NORTH SYDNEY BOYS HIGH SCHOOL
100 Years
1912 - 2012

MATHEMATICS (EXTENSION 1)

2014 Preliminary Course Assessment Task 1
SUPPLEMENTARY EXAMINATION
Tuesday 4 March, 2014

General instructions

- Working time – 45 minutes.
- Write your answers on the answer sheet supplied, numbered page 9.
- Write using *pencil*.
- Board approved calculators may be used.
- Attempt **all** questions (Questions 1 to 30).
- At the conclusion of the examination, this question paper and the answer sheet will be collected as two bundles.
- **Paper used for scratch space is to be submitted with the question paper and not the answer sheet.**

This question paper will not be read by markers.

Section I

Mark your answers on the answer sheet provided.

Questions **Marks**

1. What is the value of $\sqrt{\pi^2 + 5}$, correct to 2 decimal places? **1**

(A) 3.85 (B) 3.86 (C) 8.14 (D) 8.15

2. Which of the following is 339 400 in scientific notation, correct to two significant figures? **1**

(A) 3.3×10^5 (C) 3.4×10^5

(B) 3.3×10^6 (D) 3.4×10^6

3. Which of the following is the fully factored form of $4a^2y - 10ay^2$? **1**

(A) $2ay(2y - 5a)$ (C) $2a^2y^2(2y - 5a)$

(B) $2ay(2a - 5y)$ (D) $4ay(y - 2.5a)$

4. Eric and Chris paid \$315 for a meal at a restaurant, which included a 12.5% credit card surcharge on top of the cost of the meal. **1**

Which of the following gives the price of the meal without the credit card surcharge?

(A) $315 - \dfrac{87.5}{100}$ (C) $\dfrac{315 \times 112.5}{100}$

(B) $315 - \dfrac{112.5}{100}$ (D) $\dfrac{315 \times 100}{112.5}$

5. A student writes the following solution to express $0.2\overline{71}$ as the simplest fraction. Which line does the error occur? **1**

$$\begin{aligned} \text{Let } x &= 0.2717171\cdots && (1)\\ 10x &= 2.7171717\cdots && (2)\\ 1000x &= 271.717171\cdots && (3)\\ x &= \frac{269}{999} && (4) \end{aligned}$$

(A) Line 1 (B) Line 2 (C) Line 3 (D) Line 4

6. What does **1**

$$L + 2m - (L - 2n) - [2m + L - (2n - L)]$$

simplify to?

(A) $4n + 2L$ (C) $4m + 4n - 2L$

(B) $4n - 2L$ (D) $4m - 4n - 2L$

7. Which of the following is equivalent to $2x^2 + 5x - 3$? **1**

(A) $(2x - 1)(x + 3)$ (C) $(2x + 3)(x - 1)$

(B) $(2x + 1)(x - 3)$ (D) $(2x - 3)(x + 1)$

8. What does $\dfrac{x^2 + 4x}{x^3 - 9x} \div \dfrac{x^2 + 2x - 8}{x^2 + x - 6}$ simplify to? **1**

(A) 1 (B) $\dfrac{x}{x - 3}$ (C) $\dfrac{1}{x - 3}$ (D) $\dfrac{1}{x + 3}$

9. Find the ratio of $x : y$ if $6y + 2x = -3x + 13y$. **1**

(A) 5 : 7 (B) 6 : 2 (C) 13 : −3 (D) 7 : 5

10. What is the exact form solution to $2x^2 - 5x - 2 = 0$? **1**

(A) $x = \dfrac{-5 \pm 3}{4}$ (C) $x = \dfrac{-5 \pm \sqrt{41}}{4}$

(B) $x = \dfrac{5 \pm 3}{4}$ (D) $x = \dfrac{5 \pm \sqrt{41}}{4}$

11. What are the values of a and b if $\dfrac{5 - 2\sqrt{2}}{1 + \sqrt{2}} \equiv a + b\sqrt{2}$? **1**

(A) $a = -9$, $b = 7$ (C) $a = -7$, $b = 9$

(B) $a = 9$, $b = -7$ (D) $a = 7$, $b = -9$

12. What is $8^3 \times 6^{\frac{1}{2}} \div 32^{\frac{3}{2}}$ in simplest form? **1**

(A) $4\sqrt{3}$ (B) $2\sqrt{3}$ (C) $3\sqrt{2}$ (D) $4\sqrt{2}$

13. $\dfrac{1}{\sqrt[4]{m^3}}$ in index form is **1**

(A) $\dfrac{3}{m^{\frac{1}{4}}}$ (B) $m^{-\frac{3}{4}}$ (C) $m^{\frac{3}{4}}$ (D) $m^{\frac{4}{3}}$

