| Name : | | | Index No : | Class : | Calculator Model: |
|---|---|---|---|---|---|
| Expected Grade : | Marks Awarded : | / 50 | Actual Grade : | Parent's Signature: | |

# NORTHLAND SECONDARY SCHOOL

*Motivated Learners, Assets to Community*

*Nurturing Minds, Shaping Character, Strengthening Vigour*

| MID YEAR EXAMINATION 2014 | |
|---|---|
| Subject : MATHEMATICS | Paper: 1 |
| Level : Secondary 1 Normal Academic | Date: 14 May 2014 |
| Setter : Mr Chia Meng Guan | Duration : 1 hour 15 minutes |
| Vetter : Mrs Chang Ying Ying | Time : 0900 - 1015 |

**READ THESE INSTRUCTIONS FIRST**

Write your name, index number, class and calculator model at the top of the page.
Write in dark blue or black pen on both sides of the paper.
You may use a pencil for any diagrams or graphs.
Do not use staples, paper clips, highlighters, glue or correction fluid.

Answer **all** 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.
Calculators should be used where appropriate.
If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer to three significant figures. Give answers in degrees to one decimal place.
For $\pi$, use either your calculator value or 3.142, unless the question requires the answer in terms of $\pi$.

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 of the marks for this paper is 50.

For Examiner's use

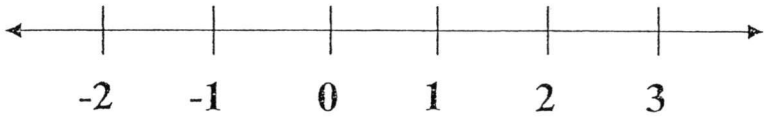
1. Write down all the prime numbers between 20 and 30.

Answer _____ [1]

2. Use the number line below to show the following numbers

$$\sqrt{3},\ \frac{1}{5},\ -1.5,\ \sqrt[3]{-8}$$

[2]




3. **(a)** Write down any 2 rational numbers between 0 and 1.

**(b)** Hence, find the difference between the 2 rational numbers in **(a)**.

Ans (a): _____ [1]

Ans (b): _____ [1]

For Examiner's use

4. (a) Express $\dfrac{\sqrt{9.8765}}{1.2345^2 + 6.789}$ as a decimal.

Write down all the figures shown on your calculator.

(b) Give your answer to part (a) correct to

(i) two significant figures,

(ii) four decimal places.

Answer (a) _____ [1]

(b)(i) _____ [1]

(ii) _____ [1]

5. Find the next two terms in the following number sequences.

(a) 0, 1, 3, 6, 10, ___, ___, ...

(b) $1, \frac{1}{8}, \frac{1}{27}, \frac{1}{64}, \frac{1}{125}, \frac{1}{216}$, ___, ___, ...

Answer (a) _____ , _____ [1]

(b) _____ , _____ [1]

For Examiner's use

6. Express each of the following as a percentage:

(a) $\frac{5}{4}$,

(b) 0.123.

Answer (a) _____ % [1]

(b) _____ % [1]

7. Express 0.125% as a fraction in its lowest terms.

Answer _____ [1]

8. Mike spent $\frac{1}{3}$ of his pocket money on books, $\frac{1}{6}$ on presents and $\frac{1}{12}$ on food. Given that he had \$2.50 left, how much money did he have at first?

Answer: \$ _____ [2]

4

For Examiner's use

9. Solve.

**(a)** $7x+5=15+2x$,

Answer: $x =$ _____ [2]

**(b)** $2(3x+5)=34$.

Answer: $x =$ _____ [2]

**10.** Consider the numbers: $\pi$, 0, $\sqrt{2}$, 8, $-20$, 23 and 27.

Write down

**(a)** the integer(s),

**(b)** the perfect cube(s),

**(c)** the irrational number(s).

Answer (a) _____ [1]

(b) _____ [1]

(c) _____ [1]

For Examiner's use

**11.** Evaluate the following, showing your workings clearly.

**(a)** $-2-(-1)-3$,

**(b)** $-\frac{1}{4}+7\div\frac{1}{2}$,

**(c)** $(-2)^3-(-3-4)^2\times 2-\sqrt{81}$.

Answer (a) _____ [2]

(b) _____ [2]

(c) _____ [2]

**12.** Given that $a=2, b=-2$ and $c=-3$, find the value of

**(a)** $2(a-b)+c$,

**(b)** $\frac{c^2-4}{a+c}$.

Answer (a) _____ [1]

(b) _____ [1]

13. Expand and simplify the following expressions:

For Examiner's use

(a) $5-4a+5a$,

(b) $(b+c)-2(b-c)$.

