NAME:	CLASS:	INDEX NO:

QUEENSWAY SECONDARY SCHOOL

MID-YEAR EXAMINATION 2018

SECONDARY 2 NORMAL ACADEMIC

Parent's Signature:

MATHEMATICS

Paper 1

4045/01
8 May 2018
1 hour

Candidates answer on the Question Paper.

READ THESE INSTRUCTIONS FIRST

Write your name, index number and class on all the work you hand in.

Write in dark blue or black pen on both sides of the paper.

You may use a soft pencil for any diagrams or graphs.

Do not use staples, paper clips, highlighters, glue or correction tape.

Answer **all** the questions.

Write your answers and working on the writing paper provided.

Give non-exact numerical answers correct to 3 significant figures, or 1 decimal place in the case of angles in degrees, unless a different level of accuracy is specified in the question.

The use of an approved scientific calculator is expected, where appropriate.

You are reminded of the need for clear presentation in your answers.

The number of marks is given in brackets [ ] at the end of each question or part question.

The total number of marks for this paper is 40.

Setter: Mrs Grace Lai

[Turn over

1. Estimate $\dfrac{99.875 \times \sqrt[3]{215}}{963 - 662}$, giving your answer correct to 1 significant figure.

Answer ..... [2]

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2. Kenneth bought a second hand Samsung phone for $240 and sold it at $300. Express the profit as a percentage of the cost price.

Answer ..... % [2]

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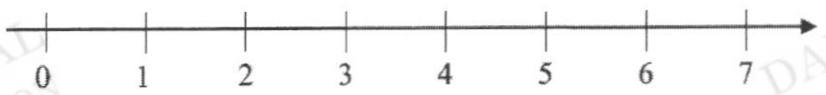
3. (a) Solve the inequality $6x - 9 > 3 - 2x$.

Answer *(a)* ..... [1]

(b) Show your solution to part (a) on the number line below.



[1]

(c) Hence, write down the smallest integer value of x which satisfies $6x - 9 > 3 - 2x$.

Answer *(c)* $x =$ ..... [1]

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4. The numerator of a fraction is 2 less than the denominator. If 3 is subtracted from the numerator and the denominator, the new fraction obtained is $\frac{3}{4}$. Find the original fraction.

Answer .....[3]

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5. A building can be completed in 240 days with 100 workers. It is given that all the workers work at the same rate.

(a) Find the number of days 40 workers will take to complete the building.

Answer *(a)* ..... days [2]

(b) Find the additional number of workers needed to complete the building in 200 days.

Answer *(b)* ..... more workers [2]

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6. Solve the following pair of simultaneous equations.

$$x + 3y = 2$$
$$x - 2y = -3$$

Answer $x =$ .....

$y =$ ..... [3]

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7. Factorise completely.

(a) $4p^2 - 1$

Answer.....[2]

(b) $3x^2 + yz + 3xz + xy$

Answer.....[2]

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8. Expand and simplify $2(6a + 4b) - 10(3a - b)$.

Answer _____ [2]

9(a) Expand $(3x - 2y)(4x + 5y)$.

Answer .....[2]

(b) Factorise $x^2 - 9x + 8$

Answer.....[2]

10. It is known that y is directly proportional to x^2 and that $y = 150$ when $x = 5$.

(a) Write down an equation connecting y and x.

Answer *(a)* ..... [2]

(b) Find y when $x = 9$.

Answer *(b)* ..... [1]

(c) Find x when $y = 13.5$

Answer *(c)* ..... [2]