14. If $4^{x-1} = 32$, what is the value of x? **1**

(A) 10

(C) 3

(B) 3.5

(D) 6

15. Which of the following represents the fully factored form of $64p^3 + 8$? **1**

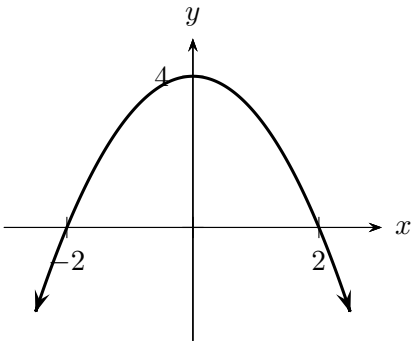
(A) $(4p+2)\left(16p^2-8p+2\right)$

(C) $8(2p+1)\left(4p^2-2p+1\right)$

(B) $(4p+2)\left(16p^2+8p+2\right)$

(D) $8(2p+1)\left(4p^2+2p+1\right)$

16. Which equation corresponds to the graph below? **1**



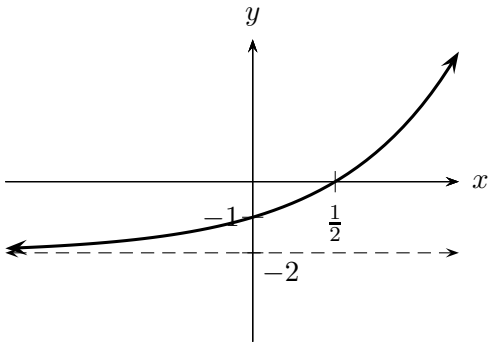
(A) $y = 2 - x^2$

(B) $y = 4 - x^2$

(C) $y = x + 4$

(D) $y = x^2 + 4$

17. Which of the following equations best describes the graph shown? **1**



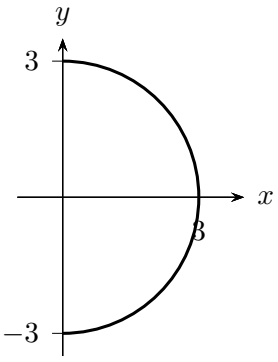
(A) $y = 4^x - 1$

(B) $y = 2^x - 1$

(C) $y = 4^x - 2$

(D) $y = 2^x - 2$

18. Which of the following represent the equation of the semicircle shown below? **1**



(A) $y = \sqrt{9 - x^2}$

(B) $y = -\sqrt{9 - x^2}$

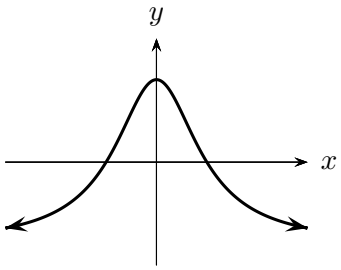
(C) $x = \sqrt{9 - y^2}$

(D) $x = -\sqrt{9 - y^2}$

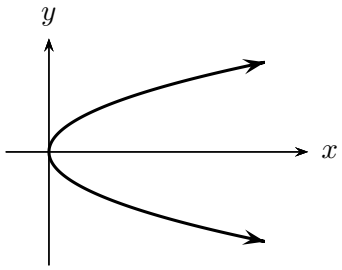
19. A particular relation $R(x)$ obeys the property $R(x) \neq R(-x)$, as well as $R(-x) \neq -R(x)$. **1**

Which graph best represents this relation?

