THE KING'S SCHOOL

Assessment Task 4
November 2013

Mathematics
Year 9 – Level 5.2

General Instructions

- Working time – 90 minutes
- Write using black or blue pen
  Black pen is preferred
- Board-approved calculators may be used

Total marks (100)

- Attempt **ALL** Questions
- Start a new sheet for each question
- Marks for each question are indicated on the question paper
- Show all necessary working
- Marks may be deducted for careless or badly arranged work

Questions	*Algebra*	*Data*	*Geometry*	*Measurement*	*Number*	*Total*
1					/19	/19
2	/30					/30
3	/ 7					/ 7
4				/15		/15
5			/12			/12
6		/17				/17
Total	/37	/17	/12	/15	/19	/100

START A NEW ANSWER BOOKLET
Question 1: Number (19 marks) **Marks**

(a) Simplify the following ratio $4\frac{1}{2} : 3$ **1**

(b) Convert 12 metres per second to km/h. **1**

(c) Find Paul's annual salary if his fortnightly pay is $1 362.50 **1**

(d) John works 35 hours per week in a child care centre and is paid $25.20 per hour. Any overtime is paid at time and a half for the first three hours per week and double time after that.

How much does John earn for a week when he works 43 hours? **3**

(e) Chris earns $1.15 for each bag of potatoes he picks. How many whole bags must he pick to earn at least $100? **1**

(f) Which is the better buy? Justify your answer. **2**

600g of beef for $5.42

OR

420g of beef for $3.87

Question 1 continues on the next page

(g) Brian buys a car for $4000 and sells it two years later for $2800. What is the loss as a percentage of the cost price? **2**

(h) Tristan earns $850 per week. When he takes 4 weeks annual holidays he receives 17½% loading on his four weeks annual pay. Calculate

(i) his holiday loading **2**

(ii) his total holiday pay **1**

(i) Jonathan has a gross annual salary of $75 000 and last year earned $5 136 interest on investments. He has allowable tax deductions for union fees and work related expenses of $1318. His employer deducted $528.30 in PAYG tax instalments each week.

Taxable income range	Tax payable
$1-$6000	Nil
$6001-$20 000	*17c* for each *$1* over *$6000*
$20 001 - $50 000	*$2380* plus *30c* for each *$1* over *$20 000*
$50 001 - $60 000	*$11 380* plus *42c* for each *$1* over *$50 000*
$60 001 and over	*$15 580* plus *47c* for each *$1* over *$60 000*

(i) Show that Jonathan's taxable income is $78 818 **1**

(ii) How much tax should Jonathan pay? **2**

(iii) Is Jonathan entitled to a refund or does he have more tax to pay? State the amount. **2**

End of Question 1

START A NEW ANSWER BOOKLET
Question 2: Algebra (30 marks) **Marks**

(a) Simplify the following expressions

(i) $5 + 3t - 3 + t$ **1**

(ii) $4x \times (-3xy)$ **1**

(iii) $25rd^2 \div 35r^2d$ **2**

(iv) $\left(3x^2\right)^3$ **2**

(v) $\dfrac{\left(a^3\right)^4 \times a^{-5}}{a^7}$ **2**

(b) Factorise the following fully: $32x - 24x^2$ **1**

(c) Expand and simplify

(i) $2x + 3(x + 15)$ **2**

(ii) $2(a + b) - 3(a + b)$ **2**

(d) Simplify, by first finding a common denominator $\dfrac{2x + 1}{4} + \dfrac{x}{6}$ **3**

(e) If $p = 5$, $q = 2$ and $r = -6$, find the value of $\dfrac{2p + r}{pq^2}$ **2**

Question 2 continues on the next page

(f) Solve the following equations:

(i) $y + 7 = 31 - 2y$ **1**

(ii) $2(m + 3) - 3(m - 4) = 19$ **2**

(iii) $\frac{x + 6}{3} = \frac{2x + 4}{4}$ **3**

(g) Form an equation, then solve it, to answer the question:

"*A number is decreased by 3, then this amount is doubled. The result is 80"*.