11. Solve the following equations.

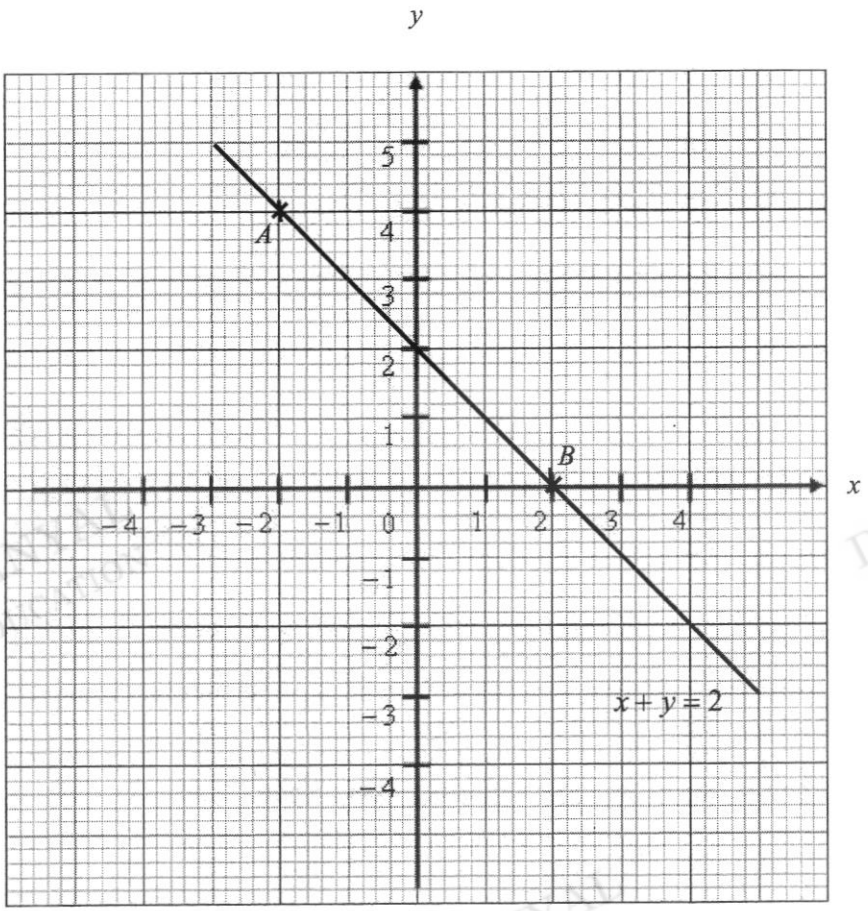
(a) $3(x-5)=11+x$

Answer x = ... [2] [2]

(b) $\frac{2y+1}{3}=5y$

Answer y =.....[2] [2]

12.



(a) State the y-intercept of the line $x + y = 2$.

Answer ..... [1]

(b) State the coordinates of points A and B.

Answer A (....., ...) [1]

B (....., ...) [1]

(c) Find the gradient of the line $x + y = 2$.

Answer .....[1]

E N D O F P A P E R 1

NAME:	CLASS:	INDEX NO:

QUEENSWAY SECONDARY SCHOOL

MID-YEAR EXAMINATION 2018

SECONDARY 2 NORMAL ACADEMIC

Parent's Signature:

MATHEMATICS

Paper 2

4045/02

11 May 2018

1 hour 30 minutes

Additional Material: Graph Paper (1 sheet)

Candidates answer on the Question Paper.

READ THESE INSTRUCTIONS FIRST

Write your name, index number and class on all the work you hand in.

Write in dark blue or black pen.

You may use a HB pencil for any diagrams or graphs.

Do not use staples, paper clips, glue or correction fluid.

Answer **all** the questions.

If working is needed for any question, it must be shown with the answer.

Omission of essential working will result in loss of marks.

The use of an approved scientific calculator is expected, where appropriate.

If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer to 3 significant figures. Give answers in degrees to 1 decimal place.

For π, use either your calculator value or 3.142, unless the question requires the answer in terms of π.

The number of marks is given in brackets [ ] at the end of each question or part question.

The total number of marks for this paper is 60.

This document consists of 12 printed pages.

Setter: Mrs Grace Lai

[Turn over

Section A (28 marks)

1. Calculate

$$10.3 - 0.3 \times \frac{14.7}{2.3} + 18.6,$$

giving your answer correct to

(a) the nearest integer,

(b) 2 decimal places,

(c) 3 significant figures.

Answer: (a) _____ [1]

(b) _____ [1]

(c) _____ [1]

---

2. A boy ran 10 km in 50 minutes. He then walked a further 5 km at an average speed of 3 km/h.

Calculate

(a) his average running speed, giving your answer in kilometres per hour,

Answer: (a) ..... km/h [1]

(b) the number of minutes he was walking,

(b) ..... mins [1]

(c) his average speed, in km/h for the whole journey.

(c).....km/h [2]

---

3. Simplify the following.

(a) $\frac{1}{3}h - 2h$

Answer:(a) _____ [1]

(b) $\frac{x}{4} - \frac{2x-3}{2}$

*Answer:(b)*_____[2]

---

4. Solve the following pair of simultaneous equations.

$2x + 3y = 18$

$2x - y = 5$

*Answer: x=*_____, *y =* _____[3]

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5. Solve the following equations.