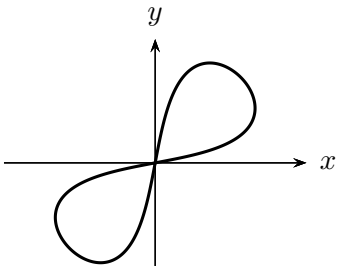
(A)



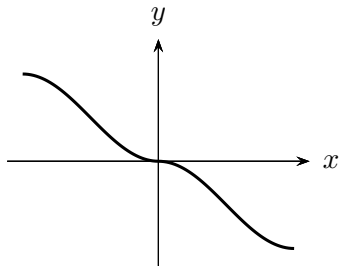
(C)



(B)



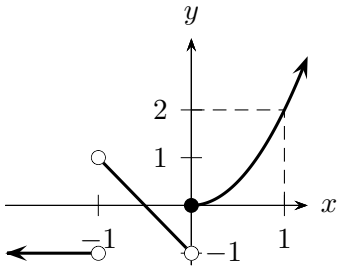
(D)



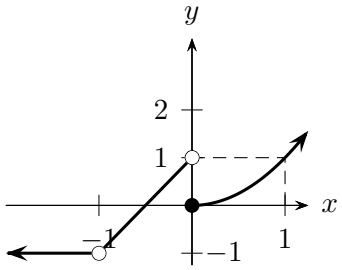
20. Which graph best describes the following piecewise-defined function **1**

$$f(x) = \begin{cases} -1 & x < -1 \\ 2x+1 & -1 < x < 0 \\ 2x^2 & x \geq 0 \end{cases}$$

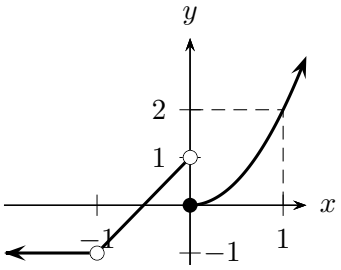
(A)



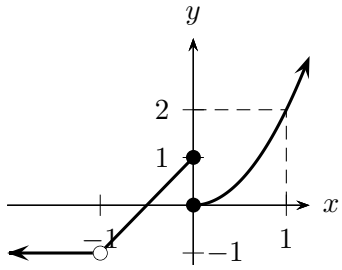
(C)



(B)

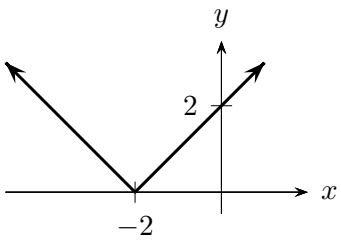


(D)

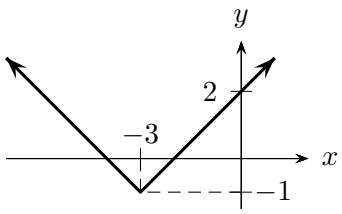


21. Which of the following graphs best represents $y = |x + 3| - 1$? **1**

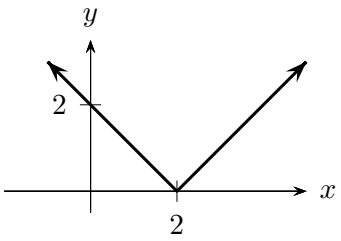
(A)



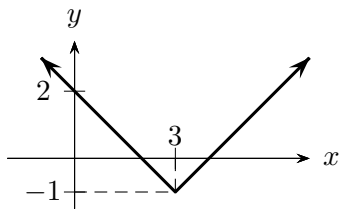
(C)



(B)



(D)



22. Which of the following best describes the function $f(x) = \dfrac{x^3 - 1}{x^2}$? **1**

(A) Even function

(B) Odd function

(C) Neither odd nor even function

(D) Zero function

23. The graph with equation $y = x^3$ is stretched vertically by a factor of $\frac{1}{4}$, translated 4 units to the left and 3 units up. Which equation represents the resulting graph? **1**