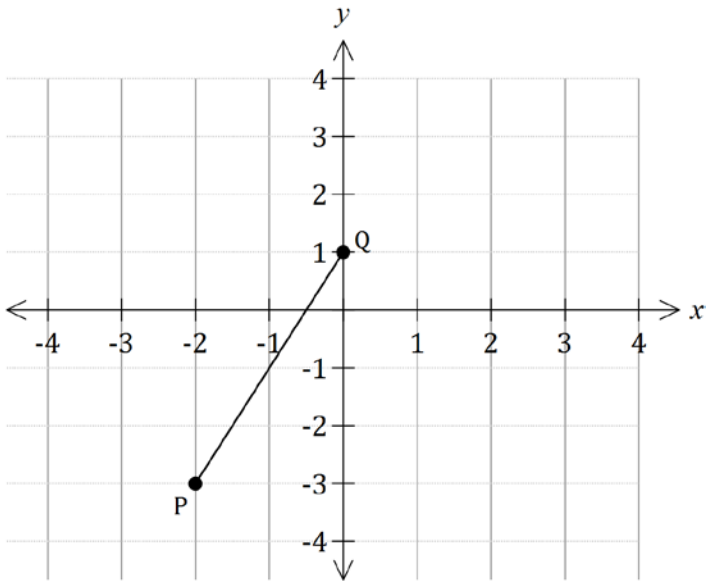
What is the number? **3**

(h) Solve this inequation and graph the solution on a number line: $5 - 2x > 9$ **3**

End of Question 2

START A NEW ANSWER BOOKLET
Question 3: Algebra (Graphs and Coordinate Geometry) (7 marks) **Marks**

(a) P is the point (-2,-3) and Q is the point (0,1) as shown in the diagram below:



(i) Find the length of PQ, to one decimal place. **2**

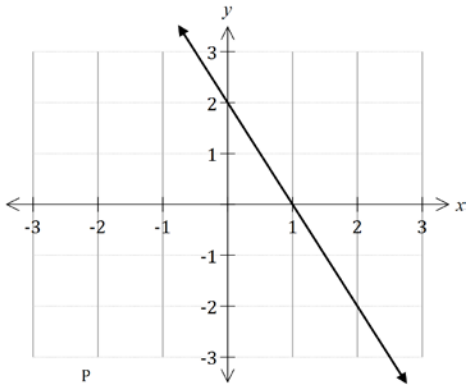
(ii) Find the gradient of PQ **1**

(iii) Find the coordinates of R, if R is the midpoint of PQ **1**

(iv) Find the equation of the line joining PQ **1**

(b) Oliver faces the following multiple choice question in his yearly Maths exam. **2**

The equation of the line in the diagram could be



(A) $y = 2x + 2$

(B) $y = -2x - 3$

(C) $y = -2x + 2$

(D) $y = 2x + 1$

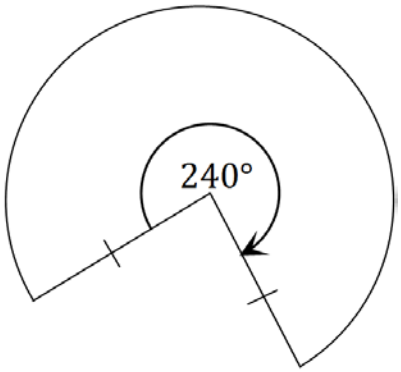
Oliver answers D. Explain how you know he is wrong and what the correct answer should be.

