

YEAR 10 MATHEMATICS
Examination - Semester 2, 2015



**KINROSS
COLLEGE**
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WRITTEN QUESTION AND ANSWER BOOKLET

STUDENT'S NAME::
TEACHER'S NAME:
DATE:

TIME ALLOWED FOR THIS PAPER:

Reading time **before** commencing work: 10 minutes
Working time for this paper: 1 hour & 45 minutes

MATERIAL REQUIRED / RECOMMENDED FOR THIS PAPER:

To be provided by the supervisor

- This question and answer booklet

To be provided by the candidate

- Pens, pencils, eraser and / or correction fluid
- Up to two scientific calculators.
- Written notes on **one** unfolded A4 sized paper; can be double-sided

IMPORTANT NOTE TO CANDIDATES

No other items may be taken into the examination room.

It is your responsibility to ensure that you do not have any unauthorised notes or other items of a non-personal nature in the examination room. If you have any unauthorised material with you, hand it to the supervisor **BEFORE** reading any further. All iPads and mobile phones must be turned off and in your bag along with any other devices and notes. Bags are to be closed and placed under the desk.

INSTRUCTION TO CANDIDATES:

1. **Read** through the paper to familiarise yourself with all of the questions.
2. Use a **blue or black** ballpoint / ink pen. Do not answer in pencil.
3. **Write** your answers in this booklet.

AT THE END OF THE EXAMINATION:

- Any planning sheets or other pieces of paper **MUST** be handed in with this booklet.
- At the end of the examination make sure that your name is on your booklet and any other pieces of paper used.

Structure of this paper

TOTAL QUESTIONS: 45

TOTAL MARKS: 125

<p><u>Section 1:</u> <i>Multiple Choice</i> 25 questions, 25 marks Attempt questions 1 - 25</p>	<p><u>Section 2:</u> <i>Written Answer</i> 20 questions, 100 marks Attempt questions 1 - 20</p>
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Instructions to candidates

1. Sitting this examination implies that you agree to abide by the examination rules set down by Kinross College.
2. Answer the questions in the space provided.
3. You must be careful to confine your responses to the specific questions asked and to follow any instructions that are specific to a particular question.
4. A Spare page is included at the end of this booklet. It can be used for planning your responses and/or as additional space if required to continue an answer.
 - (a) Planning: If you use the spare page for planning, indicate this clearly at the top of the page. If you choose to use lined paper for planning, ensure your name and the title is clearly printed.
 - (b) Continuing an answer: If you need to use the space to continue an answer, indicate in the original answer space where the answer is continued, i.e. give the page number. Fill in the number of the question (s) that you are continuing to answer at the top of the page.
5. This examination contributes towards your grade and will be in your report. If you have any questions, please ask them during the ten-minute reading time.
6. Manage your time wisely. Always provide substantiation (evidence). Make sure that what you have written makes sense.

Note: Do not turn the page until you are asked to do so.

Section 1: Multiple choice (Total 25 marks, one mark per question)

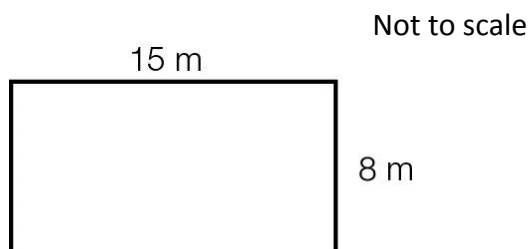
1. State the basic numeral of 1.42×10^7 :