(A) $y = \frac{1}{4}(x - 4)^3 + 3$

(B) $y = \frac{1}{4}(x - 4)^3 - 3$

(C) $y = \frac{1}{4}(x + 4)^3 + 3$

(D) $y = \frac{1}{4}(x + 4)^3 - 3$

24. What is the domain of $f(x) = 3 - \sqrt{2x + 1}$? **1**

(A) $x \neq -\frac{1}{2}$ (B) $x \leq -\frac{1}{2}$ (C) $x \leq \frac{1}{2}$ (D) $x \geq -\frac{1}{2}$

25. What is the value of k if $4x^2 - 6x + k$ is a perfect square? **1**

(A) $\dfrac{4}{9}$ (B) $\dfrac{9}{4}$ (C) 4 (D) 9

26. Which of the following represent the solutions of $3x - x^2 < 0$? **1**

(A) $0 < x < 3$

(B) $x < 0$, $x < 3$

(C) $x < 0$, $x > 3$

(D) $x > 0$, $x < 3$

27. Which of the following are the asymptotes to $y = \dfrac{3x-2}{x+7}$? **1**

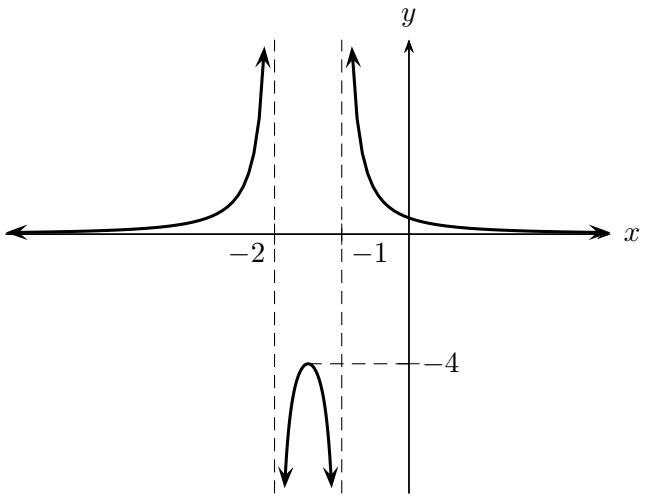
(A) $x = 3$, $y = 7$

(B) $x = 3$, $y = -7$

(C) $y = 3$, $x = 7$

(D) $y = 3$, $x = -7$

28. The graph of $y = f(x)$ is shown in the diagram below. **1**



Which of the following represents the range of the function?

