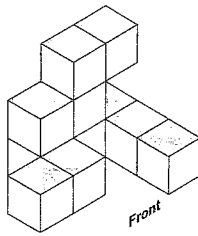


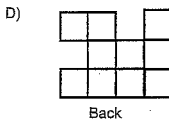
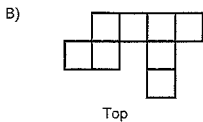
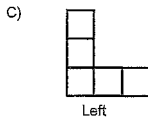
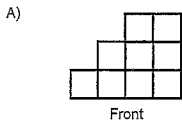
Practice Exam - 6 - C2 -

Part A Questions 1 to 6
 In the *Student Booklet*, darken the letter that corresponds to your answer.
 Each question is worth 4 marks.

1. A solid is shown below in the axonometric perspective.



Which view correctly represents the cubes shown above?



4. Which interval notation represents the solution set of the inequality below?

$$3x - 4 \leq 11$$

A) $[5, +\infty[$

C) $]-\infty, -5]$

B) $] -\infty, 5]$

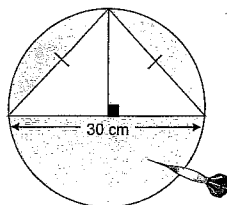
D) $[-5, +\infty[$

5. A game of chance involves throwing a dart at a circular target on which an isosceles triangle is drawn.

The height of the triangle is the radius of the circle.

The base of the isosceles triangle measures 30 cm.

If the dart lands in a shaded area, the player wins a prize.



What is the probability of winning a prize in this game?

A) 25%

C) 33%

B) 64%

D) 68%

2. Which of the following expresses the number 0.000 000 78 in scientific notation?

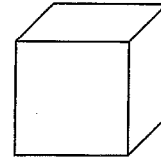
A) 78×10^8

C) 7.8×10^7

B) 7.8×10^{-7}

D) 78×10^{-8}

3. A cube has a total surface area of 433.5 cm^2 .



What is the volume of the cube?

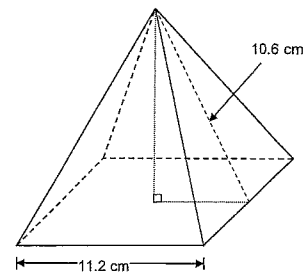
A) 614.125 cm^3

C) 216 cm^3

B) 25.5 cm^3

D) 377.32 cm^3

6. A square based pyramid is shown below. The dimensions are shown in cm



What is the total surface area of the pyramid in square decimeters?

A) 3.63 dm^2

C) 376 dm^2

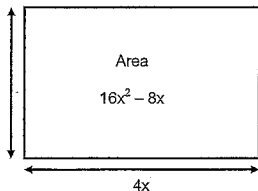
B) 3.76 dm^2

D) $36\,300 \text{ dm}^2$

Part B Questions 7 to 10

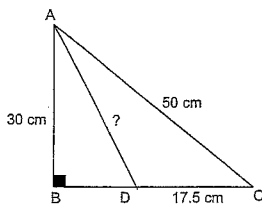
In the *Student Booklet*, write your answer in the space provided.
Each question is worth 4 marks.

7. Besa is building a rectangular garden with an area of $16x^2 - 8x$ units and a side length of $4x$. The other side length is unknown. The perimeter of this garden is 28 units.



What is the numerical area of the garden?

8. Triangle ABC below is a right angle triangle.



What is the length segment of \overline{AD} ?

Part C This part of the examination consists of **Questions 11 to 16**.

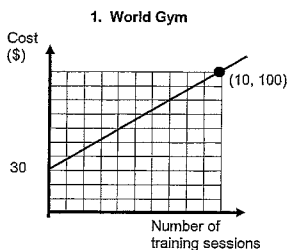
For each question, you must show all your work to justify your answer. The work you show on all the pages of Part C will be considered.

Your work must be organized and clearly presented; it cannot simply involve listing the calculator applications or programs used to obtain results or information.