(a) $\dfrac{2}{2x-1}=\dfrac{3}{4x}$,

Answer:(a) _____[2]

(b) $\dfrac{x}{3}+\dfrac{2x-5}{4}=5$

Answer:(b) _____[3]

6. Expand and simplify

(a) $(3d+5)(d-2)-4d^2+7d$,

Answer (a) ..... [2]

(b) $(4x-y)^2+x(4x-y)$

Answer (b) ..... [3]

7. It is given that $x^2 - y^2 = 189$ and $x - y = 7$.

(a) Find the value of $x + y$.

Answer (*a*) ..... [3]

(b) Hence find the value of x.

Answer (*b*) ..... [2]

Section B (32 marks)

8.(a) Sean wants to travel to Johor Bahru from his house. The following table shows the time (t hours) that he will take if he travels at different speeds (v km/h).

v km/h	80	100	120
t hours	2.5	2	$1\frac{2}{3}$

Are v and t in direct or inverse proportion? Show working to support your answer.

(b) Find the speed, in km/h, of Sean if he takes 3 hours and 30 minutes to get to Johor Bahru from his house. Express your answer correct to 3 decimal places.

(c) If Sean wants to reach Johor Bahru at 2 am, what time should he set off if he plans to drive at 80 km/h?

Answer: (a) v and t are in _____ proportion because .....

..... [2]

(b) ..... km/h [2]

(c)..... [1]

9. (a) Complete the tables below for the respective equations.

$y=2x-1$

x	0	2	4	6
y		3		11

$y=-x+2$

x	0	2	4	6
y	2		-2	

[2]

(b) On a separate graph paper, using a scale of 1 cm to represent 1 unit on the y-axis and a scale of 2 cm to represent 1 unit on the x-axis, draw the graphs of $y=2x-1$ and $y=-x+2$ for $0 \le x \le 6$. [3]

(c) Using the graph, write down the solution of the two simultaneous equations.

$$y=2x-1$$

$$y=-x+2$$

[2]

10(a) (i) Factorise $kp+kq$.

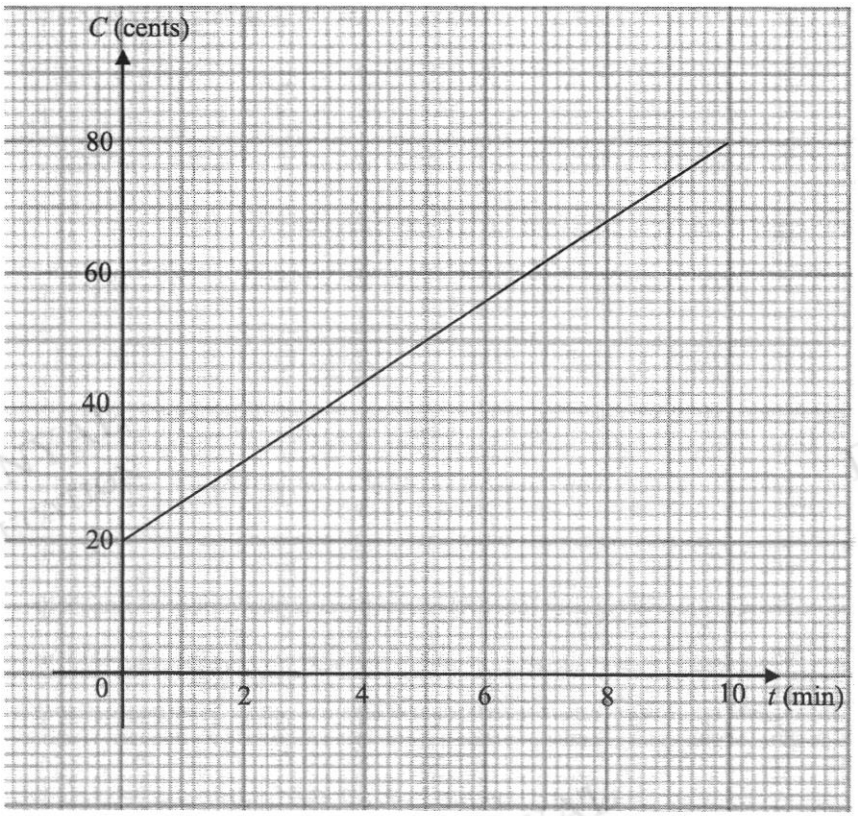
(ii) Hence evaluate $23.45\times59.12+23.45\times40.88$.

Answer(a)(i).....[1]

(ii).....[1]

10(b) The graph shows the charges made by Company M for telephone calls lasting up to

10 minutes.