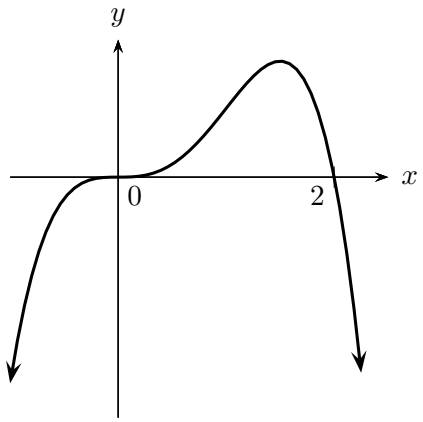
(A) $R = \{y : y > 0, y \leq -4\}$

(B) $R = \{y : y \geq 0, y \leq -4\}$

(C) $R = \{y : y \neq -1, y \neq -2\}$

(D) $R = \{y : y \in \mathbb{R}\}$

29. Which of the following could represent $y = f(x)$? **1**



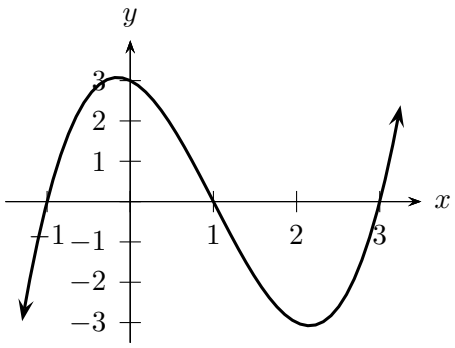
(A) $f(x) = x^3(2-x)$

(B) $f(x) = x^2(2-x)^2$

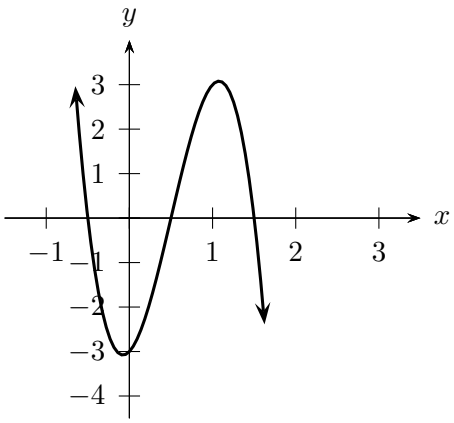
(C) $f(x) = x^3(x-2)$

(D) $f(x) = -x^3(x+2)$

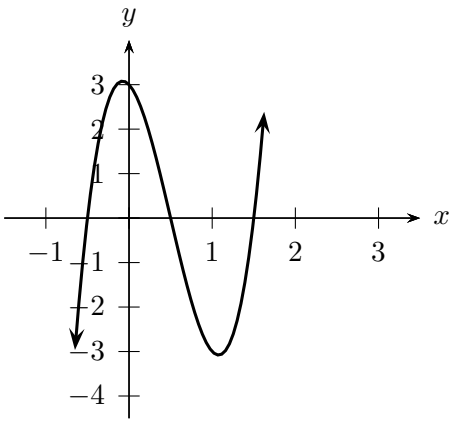
30. The graph of $y = f(x)$ is shown. The graph which best represents $1 - f(2x)$ is **1**



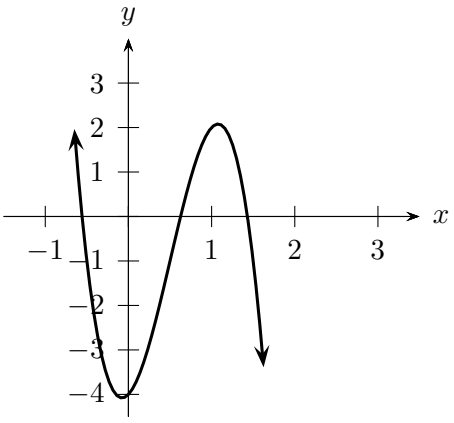
(A)



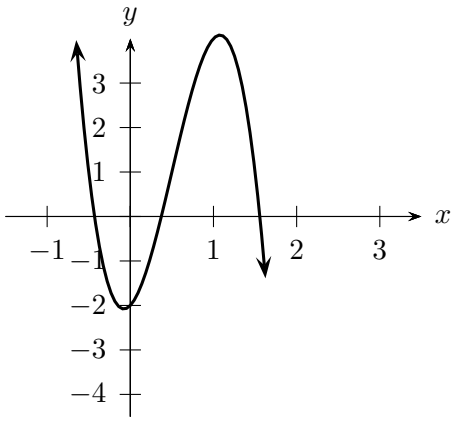
(C)



(B)



(D)



End of paper

Answer sheet for Mathematics Extension 1 Supplementary Assessment Task 1

Mark answers by fully blackening the correct circle, e.g "●"

STUDENT NUMBER: 4 ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

Class (please ✔)

- ◯ 11M3A – Ms Ziaziaris
- ◯ 11M3B – Mr Ireland
- ◯ 11M3C – Mr Lin
- ◯ 11M3D – Mr Weiss
- ◯ 11M3E – Mr Berry
- ◯ 11M3F – Mr Lam