Each question in Part C is worth 10 marks.

11. Pumping Iron

Tara would like to find a new gym to work-out in. Here are some of her options.



2. The Athletic Club

Number of training sessions	Cost (\$)
5	37.50
11	82.50
28	210
34	255
57	427.50

3. Heart and Fitness Centre

$$C = 6.75n + 35$$

or

n = number of training sessions
 C = cost (\$)

4. Olympia Fitness

This gym costs a fixed amount of \$580, if you go between 75 and 85 training sessions.

If Tara would like to train 80 times this year, which gym has the least expensive option?

9. Expand and/or simplify the following expressions.

a) $(6a + 8b) - (3a - 5b)$

b) $3x(4x - 1) + 2x - 5$

c) $\frac{18x^4y^3 - 9x^8y^4}{3x^2y^3}$

d) $(m^3n^5)^8$

10. During the term, Marissa recorded her grades and the weight of each evaluation in the table below, but forgot to write her last exam grade:

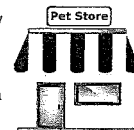
Her final term mark in math was 77%.

Evaluations	Grades	Weight %
Quiz 1	80%	25
Test 1	90%	15
Exam 1	75%	30
Exam 2	?	30
Final term mark:	77%	

What grade did Marissa receive on her second exam?

12. Chico's Pet Store

Chico left his sporting goods store to open a pet store. He hired two new employees Anna and Ben.



They are both paid a fixed amount plus a commission based on a percentage of their sales.

- Anna works in the accessories department
- Ben works with the live animals.
- The salaries in each department are calculated using different rules.

Consider the situation where x is the amount of sales (\$) and y is the daily salary (\$).

Accessories Department (Anna)

Employees earn a 10% commission on their sales plus a fixed amount of \$70 per day.

Animal Department (Ben)

Examples of what an employee can earn:

Amount in sales (\$)	Daily salary (\$)
200	105
1000	145

On Monday, Anna and Ben had the same amount of sales and earned the same daily salary.

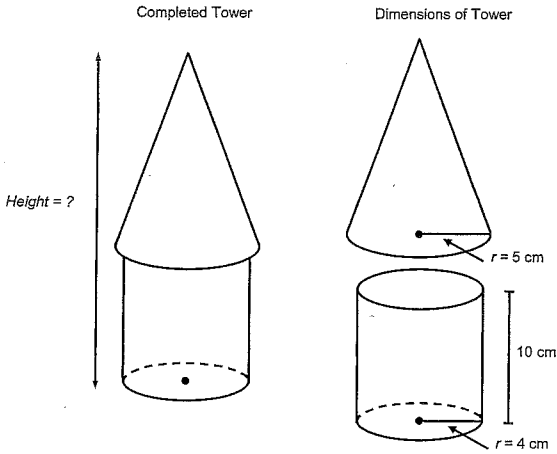
On Tuesday Ben sold \$200 more in sales than he did on Monday.

How much money did Ben make on Tuesday?

13. Tower Sculpture

Sammy has been given an art project to make a sculpture. The sculpture is made by pouring wax into a mould; once it hardens, it is removed from the mould.

- Sammy only has 1.25 L of wax.
- To fit in the display case, his sculpture must not exceed 30 cm in height.
- The cone and the cylinder he creates have the same volume.



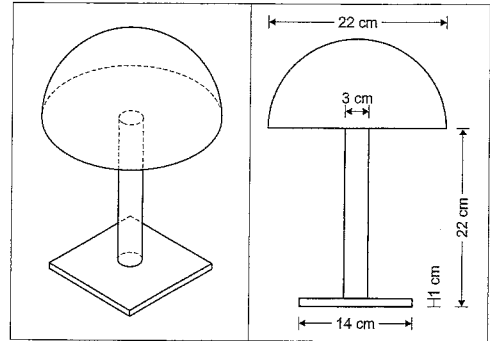
Sammy thinks his sculpture will use less than 1.25 L of wax and will not exceed 30 cm in height. Is he correct?