End of Question 3

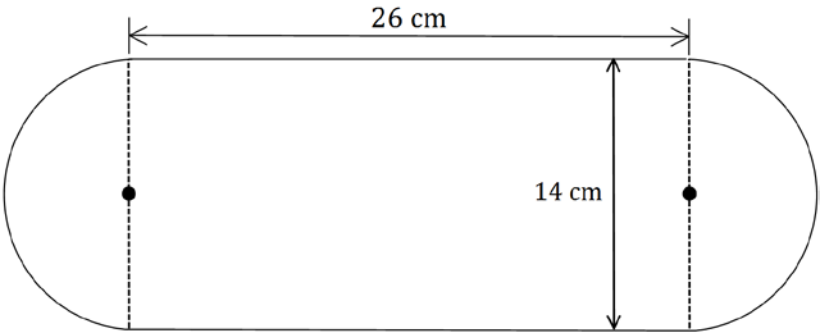
START A NEW ANSWER BOOKLET

Question 4: Measurement (15 marks) **Marks**

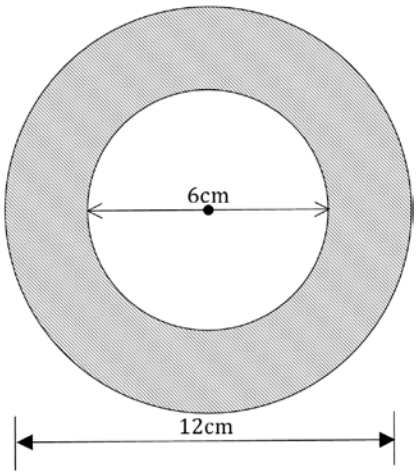
(a) In its simplest form, what **fraction** of a circle does the figure below represent? **1**



(b) Calculate the **perimeter** of the figure below, correct to two decimal places. **3**



(c) Calculate the area of the shaded figure below, correct to one decimal place. **3**



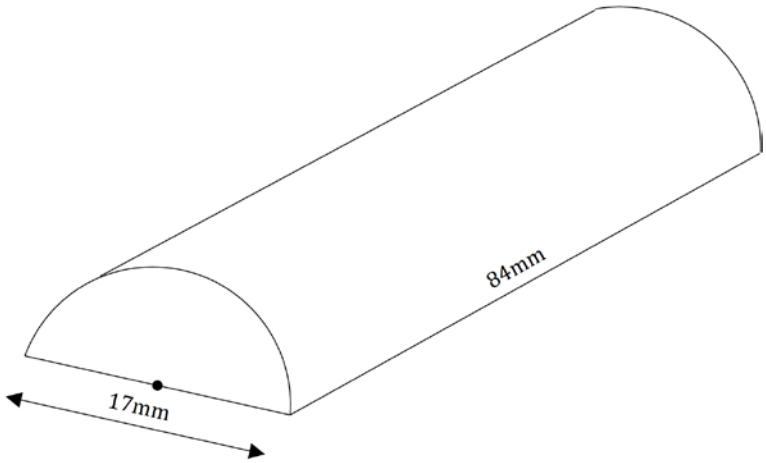
Question 4 continues on the next page

(d) A rectangular block of land is 52 m long and 36 m wide. A fence will be erected on the two long sides and one of the short sides, using fencing panels 4 m in length.

(i) How many complete panels of fencing are needed? **2**

(ii) If the panels cost $25 each, calculate the total cost. **1**

(e)



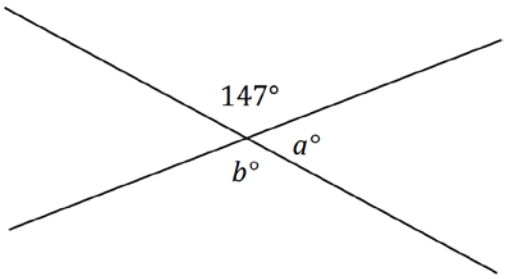
(i) Calculate the surface area of the solid above, correct to one decimal place. **3**

(ii) Calculate the volume of the solid above, correct to one decimal place. **2**

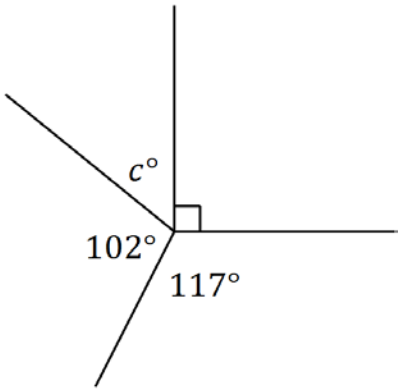
End of Question 4

START A NEW ANSWER BOOKLET
Question 5: Geometry (12 marks) **Marks**

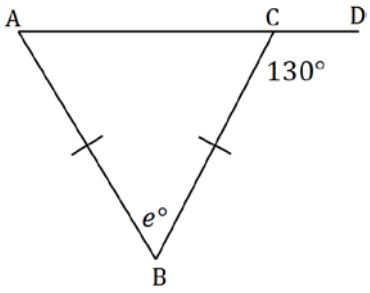
(a) For the diagram below, calculate the values of a and b, giving reasons. **4**