Answer (a) _____ [1]

(b) _____ [2]

14. 50 boys participated in a Mathematics trail.
If 20% of the participants were boys, find the number of girls that took part in the trail.

Answer: _____ girls [2]

15. The price of a hamburger increases by 100% to \$12.
Find the original price of the hamburger.

Answer: \$ _____ [2]

16. If a number after being added to 28 equals 45, what is 10% of the same number?

Answer: _____ [3]

For Examiner's use

17. 180 expressed as a product of its prime factors is $2^2 \times 3^2 \times 5$.

**(a)** Express 216 as a product of prime factors.

**(b)** Hence, using your answer in **(a)**, find

**(i)** the value of $\sqrt[3]{216}$,

**(ii)** the highest common factor (HCF) of 180 and 216,

**(iii)** the smallest positive integer, $k$, such that $180k$ is a perfect cube.

**(c)** Three buses leave the interchange every 5, 9 and 18 minutes respectively. Given that the three buses left the interchange at 0900, find the next time they will all leave the interchange together again.

Answer (a) _____ [1]

(b)(i) _____ [2]

(ii) _____ [1]

(iii) _____ [1]

(c) _____ [2]

18. The temperature at the top of a mountain was $-5°C$.
The temperature at the bottom of the mountain was $8°C$.

For Examiner's use

Find

(a) the difference between the two temperatures.

(b) the average between the two temperatures.

Answer (a) _____ °C [1]

(b) _____ °C [2]

-End of paper-

| Name : | | | Index No : | Class : | Calculator Model: |
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| MID YEAR EXAMINATION 2014 | |
|---|---|
| Subject : MATHEMATICS | Paper: 2 |
| Level : Secondary 1 Normal Academic | Date: 14 May 2013 |
| Setter : Mr Chia Meng Guan | Duration : 1 hours 15 minutes |
| Vetter : Mrs Chang Ying Ying | Time : 1130 - 1245 |

**READ THESE INSTRUCTIONS FIRST**

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

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 of the marks for this paper is 50.

Answer all the questions.

1. Mr Lim ate dinner at a restaurant.
The marked price of the food he ordered was $200.
Given that there was a service charge of 10% and GST of 7%, calculate

(a) the amount of service charge he had to pay, [2]

(b) the amount of GST he had to pay, [2]

(c) his total bill. [2]

2. On National Day, 120 biscuits, 140 whistles and 160 sweets were given to students.
These gifts were distributed evenly and packed in bags.

(a) If every bag had equal number of biscuits, whistles and sweets, find the greatest number of bags that can be packed. [2]

(b) How many sweets are there in each bag? [1]

3. A cake was made using eggs, butter and flour in the ratio 2 : 3 : 5.
900 grams of butter was used in the making of the cake.

Calculate

(a) the total weight of the cake in grams, [2]

(b) the weight of flour used in grams, [1]

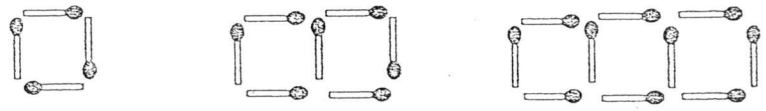
(c) the new ratio of eggs, butter and flour if 100 more grams of flour was being used to make the cake. [2]

4. I am thinking of a number, $x$.
When I multiply the number by 2 and subtract 5 from it, the number becomes 23.

(a) Form an equation in $x$. [1]

(b) Solve the equation. [2]