14. Aunt Edna's Lamp

Aunt Edna is in the process of redecorating her living room. She is on a tight budget, so she has decided to shop for inexpensive items at a local garage sale. She comes across the lamp shown below. The lamp pieces are permanently glued together (cannot be taken apart).

She likes the style of the lamp, but wants to improve its appearance by:

- > painting all of the sides of the square base excluding the bottom;
- > painting the lateral area of cylindrical pole;
- > painting the outside of the hemispherical lamp shade a new colour, the base is open.



What is the total surface area that Aunt Edna will be painting?

15. Race Against Time

Fifteen Grade 9 students completed a 100 m race in the spring. All of their times were recorded in the table below. Your principal has asked you to present the data to the training club in your city.

A. Create a box and whisker plot and label all necessary information. Once completed, fill in the table by identifying the mean, mode and range.

B. If Sophia ran a time in the most condensed quartile, would her time be closer to, the mean or the median?

Race times for the 15 students in the 100 m race



Race times

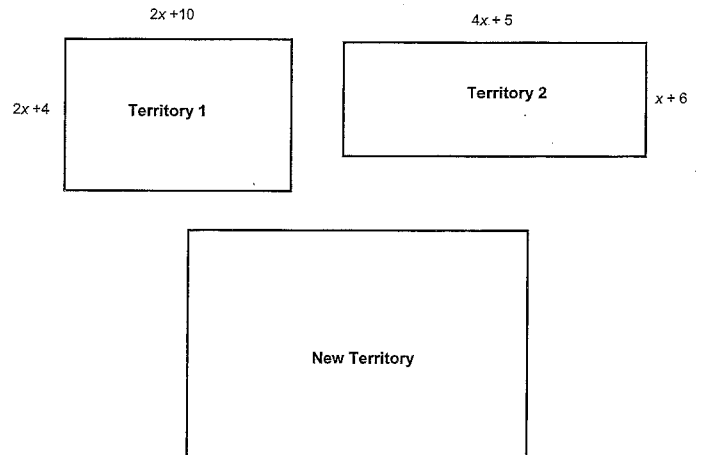
12.4	13.6	18	17.8	12.6
13.6	11.6	11.4	17.8	14.2
16.2	13.6	11.4	13.6	12.2

16. The Wolf Pack

Michael, a wildlife biologist at Everest National Park, monitors the territories of two wolf packs. Both Territories 1 and 2 have the same area.

Due to a natural disaster, Michael would like to relocate all of the wolves from Territory 1 and 2 into a New Territory. The rectangle representing the New Territory is similar to Territory 1 with an area 2.25 times larger.

Note: Diagrams are not necessarily to scale



What is the perimeter of the New Territory for the wolves? All units are in km.

Practice Exam - 6 - CA Solution

Part A Questions 1 to 6
 Darken the letter that corresponds to your answer.
 Each question is worth 4 marks.

- 1. [A] [B] [C] [D]
- 2. [A] [B] [C] [D]
- 3. [A] [B] [C] [D]
- 4. [A] [B] [C] [D]
- 5. [A] [B] [C] [D]
- 6. [A] [B] [C] [D]

Part B Questions 7 to 10
 Write your answer in the space provided.
 Each question is worth 4 marks.

