
A. $-\frac{9}{10}$

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

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

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

46. Which of the following formulae would be used in determining if ΔABC 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. $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

47. 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.

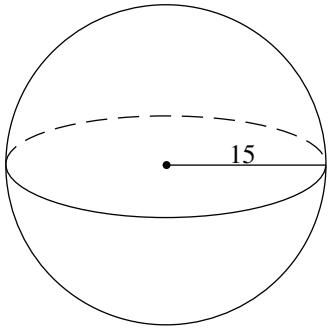
48. $(-7.5,\ 3)$ is the midpoint of a line segment $\overline{KL}$ with K at $(-3,\ -1)$.
Determine the ***x*-coordinate** of L.

A. –2.25
B. –2.50
C. –5.25
D. –12.00

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

Record your answer neatly on the Answer Sheet.

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



A. $\frac{4}{3}\pi(15)^3$

B. $4\pi(30)$

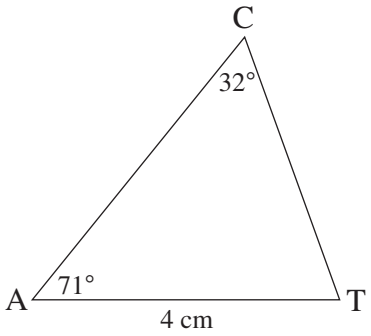
C. $4\pi(15)^2$

D. $4\pi(15)^3$

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

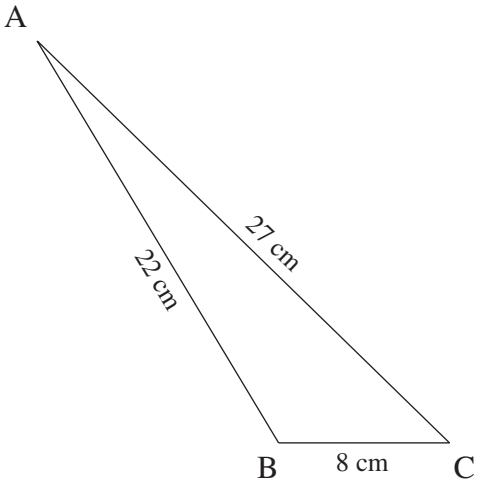
A. –0.7660
B. –0.0112
C. 0.0112
D. 0.7660

52. Determine the length of CT.



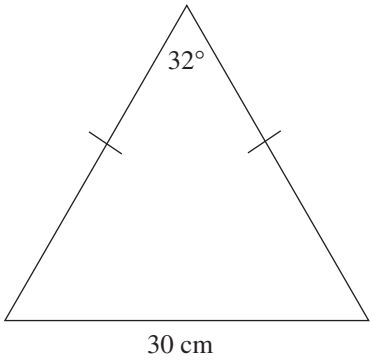
A. 3.8 cm
B. 6.4 cm
C. 7.1 cm
D. 11.6 cm

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



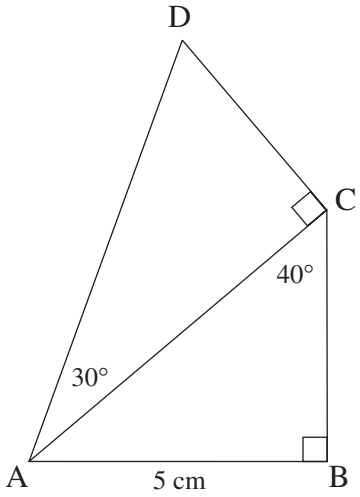
A. 118°
B. 121°
C. 136°
D. 151°

54. Determine the approximate perimeter of the given triangle.



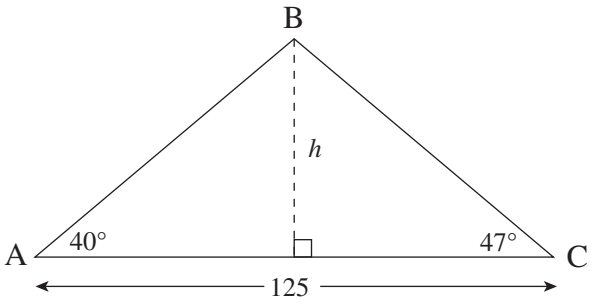
A. 84 cm
B. 109 cm
C. 139 cm
D. 169 cm

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



Record your answer neatly on the Answer Sheet.

56. Determine the height of ΔABC.



A. 70
B. 67
C. 59
D. 52

57. 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

58. Which of the following represents a line passing through $A(-2, 6)$ and $B(4, -3)$?

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

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

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

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

59. What is the equation of the line that passes through the point $(-5, -1)$ and is parallel to $2x + 5y - 2 = 0$?

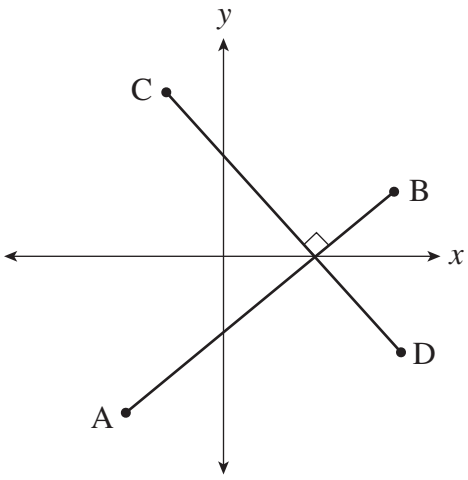
A. $y = \frac{2}{5}x - \frac{27}{5}$

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

C. $y = -\frac{2}{5}x + 1$

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

60. The equation of line segment $\overline{AB}$ is $y = 2x - 8$. Line segments $\overline{AB}$ and $\overline{CD}$ are perpendicular to each other and intersect on the x-axis. Determine the y-intercept of line segment $\overline{CD}$.



A. –2
B. 2
C. 4
D. 8

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

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

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

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

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

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

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

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

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

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

Surface area of a cylinder: $= 2\pi r^2 + 2\pi rh$

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

Surface area of a cone: $= \pi r^2 + \pi rs$

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

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

(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