- a) 1 420 000 000
- b) 1.42
- c) 14 200 000
- d) 0.0000000142

2. What is 0.0001234 in scientific notation form?

- a) 1234×10^{-4}
- b) 1.234×10^{-4}
- c) 1234×10^4
- d) 1.234×10^4

3. The perimeter of the rectangle below is:

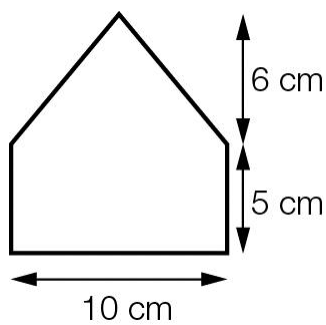


- a) 23 m
- b) 36 m
- c) 46 m
- d) 52 m

4. **192 cm is equivalent to:**

- a) 0.192 m
- b) 1.92 m
- c) 0.0192 m
- d) 0.00192 m

5. **The area of this composite shape would be:**



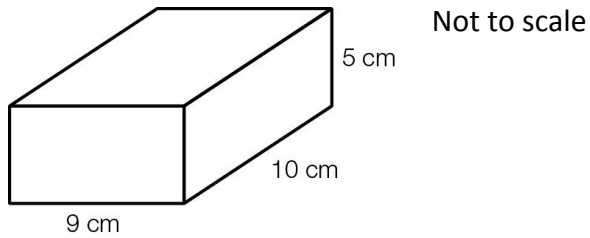
Not to scale

- a) $(10 \times 5) + (10 \times 6) \text{ cm}^2$
- b) $(10 \times 11) + \left(\frac{1}{2} \times 10 \times 6\right) \text{ cm}^2$
- c) $(10 \times 15) + \left(\frac{1}{2} \times 10 \times 6\right) \text{ cm}^2$
- d) $(10 \times 5) + \left(\frac{1}{2} \times 10 \times 6\right) \text{ cm}^2$

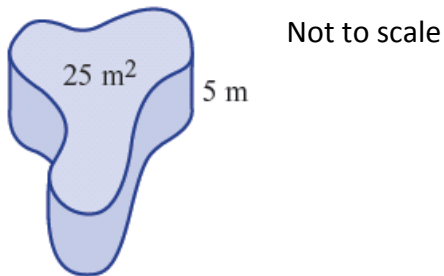
6. **The area of a circle of diameter 20 m is approximately:**

- a) 3.14 m²
- b) 3140 m²
- c) 31.4 m²
- d) 314 m²

7. **The surface area of the rectangular prism below is:**



- a) 450 cm^2
 - b) 24 cm^2
 - c) 370 cm^2
 - d) 150 cm^2
8. **The volume of the solid below is:**



- a) 25 m^3
 - b) 50 m^3
 - c) 75 m^3
 - d) 125 m^3
9. **A triangular prism has a base length of 6 cm, height of 4 cm and depth of 10 cm. What is the volume of the prism?**
- a) 120 cm^3
 - b) 60 cm^3
 - c) 40 cm^3
 - d) 150 cm^3

10. Find the value of the expression $4(2x + y)$ if $x = 5$ and $y = 4$:

- a) 56
- b) 36
- c) 44
- d) 54

11. Simplify $3a + 2b + c - 6a + 4b$:

- a) $-6a + 6bc$
- b) $9a + 6b$
- c) $3abc$
- d) $-3a + 6b + c$

12. Expand and simplify $-3(2x - 1)$:

- a) $-x - 4$
- b) $-6x + 3$
- c) $-5x - 4$
- d) $6x - 3$

13. The expression $\frac{g^3 \times g^2}{g^9}$ simplifies to:

- a) g^4
- b) $\frac{1}{g^3}$
- c) $\frac{1}{g^5}$
- d) $\frac{1}{g^4}$

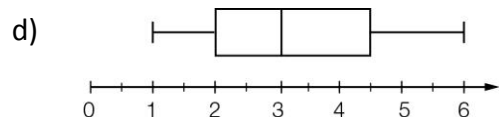
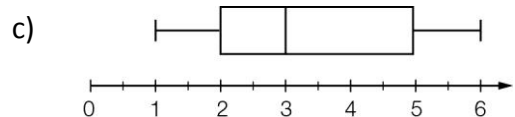
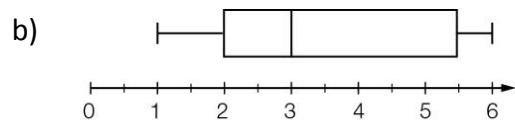
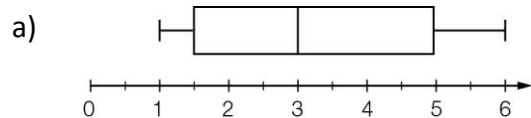
14. The y -intercept of the equation $y = 2x - 4$ is:

- a) -8
- b) 2
- c) -4
- d) $\frac{1}{2}$

15. The gradient of the line joining the points $(2, 5)$ and $(-3, 2)$ is:

- a) -3
- b) $\frac{3}{5}$
- c) $\frac{5}{3}$
- d) 3

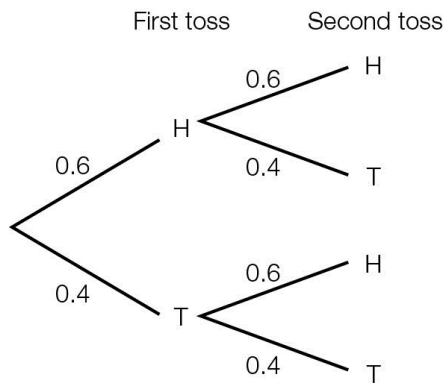
16. The box plot for the data set $\{1, 1, 2, 2, 3, 4, 5, 5, 6\}$ is:



17. The data below represent Bob's marks in each of the five tests in four different subjects. In which subject does he achieve the highest mean?

a) English:	60	82	75	47	90
b) Maths:	72	74	35	100	89
c) Science:	50	57	65	46	50
d) Geography:	60	70	65	85	79

18. The tree diagram shows the probabilities associated with tossing a biased coin twice. The probability of obtaining exactly one tail is:



- a) 0.6
- b) 0.4
- c) 0.48
- d) 0.64
19. The probability of choosing, by random selection, a brown ball from a bag containing 3 red balls, 2 white balls and 4 brown balls is:

- a) $\frac{1}{3}$
- b) $\frac{4}{9}$
- c) $\frac{1}{2}$
- d) $\frac{4}{5}$

20. A jar contains 9 red lollies, 6 yellow lollies and 5 green lollies. What is the probability that a lolly chosen at random from the jar is *not* red?

a) $\frac{9}{20}$

b) $\frac{11}{20}$

c) $\frac{7}{10}$

d) $\frac{3}{4}$

21. You draw 2 cards from a normal pack of 52 playing cards. What is the probability that the second card you draw is an Ace, if the first card drawn is not an Ace?

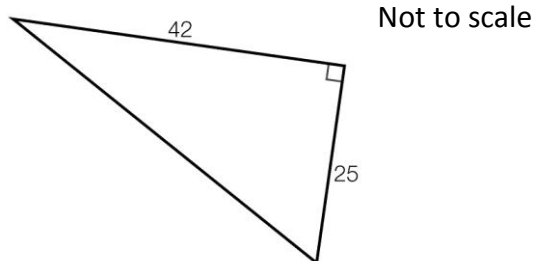
a) $\frac{4}{51}$

b) $\frac{1}{4}$

c) $\frac{4}{13}$

d) $\frac{1}{3}$

22. The length of the hypotenuse in the diagram, correct to two decimal places is:



a) 33.74 units

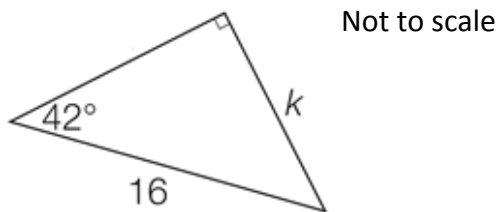
b) 67.00 units

c) 48.88 units

d) 33.75 units

23. The hypotenuse of a right-angled triangle is 8 cm. One of the shorter sides is 5 cm. What is the value of the third side?
- a) $\sqrt{89}$ cm
 - b) $\sqrt{13}$ cm
 - c) 89 cm
 - d) $\sqrt{39}$ cm

24. The value of k can be found by using which equation below?



- a) $\cos 42^\circ = \frac{k}{16}$
 - b) $\tan 42^\circ = \frac{k}{16}$
 - c) $\sin 42^\circ = \frac{16}{k}$
 - d) $\sin 42^\circ = \frac{k}{16}$
25. The angle of elevation of the top of a tree from a point on the ground 22 m away is 24° . The height of the tree in metres, correct to two decimal places is:
- a) 20.10 m
 - b) 9.80 m
 - c) 24.08 m
 - d) 8.95 m

END OF SECTION ONE
PROCEED TO SECTION TWO

Section 2: Written answer (Total 100 marks)

Mark/s

1. Use words from the list below to complete the following sentences.

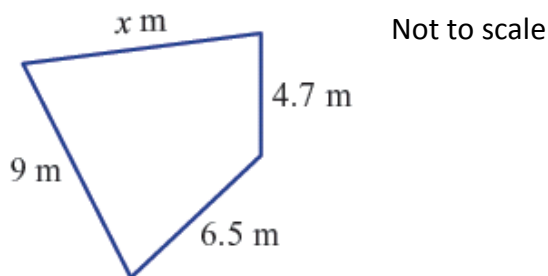
4 (marks)

height perimeter diameter area base volume surface area

- a) The _____ of a shape is the distance around the boundary.
- b) The _____ of a circle is the length drawn from one edge to the other, through its centre.
- c) The _____ of a shape is the two-dimensional space inside it.
- d) The _____ of a solid is the three-dimensional space inside it.