1 –	Ⓐ	Ⓑ	Ⓒ	Ⓓ		**16** –	Ⓐ	Ⓑ	Ⓒ	Ⓓ
2 –	Ⓐ	Ⓑ	Ⓒ	Ⓓ		**17** –	Ⓐ	Ⓑ	Ⓒ	Ⓓ
3 –	Ⓐ	Ⓑ	Ⓒ	Ⓓ		**18** –	Ⓐ	Ⓑ	Ⓒ	Ⓓ
4 –	Ⓐ	Ⓑ	Ⓒ	Ⓓ		**19** –	Ⓐ	Ⓑ	Ⓒ	Ⓓ
5 –	Ⓐ	Ⓑ	Ⓒ	Ⓓ		**20** –	Ⓐ	Ⓑ	Ⓒ	Ⓓ
6 –	Ⓐ	Ⓑ	Ⓒ	Ⓓ		**21** –	Ⓐ	Ⓑ	Ⓒ	Ⓓ
7 –	Ⓐ	Ⓑ	Ⓒ	Ⓓ		**22** –	Ⓐ	Ⓑ	Ⓒ	Ⓓ
8 –	Ⓐ	Ⓑ	Ⓒ	Ⓓ		**23** –	Ⓐ	Ⓑ	Ⓒ	Ⓓ
9 –	Ⓐ	Ⓑ	Ⓒ	Ⓓ		**24** –	Ⓐ	Ⓑ	Ⓒ	Ⓓ
10 –	Ⓐ	Ⓑ	Ⓒ	Ⓓ		**25** –	Ⓐ	Ⓑ	Ⓒ	Ⓓ
11 –	Ⓐ	Ⓑ	Ⓒ	Ⓓ		**26** –	Ⓐ	Ⓑ	Ⓒ	Ⓓ
12 –	Ⓐ	Ⓑ	Ⓒ	Ⓓ		**27** –	Ⓐ	Ⓑ	Ⓒ	Ⓓ
13 –	Ⓐ	Ⓑ	Ⓒ	Ⓓ		**28** –	Ⓐ	Ⓑ	Ⓒ	Ⓓ
14 –	Ⓐ	Ⓑ	Ⓒ	Ⓓ		**29** –	Ⓐ	Ⓑ	Ⓒ	Ⓓ
15 –	Ⓐ	Ⓑ	Ⓒ	Ⓓ		**30** –	Ⓐ	Ⓑ	Ⓒ	Ⓓ

Marker's use only.

QUESTION	1-15	16-25	27-30	**Total**	%
MARKS	$\overline{15}$	$\overline{10}$	$\overline{5}$	$\overline{30}$	

Answer sheet for Mathematics Extension 1 Assessment Ta

Mark answers by fully blackening the correct circle, e.g "●"

SOLUTIONS

STUDENT NUMBER: 4 ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

Class (please ✔)

- ○ 11M3A – Ms Ziaziaris
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- ○ 11M3F – Mr Lam

1 –	Ⓐ	●	Ⓒ	Ⓓ
2 –	Ⓐ	Ⓑ	●	Ⓓ
3 –	Ⓐ	●	Ⓒ	Ⓓ
4 –	Ⓐ	Ⓑ	Ⓒ	●
5 –	Ⓐ		Ⓒ	●
6 –	Ⓐ	●	Ⓒ	Ⓓ
7 –	●	Ⓑ	Ⓒ	Ⓓ
8 –	Ⓐ	Ⓑ	●	Ⓓ
9 –	●	Ⓑ	Ⓒ	Ⓓ
10 –	Ⓐ	Ⓑ	Ⓒ	●
11 –	●	Ⓑ	Ⓒ	Ⓓ
12 –	●	Ⓑ	Ⓒ	Ⓓ
13 –	Ⓐ	●	Ⓒ	Ⓓ
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16 –	Ⓐ	●	Ⓒ	Ⓓ
17 –	Ⓐ	Ⓑ	●	Ⓓ
18 –	Ⓐ	Ⓑ	●	Ⓓ
19 –	Ⓐ	Ⓑ	●	Ⓓ
20 –	Ⓐ	●	Ⓒ	Ⓓ
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22 –	Ⓐ	●	Ⓒ	Ⓓ
23 –	●	Ⓑ	Ⓒ	Ⓓ
24 –	Ⓐ	Ⓑ	Ⓒ	●
25 –	Ⓐ	●	Ⓒ	Ⓓ
26 –	Ⓐ	Ⓑ	●	Ⓓ
27 –	Ⓐ	Ⓑ	Ⓒ	●
28 –	●	Ⓑ	Ⓒ	Ⓓ
29 –	●	Ⓑ	Ⓒ	Ⓓ
30 –	Ⓐ	Ⓑ	Ⓒ	●

Marker's use only.

QUESTION	1-15	16-25	27-30	Total	%
MARKS	15	10	5	30	