5. The diagram shows some patterns made using matchsticks.



Pattern 1 Pattern 2 Pattern 3

| Pattern Number | Number of matchsticks |
|---|---|
| 1 | 4 |
| 2 | 7 |
| 3 | 10 |
| 4 | $x$ |
| 5 | $y$ |

**(a)** Write down the values of $x$ and $y$. [2]

**(b)** Write down an expression, in terms of $n$, for the number of matchsticks in Pattern $n$. [1]

**(c)** Which pattern would use 100 matchsticks? [2]

6. Mary spends all her monthly pocket money on taking a bus, buying her food and buying stationery in the ratio 5 : 6 : 2. If her monthly pocket money is \$39, calculate

**(a)** **(i)** the fraction of her pocket money she spends on food, [1]

**(ii)** the percentage of her pocket money she uses to take a bus, [2]

**(iii)** the amount she uses to buy her food as a percentage of the amount she uses to take a bus. [2]

**(b)** Mary's pocket money was increased to \$45. [2]
Calculate the percentage increase in her pocket money.

7. **(a)** By rounding each number to 1 significant figure, estimate the value of

$$\frac{61.5\times10.6}{21}.$$

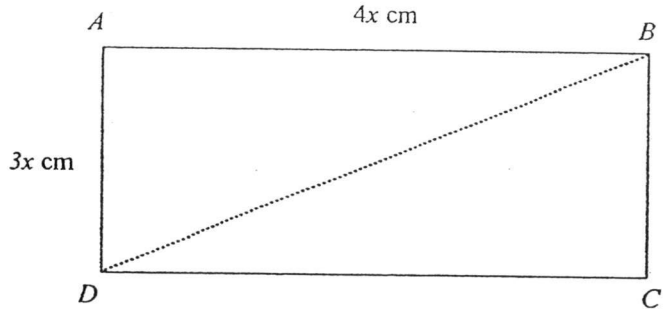
You must show your working. [2]

**(b)** Nathan needs to buy three items from the school bookstore.
The items and prices are shown in the table below.

| | | |
|---|---|---|
| Item 1 | 1 Mathematics Workbook | \$11.54 |
| Item 2 | 1 Mathematics Textbook | \$18.17 |
| Item 3 | 1 Calculator | \$28.60 |

By rounding off each cost of the items to the nearest dollar, estimate the total cost of the three items. [2]

8. $ABCD$ is a rectangle where $AB = 4x$ cm and $AD = 3x$ cm.




**(a)** Write down and simplify an expression, in terms of $x$, for the perimeter of rectangle $ABCD$. [2]

**(b)** Given that the perimeter of $ABCD$ is 28 cm, form an equation in $x$ and solve the equation. [2]

**(c)** Find the area of triangle $BCD$ [3]

9. A set meal consists of fries, drink and burger.
The set meal cost $\$(11x + 5y + 2)$.
The burger cost $\$(8x + 4y)$ if purchased separately.
The fries cost $\$(2x - y + 3)$ if purchased separately.
The drink cost $\$(2x + 3y - 2)$ if purchased separately.

(a) Expressing your answers in terms of $x$ and $y$, find

(i) the total cost of the meal if the fries, burger and drink were all bought separately. [2]

(ii) the cost of buying fries with drink. [2]

(iii) the cost of an upsized pack of fries if it cost an additional of \$1 to upsize the fries. [1]

(b) A set meal will cost less compared to buying the fries, drink and burger separately. Find, in terms of $x$ and $y$, the amount a person can save when he buys a set meal. [2]

10 A card collector, Mr Chen, spent \$10 to buy a limited edition rare card.
He sold the card to Mr Lim at a profit of 20%.

(a) How much did Mr Lim pay for the card? [1]

(b) Mr Lim then sold the card to Peter at a loss of 15%.
How much did Peter pay for the card? [2]

-End of Paper-

| Name : | | | Index No : | Class : | Calculator Model: |
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| MID YEAR EXAMINATION 2014 | |
|---|---|
| Subject : MATHEMATICS | Paper: 1 |
| Level : Secondary 1 Normal Academic | Date: 14 May 2014 |
| Setter : Mr Chia Meng Guan | Duration : 1 hour 15 minutes |
| Vetter : Mrs Chang Ying Ying | Time : 0900 - 1015 |

**READ THESE INSTRUCTIONS FIRST**

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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 of the marks for this paper is 50.