(b) Calculate the value of the pronumeral, giving reason. **2**

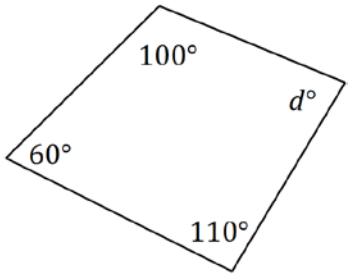


(c) Calculate the value of the pronumeral, giving reason. **2**

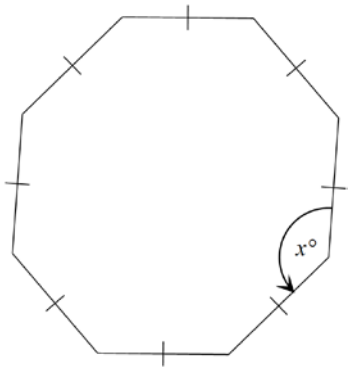


Question 5 continues on the next page

(d) Calculate the value of the pronumeral, giving a reason. **2**



(e) A regular octagon is drawn below.



(i) What is the angle sum of a regular octagon? **1**

(ii) Hence, find the value of x. **1**

End of Question 5

ANSWER ON THE SEPARATE ANSWER SHEET PROVIDED

Question 6: Data (17 marks) **Marks**

(a) The table below represents the marks in a Year 9 Quick Quiz out of 8.

Score (x)	*Frequency* (f)	fx	cf
2	2	4	2
3	3	**A**	5
4	8	32	13
5	6	30	**B**
6	5	30	24
7	4	28	28
8	2	16	30
	$\Sigma f =$	$\Sigma fx =$	

(i) State the values missing at **A** and **B**. **2**

(ii) How many students completed the quick quiz? **1**

(iii) Calculate the mean, correct to two decimal places. **1**

(iv) What is the mode? **1**

(v) Calculate the range. **1**

(vi) Find the median score. **1**

(vii) On the answer sheet provided, complete the frequency histogram. **1**

Question 6 continues on the next page

(b) In a bag there are six blue marbles, four white marbles and two red marbles. A marble is chosen at random. What is the probability of choosing:

(i) a blue marble? **1**

(ii) a blue or a white marble? **1**

(iii) a pink marble? **1**

(iv) anything but a white marble? **1**

(c) A die is rolled. What is the probability that, on the uppermost face, it will:

(i) show a 6? **1**

(ii) show a number less than 3? **1**

(iii) show an odd number? **1**

(d) When two teams play football there are three possible results. Each team could win or the game could be drawn.

Therefore the probability that a particular team wins is $\frac{1}{3}$.

Is this statement correct? Justify your answer. **2**

End of Assessment Task

Name _____ Class _____

QUESTION 6 ANSWER SHEET

Question 6: Data (23 marks)

(a) (i) **A** = ...

B = ...

(ii) How many students completed the quiz?

.....