2. Consider the given two-dimensional shape below:

4 (marks)

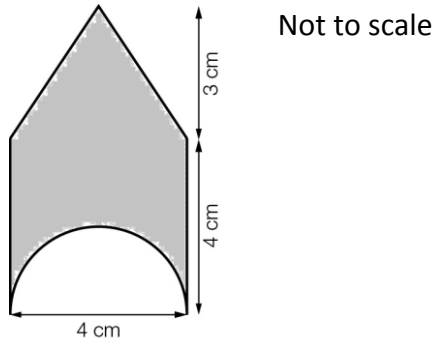


- a) Find the perimeter of the shape if $x = 8.8 \text{ m}$.

- b) Find the value of x if the perimeter of the shape is 29.3 m .

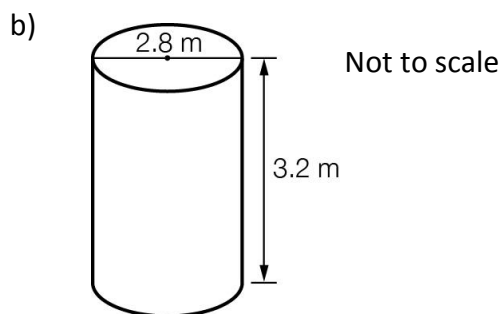
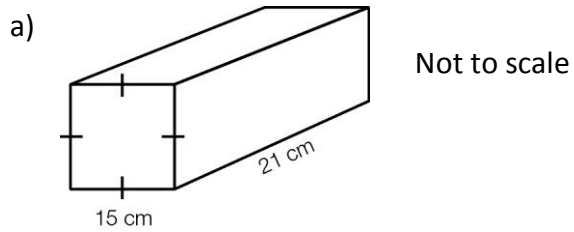
3. Calculate the shaded composite shape below, correct to two decimal places:

4 (marks)



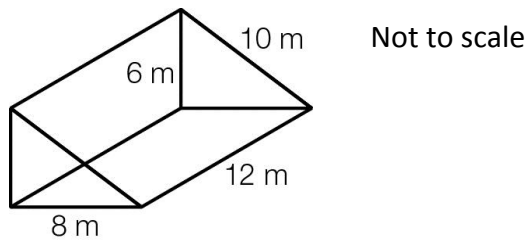
4. Calculate the surface area of the figures below, correct to two decimal places:

4 (marks)



4 (marks)

5. A triangular prism is shown below:



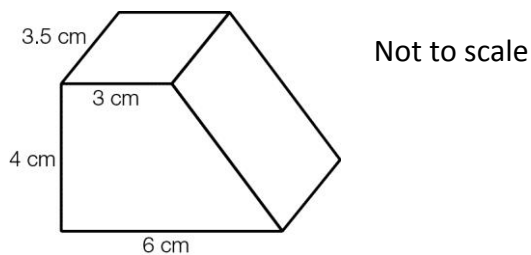
a) Calculate the surface area, correct to the nearest m^2 : 3 (marks)

b) What is the surface area in cm^2 ? 1 (mark)

c) Calculate the volume, correct to the nearest m^3 : 3 (marks)

d) What is the volume in mm^3 ? 1 (mark)

6. Calculate the volume of the figure below and answer in cubic meters: 3 (marks)



7. Simplify the following algebraic expressions:

7 (marks)

a) $-3p \times 7p^2q$

b) $\frac{30bc}{18b}$

c) $\frac{2m}{3} + \frac{m}{4}$

d) $\frac{5a+2}{3} \div \frac{10g+4}{6}$

8. Expand the following algebraic expressions and simplify where appropriate:

a) $-2m(5 + 4m)$

2 (marks)

b) $(k + 6)(k + 2)$

2 (marks)

c) $6(2x + 4) + 2(5 - 3x)$

2 (marks)

9. Solve the following equations:

6 (marks)

a) $\frac{h}{6} - 8 = 3$

b) $\frac{17 - k}{2} = 4$

c) $9(2x + 3) = 45$

10. Factorise the following by finding the highest common factor:

4 (marks)

a) $28st + 14st^2$

b) $45ab^2 - 15a^2b + 25ab$

11. Simplify each of the following expressions below. Leave your answers in index form. 3 (marks)

a) $q^{11} \div q^7$

b) $\frac{2w^3 \times z^5}{z^5 \times 4w^6}$

12. Use the quadratic formula to solve the following. Round your answers to two decimal places: 4 (marks)

$$x^2 - 7x + 1 = 0$$

13. Factorise the following trinomial: 3 (marks)

$$x^2 + 3x - 10$$

14. Solve the following pair of simultaneous equations by using either the substitution method *or* elimination method: 4 (marks)