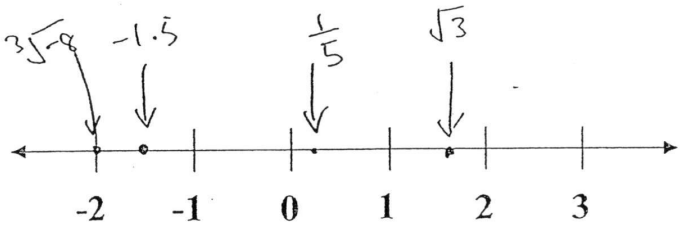
For Examiner's use

1. Write down all the prime numbers between 20 and 30.

Answer 23, 29 [B1] [1]

2. Use the number line below to show the following numbers

$$\sqrt{3},\ \frac{1}{5},\ -1.5,\ \sqrt[3]{-8}$$




[2]

2 correctly placed dots and number for $\sqrt{3},\ \frac{1}{5}$ - 1 mark

2 correctly placed dots and number for $-1.5,\ \sqrt[3]{-8}$ - 1 mark

3. **(a)** Write down any 2 rational numbers between 0 and 1.

**(b)** Hence, find the difference between the 2 rational numbers in **(a)**.

Any 2 numbers

Ans (a): $\frac{1}{2}, \frac{1}{10}$ [B1] [1]

Ans (b): $\frac{2}{5}$ [B1] [1]



2

For Examiner's use

4. (a) Express $\dfrac{\sqrt{9.8765}}{1.2345^2 + 6.789}$ as a decimal.

Write down all the figures shown on your calculator.

(b) Give your answer to part (a) correct to

(i) two significant figures,

(ii) four decimal places.

Answer (a) 0.378045665 [B1] [1]

(b) 0.38 [√B1] [1]

(c) 0.3780 [√B1] [1]

5. Find the next two terms in the following number sequences.

(a) 0, 1, 3, 6, 10, ___ , ___, ...

(b) $1, \frac{1}{8}, \frac{1}{27}, \frac{1}{64}, \frac{1}{125}, \frac{1}{216}$, ___, ___, ...

Answer (a) 15 , 21 [B1] [1]

(b) $\frac{1}{343}$ , $\frac{1}{512}$ [B1] [1]

For Examiner's use

**6.** Express each of the following as a percentage:

(a) $\frac{5}{4}$,

(b) 0.123.

Answer (a) 125 [B1] % [1]

(b) 12.3 [B1] % [1]

**7.** Express 0.125% as a fraction in its lowest terms.

Answer $\frac{1}{800}$ [B1] [1]

**8.** Mike spent $\frac{1}{3}$ of his pocket money on books, $\frac{1}{6}$ on presents and $\frac{1}{12}$ on food.
Given that he had \$2.50 left, how much money did he have at first?

Fraction left $= 1-\frac{1}{3}-\frac{1}{6}-\frac{1}{12}=\frac{5}{12}$ [M1] or fraction left $=\frac{1}{3}+\frac{1}{6}+\frac{1}{12}=\frac{7}{12}$ [M1]

If $\frac{5}{12}$ -> 2.50 -
1->\$6

Answer: \$ 6 [A1] [2]

For Examiner's use

9. Solve.

(a) $7x+5=15+2x$,

$7x+5=15+2x$

$5x=10$ [M1]

$x=2$

Answer: $x=$ 2 [A1] [2]

(b) $2(3x+5)=34$.

$6x+10=34$[M1]

$6x=24$

$x=4$

Answer: $x=$ 4 [A1] [2]

10. Consider the numbers: $\pi$, 0, $\sqrt{2}$, 8, $-20$, 23 and 27.
Write down

(a) the integer(s),

(b) the perfect cube(s),

(c) the irrational number(s).