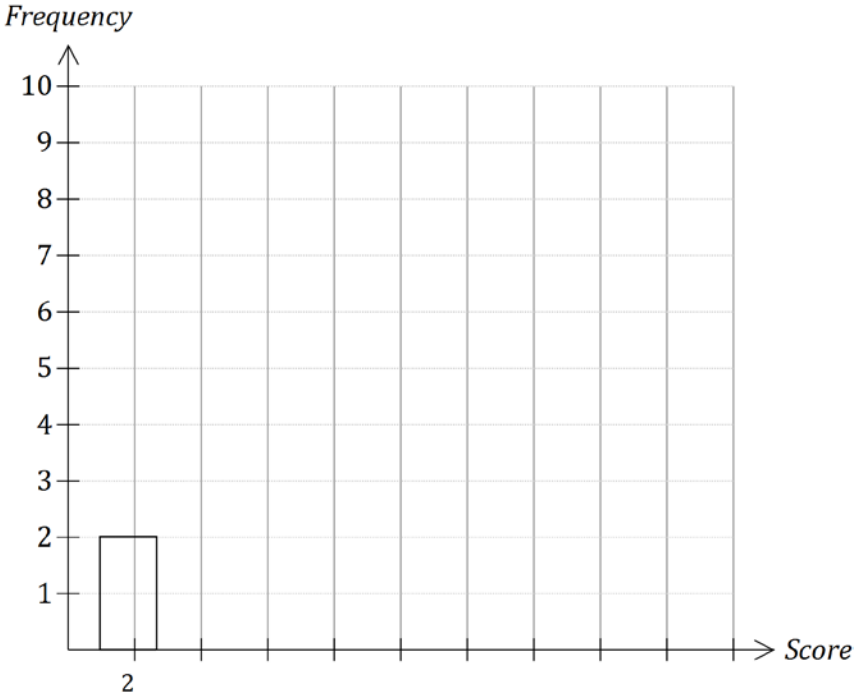
(iii) mean .....

(iv) mode .....

(v) range .....

(vi) median .....

(vii)



Continue answering Question 6 on the next page

Name _____ Class _____

Question 6 (continued)

(b) (i) .....

(ii) .....

(iii) .....

(iv) .....

(c) (i) .....

(ii) .....

(iii) .....

(d) .....

.....

.....

.....

YEAR 9 Mathematics 5·2 YEARLY EXAM SOLUTIONS NOV. 2013.

Question 1. (19 Marks)

a). 3 : 2 ✓

b). 12m/s = 43.2 km/h. ✓

c) $1362.50 × 26
= $35425 ✓

d). (35 × 25.20) + (3 × 25.20 × 1.5) + (5 × 25.20 × 2) ✓✓
= $1262.25 ✓

e) 100 ÷ 1.15 = 86.96
= 87 Bags ✓

f). $\frac{\$542c}{600} = 0.9$ c/g
or $\frac{\$3.87}{420} = 0.92$ c/g ✓
✓
∴ Best Buy is 600g for $5.42

g). % loss = $\frac{4000-2800}{4000} \times 100$ ✓
= 30% loss. ✓

h) (i). loading = $(850 \times 4) \times \frac{17.5}{100}$ ✓
= $595 ✓

(ii). holiday Pay = (850 × 4) + 595
= $3995 ✓

(i). Taxable Income = 75000 + 5136 − 1318 ✓
(i) = $78818

(ii) Tax = 15580 + (0.48 × 18818) ✓
= $24424.46 ✓

(iii) Refund = ($528.30 × 52) − 24424.46 ✓
= $3047.14 ✓

Question 2 (30 marks)

(a) (i). 2 + 4t ✓

(ii) $-12x^2y$ ✓

(iii) $\frac{25rd^2}{35r^2d} = \frac{5d}{7r}$ ✓

(iv) $(3x^2)^3 = 27x^6$ ✓

(v). $\frac{a^{12} \times a^{-5}}{a^7} = \frac{a^7}{a^7} = 1$ ✓ ✓

b). $8x(4-3x)$ ✓

c). (i) $2x + 3x + 45$ ✓
$= 5x + 45$ ✓

(ii). $2a + 2b - 3a - 3b$ ✓
$= -a - b$ ✓

d). $\frac{2x+1}{4} + \frac{x}{6}$
$\frac{3(2x+1)+2x}{12} = \frac{6x+3+2x}{12}$ ✓
✓
$= \frac{8x+3}{12}$ ✓

e). $\frac{(2 \times 5) + (-6)}{5 \times 2^2} = \frac{10-6}{20} = \frac{1}{5}$ ✓ ✓

f) (i) $3y = 24$
$y = 8$ ✓

(ii). $2m + 6 - 3m + 12 = 19$ ✓
$-m + 18 = 19$
$m = -1$ ✓

(iii) $4(x+6) = 3(2x+4)$ ✓
$4x + 24 = 6x + 12$. ✓
$12 = 2x$
$x = 6$ ✓

g). $2(x-3) = 80$ ✓

$2x - 6 = 80$ ✓

$2x = 86$

$x = 43$ ✓

h). $5 - 2x > 9$

$-2x > 4$ ✓

$x < -2$ ✓

✓

Question 3 (7 Marks).