Company M charges a connection fee of x cents and all calls are charged at the constant rate of y cents per minute.

Using the graph, find

(i) the cost of a 7 minute call,

(ii) the value of x and of y.

Answer: (i).....[1]

(ii)x =.....,y = ...[3]

---

11. A rectangular field is $(x + 3)$ m long and $(x - 3)$ m wide.

(a) Write down an expression, in terms of x, for the area of the field.

Expand and simplify your answer.

Answer: _____[2]

Inside the field, a square of length $(x - 5)$m is fenced up to plant vegetables.

(b) Write down an expression in terms of x for the area of the square fenced up to plant vegetables.

Expand and simplify your answer.

Answer: _____ [2]

(c) Find, in terms of x, the remaining area left.

Answer: _____[2]

(d) If the remaining area is 16 cm^2, find the value of x.

Answer: _____[1]

---

12. (a) y is directly proportional to the cube of x and $y = 48$ when $x = 2$.

Find

(i) an equation connecting y and x,

Answer: (a) _____ [2]

(ii) the percentage increase in the value of y when the value of x is doubled.

Answer: (b) _____ [1]

12(b) The sum of ages of Brandon and his mother is 52.

Four years later, Brandon's mother will be three times as old as Brandon.

(i) Given that Brandon is y years old and Brandon's mother is x years old, write down two equations in x and y.

Answer (b)(i)_____

_____[2]

(ii) Solve the pair of simultaneous equations and hence, find the present age of Brandon.

Answer (ii) _____[2]

END OF PAPER 2

2NA MYE PAPER 1 MARKING SCHEME

Qn No.	WORKING / ANSWER	MARKS
1.	$\approx \frac{100 \times \sqrt[3]{216}}{300}$ $= \frac{100 \times 6}{300}$ $= 2$	M1 A1
2	Profit = \$300 - \$240 = \$60 Profit % = $\frac{60}{240} \times 100\%$ $= 25\%$	 M1 A1
3a	6x + 2x > 3+9 8x >12 x > 1.5	 A1
3c	Smallest integer value of x is 2	A1
4	Let the denominator be x. The numerator is x – 2. $\frac{(x-2)-3}{x-3} = \frac{3}{4}$ $\frac{x-5}{x-3} = \frac{3}{4}$ $4(x-5) = 3(x-3)$ $4x - 20 = 3x - 9$ $4x - 3x = 20 - 9$ $x = 11$ The fraction is $\frac{9}{11}$	 M1 M1 A1
5a	100 workers take 240 days. 1 worker will take 240x100 days 40 workers will take $\frac{240 \times 100}{40} = 600$ days	M1 A1
b	240 days ----------100 workers 1 day ----------100x249 workers 200days---------- $\frac{100 \times 240}{200} = 120$ workers	M1

	Hence 120-100=20 more workers are needed.	A1
6	x + 3y = 2 ----------(1) x – 2y = -3 ----------(2) (1) –(2): 5y = 5 y = 1 Subst y = 1 into (1) x + 3(1) = 2 x = 2 – 3 x = - 1	Method : 1 mark A1 A1
7a	$=(2p)^2-1^2$ $=(2p-1)(2p+1)$	M1 A1
B This qn is taken out.	$=(3x^2+xy)+(yz+3xz)$ $=x(3x+y)+z(y+3x)$ $=(3x+y)(x+z)$	M1 A1
8	= 12a + 8b – 30a +10b = 12a – 30a + 8b + 10b = - 18a + 18b = 18(b – a)	M1 A1
9a	$=12x^2+15xy-8xy-10y^2$ $=12x^2+7xy-10y^2$	M1 A1
9b	<table><tr><td></td><td>x</td><td>- 8</td></tr><tr><td>x</td><td>x^2</td><td>-8x</td></tr><tr><td>-1</td><td>-x</td><td>-8</td></tr></table> $X^2-9x+8 = (x-8)(x-1)$	M1 A1
10a	$y=kx^2$, where k is a constant. Subst x = 5, y = 150 $150 = k(5)^2$ 150 = 25k $k=\frac{150}{25}=6$ $y=6x^2$	 M1 A1
b	When x = 9 $y = 6(9)^2$ = 486	 A1
c	When y = 13.5, $6x^2 = 13.5$	