Answer (a) 0, 8, $-20$, 23, 27 [B1] [1]

(b) 8, 27 [B1] [1]

(c) $\pi$, $\sqrt{2}$ [B1] [1]

For Examiner's use

**11.** Evaluate the following, showing your workings clearly.

**(a)** $-2-(-1)-3$,

**(b)** $-\frac{1}{4}+7\div\frac{1}{2}$,

**(c)** $(-2)^3-(-3-4)^2\times 2-\sqrt{81}$.

(a) $-2+1$ [B1] $-3$

$=-4$

(b) $-\frac{1}{4}+14$ [B1]

$=-\frac{1}{4}+\frac{56}{4}$

$=13\frac{3}{4}$

(c) $(-2)^3-(-3-4)^2\times 2-\sqrt{81}$

$=-8-(-3-4)^2\times 2-9$

$=-8-49\times 2-9$ [B1]

$=-115$

Answer (a) $-4$ [B1] [2]

(b) $13\frac{3}{4}$ [B1] [2]

(c) $-115$ [B1] [2]

**12.** Given that $a=2, b=-2$ and $c=-3$, find the value of

**(a)** $2(a-b)+c$,

**(b)** $\frac{c^2-4}{a+c}$.

(a) $2[2-(-2)]+(-3)$

$=2(4)-3$

$=5$

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

$=\frac{9-4}{(-1)}$

$=-5$

Answer (a) 5 [B1] [1]

(b) $-5$ [B1] [1]

6

For Examiner's use

**13.** Expand and simplify the following expressions:

(a) $5-4a+5a$,

(b) $(b+c)-2(b-c)$.

(b) $b+c-2b+2c$ [M1]
$=-b+3c$

Answer (a) $5+a$ [B1] [1]

(b) $-b+3c$ [A1] [2]

**14.** 50 boys participated in a Mathematics trail.
If 20% of the participants were boys, find the number of girls that took part in the trail.

$20\% -> 50$

$80\% -> \frac{50}{20\%} \times 80\% [M1]$

$= 200$

Answer: $= 200$ [A1] girls [2]

**15.** The price of a hamburger increases by 100% to \$12.
Find the original price of the hamburger.

$200\% -> \$12$

$100\% -> \frac{\$12}{200\%} \times 100\% [M1]$

$= \$6$

Answer: \$ 6 [A1] [2]

**16.** If a number after being added to 28 equals 45, what is 10% of the same number?

$x+28=45$ [M1]
$x=17$ [M1]
$10\% \times 17 = 1.7$

Answer: 1.7 [A1] [3]

For Examiner's use

17. 180 expressed as a product of its prime factors is $2^2 \times 3^2 \times 5$.

**(a)** Express 216 as a product of prime factors, giving your answer in index notation.

**(b)** Hence, using your answer in **(a)**, find

**(i)** the value of $\sqrt[3]{216}$,

**(ii)** the highest common factor (HCF) of 180 and 216,

**(iii)** Write down the smallest positive integer, $k$, such that $180k$ is a perfect cube.

**(c)** 3 buses left the station at 0900.
If the 3 buses leave the station every 5, 9 and 18 minutes respectively, find the next time they will all leave the station together again.

(a)

| | |
|---|---|
| 2 | 216 |
| 2 | 108 |
| 2 | 54 |
| 3 | 27 |
| 3 | 9 |
| 3 | 3 |
| | 1 |

$216 = 2^3 \times 3^3$

(b) (i) $\sqrt[3]{216} = \sqrt[3]{2^3 \times 3^3}$
$= (2 \times 3)$ [M1]
$= 6$

(ii) HCF $= 2^2 \times 3^2 = 36$

(iii) k $= 2 \times 3 \times 5^2 = 150$

(c) LCM $= 2 \times 3^2 \times 5 = 90$ mins [M1]
Time $= 0900 + 90 \text{ min } s = 1030$

| | | |
|---|---|---|
| Answer (a) | $2^3 \times 3^3$ [B1] | [1] |
| (b)(i) | 6 [A1] | [2] |
| (ii) | 36 [B1] | [1] |
| (iii) | 150 [B1] | [1] |
| (c) | 1030 [A1] | [2] |

For Examiner's use

18. The temperature at the top of a mountain was $-5°C$
The temperature at the bottom of the mountain was $8°C$.

(a) Find the difference in the temperature between the top and the bottom of the mountain.