a). i). length $= \sqrt{4^2 + 2^2}$ ✓

$= \sqrt{20}$

$\doteq 4.5$ (to 1dp) ✓

(ii). $m = \frac{4}{2} = 2$ ✓

(iii). $R(-1, -1)$ ✓

(iv). $y = 2x + 1$ ✓

b). gradient should be Negative and y-intercept should be 2. ✓

so correct answer is C ✓

Question 4. (15 Marks).

a). $\frac{240}{360} = \frac{2}{3}$ ✓

b). Perimeter $= (2 \times \pi \times 7) + (26 \times 2)$ ✓

$= 95.98$ cm (2dp) ✓

c). $A_1 = \pi \times 6^2$ ✓

$A_2 = \pi \times 3^2$ ✓

∴ Area shaded

$= \pi \times 6^2 - \pi \times 3^2$

$= 84.8 \text{ cm}^2$ (2dp). ✓

d).

52m = 13 Pannels.

13 Pannels.

✓

∴ Pannels $= 9 + 9 + 13 + 13 = 44$ ✓

(ii). Cost $= 44 \times \$25$

$= 1100$ ✓

(e)(i). Surface area $=$

$(\pi \times 8.5^2) + (17 \times 84) +$ ✓✓

$\left(\frac{1}{2} \times 2 \times \pi \times 8.5 \times 84\right)$.

$= 3898.1 \text{ mm}^2$ ✓

(ii). Volume $= \frac{1}{2} \times \pi \times 8.5^2 \times 84$ ✓

$= 9533.2 \text{ mm}^3$. ✓

Question 5 (12 Marks)

a). $a = 33°$ (suppl. angles) ✓ ✓
$b = 147°$ vertically opp. $\angle$'s ✓ ✓

b). $c° = 51°$ ($\angle$ sum at a point) ✓ ✓

c). $180° - 130° = 50°$
$\therefore e° = 80°$ ($\angle$ sum of an 180s. $\triangle$). ✓ ✓

d). $d° = 90°$ ($\angle$ sum of a quad.) ✓ ✓

e). i) $(8-2) \times 180 = 1080°$ ✓

ii). $\frac{1080}{8} = 135°$ ✓

Question 6. (17 Marks)

a). (i) $A = 9$ ✓ $B = 19$ ✓

(ii). 30 students ✓

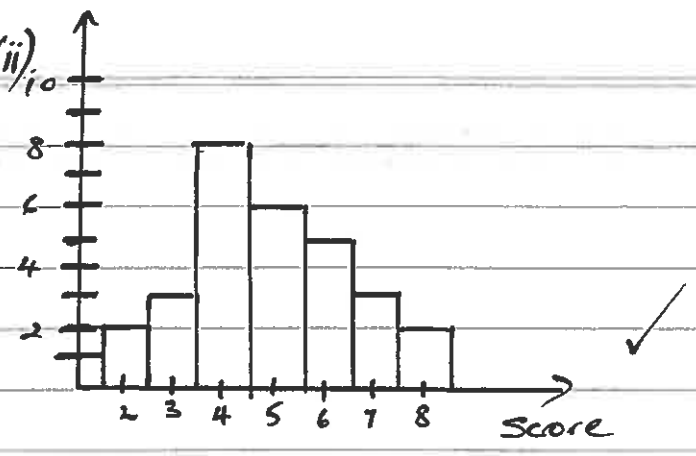
(iii). $\bar{x} = 4.97$ (2dp). ✓

(iv) Mode = 4 ✓

(v). Range = 6 ✓

(vi). median = 5 ✓

(vii)



✓

b). (i). $\frac{1}{2}$ ✓

(ii). $\frac{5}{6}$ ✓

(iii) 0 ✓

(iv). $\frac{2}{3}$ ✓

c). (i) $\frac{1}{6}$ ✓

(ii) $\frac{1}{3}$ ✓

(iii) $\frac{1}{2}$ ✓

d). Not Correct ✓
because each team has a different ability level not equally likely ✓