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DUNEARN SECONDARY SCHOOL
Mid-Year Examination 2014
Mathematics
Paper 1

Secondary 1 Express

Friday **16th May 2014** **0800 - 0900** **1 hour**

INSTRUCTIONS TO CANDIDATES

Write your name, class and register number in the spaces at the top of this page.
Answer all questions.
Write your answers on the question paper.
All working must be shown. Omission of essential working will result in loss of marks.
Do not use any highlighters, correction fluid or correction tape for the paper.

INFORMATION FOR CANDIDATES

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.
At the end of the examination, fasten all your work securely together.
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.
The use of an electronic calculator is expected where appropriate.
You are reminded of the need for clear presentation in your answers.
For π, use either your calculator value or 3.142, unless the question requires the answer in terms of π.

PARENT'S SIGNATURE

FOR EXAMINER'S USE
40

Setter: Mr Khairi

This question paper consists of 7 printed pages, including this cover page.

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Answer all questions. Show all your workings clearly.

1 Evaluate $6^2 \div [25-(-4)^2]+(-3)^3$. **You must show all your working clearly.**

Answer _____ [2]

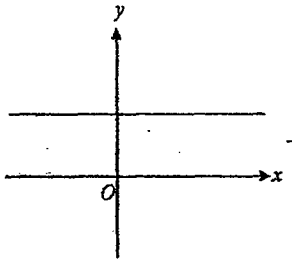
2 A stack of 500 A4 size paper is 30 mm thick. Find the thickness of each A4 paper
(a) in cm, correct to 2 decimal places,
(b) in m, correct to 2 significant figures.

Answer (a) _____ [2]

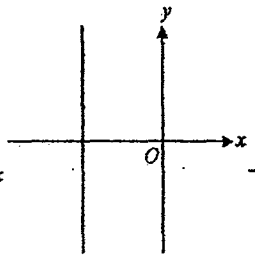
(b) _____ [1]

3 Which of the following graphs shown below has
(a) a positive gradient,
(b) a negative gradient,
(c) a zero gradient?

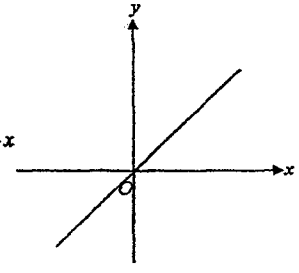
Graph *P*



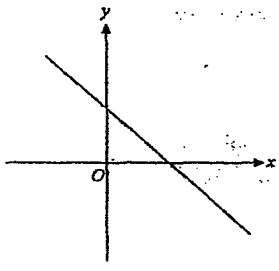
Graph *Q*



Graph *R*



Graph *S*



Answer (a) _____ [1]

(b) _____ [1]

(c) _____ [1]

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4 (a) Find the positive square root of 400 using prime factorisation. Leave your answer as a product of prime factors.

(b) Expressed as the product of prime factors, $198 = 2\times3^2\times11$. Find the smallest positive integer k, such that $198k$ is a perfect square.

Answer (a) _____ [2]

(b) _____ [1]

5 The equation of a function is $y = -\frac{2}{7}x + \frac{1}{3}$. Find

(a) y when $x = -\frac{7}{12}$,

(b) x when $y = -\frac{2}{21}$.

Answer (a) $y =$ _____ [1]

(b) $x =$ _____ [2]

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6 Given that $p = 8, q = -2$, and $r = 1\frac{1}{2}$, evaluate

(a) $\sqrt[3]{p + 4q^2}$,

(b) $(p - r)(q + r)$,

(c) $p - \frac{3q}{2r}$.

Answer (a) _____ [2]

(b) _____ [1]

(c) _____ [1]

7 (a) Express 3240 and 4212 as a product of their prime factors.

(b) **Hence**, find the largest whole number which is a factor of both 3240 and 4212.

Answer (a) 3240 = _____ [1]

4212 = _____ [1]

(b) _____ [2]

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8 Factorise completely

(a) $4h-6hp-20hq$.

(b) $-4a(4+b)+16a(b-2)$.

Answer (a) _____ [1]

(b) _____ [3]

9 (a) Evaluate $\dfrac{119.73-13.27\times 2.9454}{\sqrt[3]{-6.98}}$ correct to 5 significant figures.

(b) Expand and simplify $\dfrac{3}{4}[2(4a-b)-5(a-2b)]$.

Answer (a) _____ [1]

(b) _____ [3]

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10 A driver takes 45 minutes to drive from Town *X* to Town *Y* which is 60 km apart. He travels to Town *Z* after that, which is 40 km away from *Y*. His average speed for the whole journey from Town *X* to Town *Z* is 50 km/h. Find

(a) the total time taken for driving the whole journey from Town X to Town Z,

(b) the speed of the driver for driving from Town Y to Town Z.

Answer (a) _____ s [1]

(b) _____ km/h [3]

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11 (a) Solve the inequality $\frac{1}{3}x+1 \geq 10+2x$.

(i) Show your solution for (a) on the number line below.

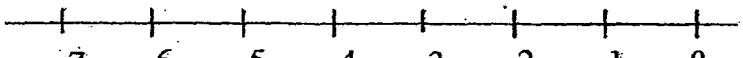
(ii) Hence, write down the greatest integer value of x which satisfies $\frac{1}{3}x+1 \geq 10+2x$.

(b) If the integers a and b satisfy the inequalities $-5 \leq a < 0$ and $0 < b \leq 11$, find

(i) the smallest value of ab,

(ii) the largest value of $(b-a)^4$.