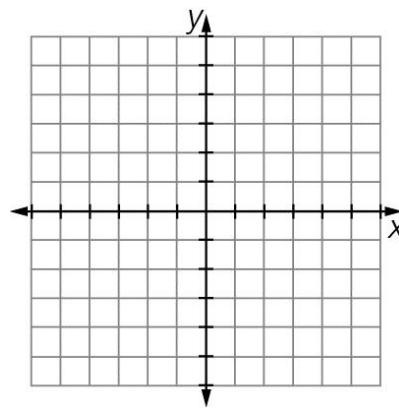
$$2x + y = 8$$

$$4x + 3y = 16$$

15. Find the gradient and y -intercept of the following equations. Use these to sketch their graphs on the axes provided.

a) $y = 3x - 2$

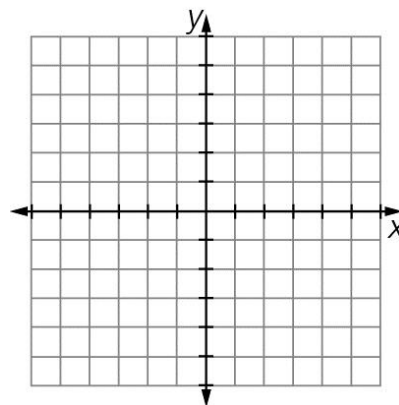
3 (marks)



$m =$ _____ $c =$ _____

b) $x + 2y = 4$

3 (marks)



$m =$ _____ $c =$ _____

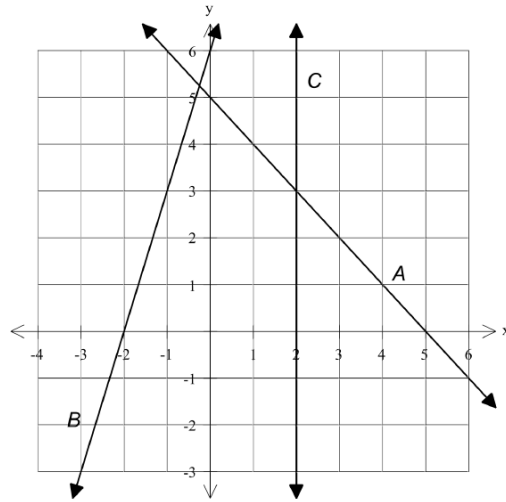
16. Determine the equation of the lines shown in the diagram below:

6 (marks)

a) _____

b) _____

c) _____

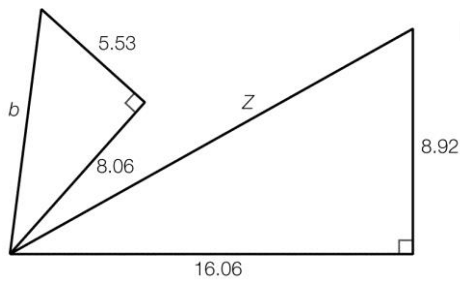


17. In a Year 10 maths class there are 23 students, where there are 5 more girls than boys. Write an algebraic equation and then solve for the number of girls and boys.

4 (marks)

18. Calculate the lengths of hypotenuse b and z in the following diagram. Correct your answer to one decimal place.

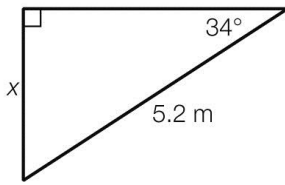
4 (marks)



Not to scale

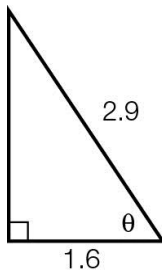
19. Find the value of the unknown in each of the following diagrams, by using the appropriate ratios. Correct your answer to two decimal places.

a)



3 (marks)

b)



3 (marks)

20. A hiker stands on the edge of a cliff that is 68 m above the ground. She looks down at her car, which is 2 km from the base of the cliff. *Draw a diagram* and then calculate the line of sight (distance) between the hiker and her car, to the nearest metre.

END OF EXAMINATION