7. The numerical area of the garden is 48 units² 4 0

8. The length of segment \overline{AD} is 37.5 cm 4 0

Algebraic Expression	Simplified Algebraic expression
a. $(6a + 8b) - (3a - 5b)$	$3a + 13b$
b. $3x(4x - 1) + 2x - 5$	$12x^2 - x - 5$
c. $\frac{18x^4y^8 - 9x^2y^4}{3x^2y^3}$	$6x^2y^5 - 3x^2y$
d. $(m^3n^5)^2$	m^6n^{10}

4 3 2 1 0

10. Marissa received a mark of 70 % on her second exam. 4 0

11. Show all your work.

① World Gym
 $a = \frac{70}{10} = 7$
 $b = 30$
 $f_1(x) = 7x + 30$
 $f_1(80) = \$590$

③ Heart & Fitness Centre
 $c = 6.75n + 35$
 $C(80) = \$575$

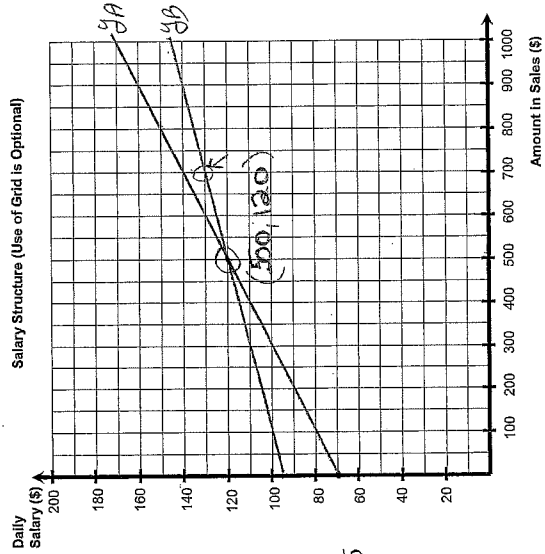
② The Athletic Club
 $a = \frac{45}{6} = 7.5$
 $b = 0$
 $f_2(x) = 7.5x$
 $f_2(80) = \$600$

④ Olympia Fitness
 $f_3(x) = 580$
 $f_3(8) = \$580$

Heart & Fitness Centre
 is the least expensive option for 80 training sessions.

Uses mathematical reasoning					
Observable indicators correspond to level					
LEVEL	A	B	C	D	E
Cr. 3	40	32	24	16	8
Cr. 2	40	32	24	16	8
Cr. 1	20	16	12	8	4
Cr. 0					

Salary Structure (Use of Grid is Optional)



#12. Show all your work.

Amne:

$$y_A = 0.10x + 70$$

$$\text{ben: } a = \frac{y_B}{x} = 0.05$$

$$b = 105 - (0.05)(200) = 95$$

$$y_B = 0.05x + 95$$

Monday: $y_A = y_B$

$$0.10x + 70 = 0.05x + 95$$

$$0.05x = 25$$

$$x = 500$$

Tuesday: Ben sold \$ 700

$$y_B(700) = 0.05(700) + 95 = 130$$

Ben made \$ 130 on Tuesday

Uses mathematical reasoning					
Observable indicators correspond to level					
LEVEL	A	B	C	D	E
Cr. 3	40	32	24	16	8
Cr. 2	40	32	24	16	8
Cr. 4	20	16	12	8	4
Cr. 5	20	16	12	8	4

#13. Show all your work.

$$1.25 \text{ Litres of wax} = 1.25 \text{ dm}^3 = 1250 \text{ cm}^3$$

$V_{\text{cone}} = V_{\text{cylinder}}$

$$\frac{A_b h}{3} = A_b h = 502.65$$

or 502.65

$$\frac{\pi(5)^2 h}{3} = \pi(4)^2(10)$$

$$\frac{25h}{3} = 160$$

$$25h = 480$$

height of cone: $h = 19.2$

Total height is $19.2 + 10$

$$= 29.2 \text{ L} < 30$$

Yes, Sammy is correct.

No, Sammy is incorrect.

Explanation:

Total height is 29.2 cm

Total wax needed is 1.015 L

Uses mathematical reasoning					
Observable indicators correspond to level					
LEVEL	A	B	C	D	E
Cr. 3	40	32	24	16	8
Cr. 2	40	32	24	16	8
Cr. 4	20	16	12	8	4
Cr. 5	20	16	12	8	4

#14, Show all your work.