Answer (ai)



[3]

(aii) _____ [1]

(bi) _____ [1]

(bii) _____ [1]

END OF PAPER

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Secondary 1E EM MYE 2014
Paper 1 Marking Scheme

Overall 1 mark deducted if non-exact numerical answers are not given correct to 3 s.f. unless otherwise stated.

No.	Solution	Marks	Remarks
1	$6^2 \div [25-(-4)^2]+(-3)^3$ $=36 \div (25-16)-27$ $=4-27$ $=-23$	M1 A1	
Marker's report:			

2a	$\frac{30 \div 10}{500} = 0.006$ $= 0.01\,\text{cm}$ (2 d.p.)	M1 A1	
2b	$0.006\,\text{cm} = 0.00006\,\text{m}$ $= 0.000060\,\text{m}$ (2 s.f.)	B1	
Marker's report:			

3a	Graph R	B1	
3b	Graph S	B1	
3c	Graph P	B1	
Marker's report:			

4a	$400 = 2^4 \times 5^2$ $\sqrt{400} = \sqrt{2^4 \times 5^2}$ $= 2^2 \times 5$	M1 A1	
4b	$k = 2 \times 11$ $= 22$	B1	
Marker's report:			

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5a	$y=-\frac{2}{7}x+\frac{1}{3}$ $y=-\frac{2}{7}(-\frac{7}{12})+\frac{1}{3}$ $y=\frac{1}{2}$	 B1	 Accept 0.5
5b	$y=-\frac{2}{7}x+\frac{1}{3}$ $-\frac{2}{21}=-\frac{2}{7}x+\frac{1}{3}$ $\frac{2}{7}x=\frac{1}{3}+\frac{2}{21}$ or $-\frac{2}{21}-\frac{1}{3}=-\frac{2}{7}x$ $\frac{2}{7}x=\frac{3}{7}$ $x=1\frac{1}{2}$	 M1 A1	 Accept 1.5
Marker's report:			

6a	$\sqrt[3]{p}+4q^2=\sqrt[3]{8}+4(-2)^2$ $=2+16$ $=18$	M1 A1	M1 for correct substitution
6b	$(p-r)(q+r)=(8-1\frac{1}{2})(-2+1\frac{1}{2})$ $=-3\frac{1}{4}$	 B1	 Accept −3.25
6c	$p-\frac{3q}{2r}=8-\frac{3(-2)}{(2)(1\frac{1}{2})}$ $=8-(-2)$ $=10$	 B1	
Marker's report:			

7a	$3240=2^3\times3^4\times5$ $4212=2^2\times3^4\times13$	B1 B1	
7b	HCF of 3240 and 4212 $=2^2\times3^4$ $=324$	M1 A1	Use working from 5a since question says "hence". Reject ladder method.
Marker's report:			

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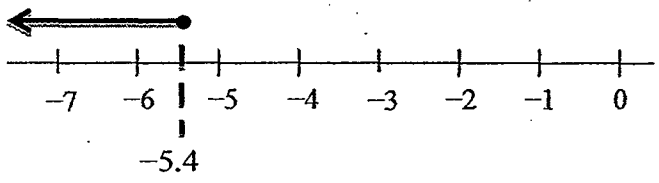
8a	$4h-6hp-20hq=2h(2-3p-10q)$	B1	
8b	$-4a(4+b)+16a(b-2)=-4a[(4+b)-4(b-2)]$ $=-4a(4+b-4b+8)$ $=-4a(12-3b)$ $=-12a(4-b)$ Alternative method: $-4a(4+b)+16a(b-2)=-16a-4ab+16ab-32a$ $=-48a+12ab$ $=-12a(4-b)$	M1 M1 A1 M1 M1 A1	Accept $12a(b-4)$ $12a(-4+b)$
Marker's report:			

9a	$\frac{119.73-13.27\times 2.9454}{\sqrt[3]{-6.98}}=-42.198$	B1	
9b	$\frac{3}{4}[2(4a-b)-5(a-2b)]$ $=\frac{3}{4}(8a-2b-5a+10b)$ $=\frac{3}{4}(3a+8b)$ $=\frac{9}{4}a+\frac{24}{4}b$ $=2\frac{1}{4}a+6b$	 M2 A1	 M1 for each correct expansion: $2(4a-b)$ and $-5(a-2b)$
Marker's report:			

10a	45 minutes $=\frac{45}{60}=\frac{3}{4}$ h Total time taken $=\frac{\text{total distance travelled}}{\text{average speed}}$ $=\frac{60+40}{50}$ $=2$ h $=7200$ s	 B1	

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10b	Time taken to travel from Town Y to Town Z $=2-\frac{3}{4}$ $=1\frac{1}{4}\text{h}$ Speed of the driver when arriving from Town Y to Z $=\frac{\text{distance from Y to Z}}{\text{time from Y to Z}}$ $=\frac{40}{1\frac{1}{4}}$ $=32\text{ km/h}$	M1 M1 A1	Allow ECF from 10a
Marker's report:			

11a(i)	$\frac{1}{3}x+1\geq 10+2x$ $\frac{1}{3}x-2x\geq 10-1$ $-\frac{5}{3}x\geq 9$ $x\leq -5\frac{2}{5}$  	M1 M1 A1	Group like terms Accept -5.4 A1 for: - Labeling of -5.4 - Correct direction and solid dot used
11a(ii)	-6	B1	
11b(i)	$ab=(-5)(11)$ $=-55$	B1	
11b(ii)	$(b-a)^4=[11-(-5)]^4$ $=65536$	B1	
Marker's report:			

— == End of Mark Scheme == —

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