(b) If the temperature increases steadily from the top to the bottom part of the mountain, find the temperature at the middle of the mountain.

$(a) 8-(-5)=13$

(b) temperature at the middle of the mountain $=\frac{-5+8}{2}$ [M1]

$temp=\frac{3}{2}$

Answer (a) 13 °C [1]

(b) 1.5 °C [2]

-End of paper-

| Name : | | | Index No : | Class : | Calculator Model: |
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| MID YEAR EXAMINATION 2014 | |
|---|---|
| Subject : MATHEMATICS | Paper: 2 |
| Level : Secondary 1 Normal Academic | Date: |
| Setter : Mr Chia Meng Guan | Duration : 1 hours 15 minutes |
| Vetter : Mrs Chang Ying Ying | Time : |

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1a Service charge $= \frac{10}{100} \times \$200$ [M1]

$= \$20$ [A1]

1b Taxable amount $= \$200 + \$20 = \$220$ [M1]

GST $= \frac{7}{100} \times \$220 = \$15.40$ [A1]

1c Total bill $= \$200 + \$20 + \$15.40$ [√M1]

$= \$235.40$ [A1]

2a HCF $= 2 \times 2 \times 5$ [M1]

$= 20$ [A1]

2b No of sweets $= 160 \div 20 = 8$ [B1]

3a 3 units -> 900g

1 unit -> 300g

10 units -> $\frac{900}{3} \times 10$ [M1]$= 3000g$ [A1]

3b Weight of flour $= 5units \times 300g = 1500g$ [B1]

3c Weight of eggs $= 2units \times 300g = 600g$ [M1]

Ratio of eggs: butter: flour = 600 : 900 : 1600

=6:9:16 [A1]

4a $2x - 5 = 23$ [B1]

4b $2x - 5 = 23$

$2x = 28$ [M1]

$x = 14$ [A1]

5a $x = 13$ [B1]

$y = 16$ [B1]

5b $1 + 3n$ [B1]

5c $1 + 3n = 100$ [m1]

$3n = 99$

33 [B1]

6ai $\frac{6}{13}$ [B1]

6aii % on bus$= \frac{5units}{13units} \times 100\%$ [M1]

$= 38.5\%$ [A1]

6aiii %food over bus $= \frac{6units}{5units} \times 100\%$ [M1]

$= 120\%$ [A1]

6b Amount increased $= \$46 - \$39 = \$6$

Percentage increase $= \frac{6}{39} \times 100\%$ [M1]

$= 15.4\%$ *or* $15.38461538\%$ [A1]

7a $\frac{60\times10}{20}$ [M1]
$=30$ [A1]

7b Item 1 = \$12
Item 2 = \$18 } [B1]
Item 3 = \$29
Total = \$12+\$18+\$29 = \$59 [B1]

8a $4x+3x+4x+3x$ [M1]
$=14x$ [A1]

8b $14x=28$ [M1]
$x=2$ [A1]

8c Area = $\frac{1}{2}\times6\times8$ [M1 for substitution of $x$, M1 for area of triangle formula]
$=24\text{cm}^2$ [A1]

9a Total = $(8x+4y)+(2x-y+3)+(2x+3y-2)$ [M1]
$=12x+6y+1$ [A1]

9b Fries with drink = $(2x-y+3)+(2x+3y-2)$ [M1]
$=4x+2y+1$ [A1]

9c Upsize fries = $2x-y+3+1$
$=2x-y+4$ [B1]

9d Savings = $(12x+6y+1)-(11x+5y+2)$ [M1]
$=x+y-1$ [A1]

10a Amt Mr Lim paid= $\frac{120}{100}\times\$10=\$12$ [B1]

10b Amt Peter paid= $\frac{85}{100}\times\$12$ [M1]
= \$10.20 [A1]

-End of Paper-