	$x^2 = 2.25$ $x = 1.5$ or -1.5	A2
11a	$3x - 15 = 11 + x$ $3x - x = 11 + 15$ $2x = 26$ $x = 13$	M1 A1
b	$2y + 1 = 15y$ $1 = 15y - 2y$ $1 = 13y$ $y = \frac{1}{13}$	M1 A1
12a	y-intercept is 2	B1
b	A is (-2 , 4) , B is (2 , 0)	B1,B1
c	Gradient of line is - 1	A1

END OF PAPER 1

2NA MYE 2018 PAPER 2 MARKING SCHEME

Qn No.	WORKING/ANSWER	MARKS
1a	27	A1
b	26.98	A1
c	27.0	A1
2a	Speed $= \frac{10}{50} \times 60$ $= 12km/h$	A1
b	Time $= \frac{5}{3} \times 60$ $= 100 \min s$	A1
c	Total distance = 10 + 5 =15 km Total time = 50 +10 =150 mins Average speed$= \frac{15}{150} \times 60$ $= 6km/h$	M1 A1
3a	$= \frac{h-6h}{3} = -\frac{5h}{3}$	A1
b	$= \frac{x-2(2x-3)}{4}$ $= \frac{x-4x+6}{4}$ $= \frac{6-3x}{4}$	M1 A1
4	2x + 3y = 18----------(1) 2x – y =5 ---------- (2) (1) – (2) 4y = 13 y $= \frac{13}{4} = 3\frac{1}{4}$ Subst y$= 3\frac{1}{4}$ into (2) 2x - $3\frac{1}{4} = 5$ 2x $= 8\frac{1}{4}$	A1 Method :1mark

	x $= \frac{33}{4} \times \frac{1}{2} = 4\frac{1}{8}$	A1
5a	3(2x – 1) = 8x 6x – 3 = 8x 6x – 8x = 3 -2x = 3 x = - 1.5	M1 A1
b	$\frac{4x+3(2x-5)}{12} = 5$ $4x + 6x - 15 = 5 \times 12$ $10x = 60+15$ $x = \frac{75}{10}$ $= 7.5$	M1 M1 A1
6a	$= 3d^2 + 5d - 6d - 10 - 4d^2 + 7d$ $= -d^2 + 6d - 10$	M1 A1
b	=(4x – y)(4x –y +x) =(4x – y)(5x – y) =20x² – 4xy – 5xy + y² = 20x² – 9xy +y²	M1 M1 A1
7a	X² – y² = (x – y)(x + y) 189 = 7 (x + y) $\frac{189}{7} = (x+y)$ $27 = (x+y)$	M1 M1 A1
b	X + y = 27----------(1) X – y = 7 ----------(2) (1) + (2) 2x = 34 X = 17	 Method: 1m A1
8a	V and t are in inverse proportion because the product vt is always a constant	Showing all values of vt: 1m Reason: 1m
b	Distance from home to JB = 200 km Time taken = 3.5 h His speed $= \frac{200}{3.5} = 57.143 km/h (3d.p.)$	 M1, A1
c	Time taken $= \frac{200}{80}$ = 2.5 h He must set off at 11.30pm	 A1

9		M1

x	0	2	4	6
y	**-1**	3	**7**	11

		M1

x	0	2	4	6
y	2	**0**		**-4**

9b	From the graph, the solutions are x = 1 and y = 1	
10ai	K(p + q)	A1
ii	= 23.45 (59.12 + 40.88) =23.45 x 100 =2345	A1
10bi	From the graph the cost of a 7 minute call is 62 cents	A1
ii	$y = \frac{80-20}{10}$ $= 6$ X = y – intercept = 20	M1 A1 A1
11a	Area = (x + 3)(x – 3) = x^2 - 9	M1 A1
b	Area of square = (x – 5)(x – 5) = x^2 – 100x + 25	M1 A1
c	Area remaining = (x^2 – 9) – (x^2 – 100x + 25) = 10x - 34	M1 A1
d	10x -34 = 16 10x = 16 + 34 =50 x = 5	A1
12ai	$y = kx^3$, where k is a constant. Given $x = 2,\ y = 48$ $48 = k(2)^3$ $k = \frac{48}{8} = 6$ $y = 6x^3$	M1 A1

ii	When $x = 4$, $y = 6(4)^3 = 384$ $\%\ \text{increase} = \frac{384 - 48}{48} \times 100\%$ $= 700\%$	 A1
12bi	X + y = 52----------(1) X + 4 = 3(y+4)----------(2)	A1 A1
ii	From (2) X + 4 = 3y + 12 X – 3y=8----------(3) X + y = 52----------(1) (3)– (1) - 4y = -44 Y =11 Brandon is 11 years old.	 M1 A1