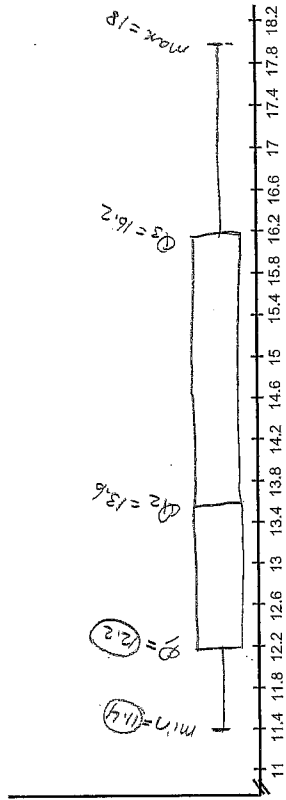
$$\begin{aligned}
 & (A_{L\text{prism}} + A_{\text{base}} - A_o) + A_{L\text{cyl}} + A_{L\text{hem}} \\
 &= (P_b h + A_b - \pi r^2) + 2\pi r h + 2\pi r^2 \\
 &= (4(14)(1) + \overset{196}{(14)^2} - \pi(1.5)^2) + 2\pi(1.5)(21) + 2\pi(1.5)^2 \\
 &= (56 + 196 - 7.07) + 63\pi + 242\pi \\
 &= 244.93 + 197.92 + 760.27 \\
 &= 1203.12 \text{ cm}^2
 \end{aligned}$$

The total surface area that Aunt Edna will

be painting is 1203.12 cm².

Uses mathematical reasoning					
Observable indicators correspond to level					
LEVEL	A	B	C	D	E
Cr. 3	40	32	24	16	8
Cr. 2	40	32	24	16	8
Cr. 4	20	16	12	8	4
Cr. 5					0

#15, Show all your work.



Statistical measure	Results of the 100 m race
Mean	14
Mode	13.6
Range	6.6

11.4	11.4	11.6	12.2	12.4
12.6	13.6	13.6	13.6	13.6
14.2	16.2	17.8	17.8	18

15
7 0 7
303 } 303

$$\bar{X} = \frac{210}{15} = 14$$

mean = 14
Median = 13.6

Is Sofia's time closer to the mean or the median time? Explain:

Sofia's time is in the first quarter
[11.4, 12.2] which is closer
to Median (13.6)
not mean (14)

Uses mathematical reasoning					
Observable indicators correspond to level					
LEVEL	A	B	C	D	E
Cr. 3	40	32	24	16	8
Cr. 2	40	32	24	16	8
Cr. 4	20	16	12	8	4
Cr. 5					0

#16. Show all your work.

$$A_{T_1} = A_2$$

$$NT \sim T_1 \Rightarrow k^2 = 2.25$$

$$\therefore k = 1.5$$

$$(2x+4)(2x+10) = (4x+5)(x+6)$$

$$4x^2 + 20x + 8x + 40 = 4x^2 + 24x + 5x + 30$$

$$4x^2 + 28x + 40 = 4x^2 + 29x + 30$$

$$28x + 40 = 29x + 30$$

$$\boxed{10 = x}$$

$$\therefore \text{Dimensions of } T_1: l = 2(10) + 10 = 30$$

$$w = 2(10) + 4 = 24$$

$$\text{Dimensions of } NT: l = 30(1.5) = 45$$

$$w = 24(1.5) = 36$$

$$\boxed{\begin{matrix} 30 \\ T_1 \end{matrix}}$$

$$\boxed{\begin{matrix} 45 \\ NT \end{matrix}}$$

$$\begin{aligned} \text{Perimeter} &= 2(36) + 2(45) \\ &= 162 \end{aligned}$$

Uses mathematical reasoning					
Observable indicators correspond to level					
LEVEL	A	B	C	D	E
Cr.3	40	32	24	16	8
Cr.2	40	32	24	16	8
Cr.4	20	16	12	8	4
Cr.5					0

The perimeter of the New Territory for the wolves is 162 km.