Name: ..... Reg. No. ..... Class: .....

Founded 1842

St. Margaret's Secondary School

Mid-Year Examinations 2012

MATHEMATICS

Paper 1
Secondary 1 Express

11th May 2012
Duration: 1 hour 30 minutes
Total Marks: 50

Instructions To Candidates:

- Answer all questions
- You are advised not to spend too much time on any one question.
- Answers are to be written on the question paper.
- If working is necessary for any question, it must be shown in the space below that question.
- Omission of essential working will result in loss of marks.
- Calculators may be used in this paper.
- Use of correction fluid or tape is not allowed.
- If required, the value of π should be taken as 3.142.

Information For Candidates

- The number of marks is given in brackets [ ] at the end of each question or part question.
- If the degree of accuracy is not specified in the question and if the answer is not exact, the answer should be given to three significant figures. Answers in degrees should be given to one decimal place.
- The figures are not drawn to scale.

This paper consists 9 of printed pages

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Answer all questions

1. Express $\frac{3}{20}$ as a percentage.

Ans. _____[1]

2. Express 2547.4002 correct to

(a) 3 decimal places,

(b) 3 significant figures.

Ans. (a) _____[1]

(b) _____[1]

3. Express the following ratio in its simplest form.

(a) 2.4: 3.6,

(b) 25 cm to 1.5 m.

Ans. (a) _____[1]

(b) _____[1]

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4. The ratio of girls to boys in a school is 5:6.

(a) If there are 545 girls, how many boys are there?

(b) What percentages of the students are boys?

Ans. (a) _____[1]

(b) _____[1]

5. The table below listed the land points on earth.

Land Point	Places	Sea Level
Lowest	Dead Sea [Israel and Jordan]	399 meters below sea level
	Singapore	15 metres above sea level
Highest	Mt Everest [Nepal and Tibet]	8,848 meters above sea level

(a) What is the difference in height between Singapore and Mt Everest?

(b) What is the difference in height between Dead Sea and Mt Everest?

Ans. (a) _____[1]

(b) _____[1]

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6. Simplify $5a + 4(b - c) - (6b - 3a + 8c)$.

Ans. _____[2]

7. Estimate, correct to 1 significant figure, the positive value of $\sqrt{\frac{16.04 \times 25.38}{3.968}}$.

Ans. _____[2]

8. Arrange the following in ascending order:

$$0.9^2,\ 0.989,\ \frac{9}{11},\ -0.999,\ -0.89,\ \sqrt{0.09}$$

Ans. _____, _____, _____, _____, _____, _____ [2]

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9. (a) Solve the inequality $\frac{2x}{3} \leq \frac{4}{15}$.

(b) Hence what is the largest possible value of x if x is an integer.

Ans. (a) _____[2]

(b) _____[1]

10. Given the numbers 192, 72 and 126. Find

(a) HCF,

(b) LCM.

Ans. (a) _____[2]

(b) _____[1]

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11. (a) Express 784 as product of prime factors using index notation.

(b) Hence find the value of $\sqrt{784}$.

Ans. (a) _____[2]

(b) _____[1]

12. A car and a bus were travelling towards each other at different uniform speeds. They were 260 km apart at 8 a.m. and passed each other at 10 a.m. If the speed of the car is 80 km/h, calculate

(a) distance travelled by the car at the point that they met,

(b) distance travelled by the bus at the point that they met,

(c) the speed of the bus.

Ans. (a) _____[1]

(b) _____[1]

(c) _____[1]

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13. Elyanna bought a new car for $125,300. Calculate

(a) the decrease in value if it is worth 18% less than its original value after one year,

(b) its percentage decrease from its original value if the car is worth only $92,722 on its second year.

Ans. (a) _____[1]

(b) _____[2]

14. Factorise the following:

(a) 12ab - 6bc,

(b) 24ax + 9bx + 32ay + 12by.

Ans. (a) _____[1]

(b) _____[2]

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15. Using as much of the information below as necessary, without the use of a calculator, find the value of $\sqrt{17750}$. Show all workings clearly.

$[\sqrt{1.775} = 1.332, \sqrt{17.75} = 4.213]$

Ans. _____[2]

16. A Christmas tree has 3 sets of fairy lights that flash at intervals of 2 seconds, 3 seconds, and 15 seconds respectively, If they flash at 8 p.m., at what time will they flash together again?

Ans. _____[3]

17. Evaluate the following without the use of a calculator, showing all workings clearly.

(a) 23 – (36 - 54) ÷ 6 x (-5),

(b) $2\frac{3}{5} - 3\frac{1}{4} + \frac{1}{5} \div 4$, giving your answer as a fraction in its simplest form.

Ans. (a) _____[2]

(b) _____[2]

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18. If a = 2.2, b = $-\frac{2}{7}$, c = -5, d = 3 and e = 2, find the value of each of the following:

(a) c – 2d + 5e,

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

Ans. (a) _____[2]

(b) _____[2]

19. Solve the following equations.

(a) 8a – 4 = 5a + 20,

(b) $\frac{m}{3}-\frac{2m}{5}=\frac{m}{6}+\frac{7}{10}$.

Ans. (a) _____[2]

(b) _____[2]

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Name: ..... Reg. No. ..... Class: .....

St. Margaret's Secondary School

Mid-Year Examinations 2012

Founded 1842

MATHEMATICS

Paper 2
Secondary One Express

9 May 2012
Duration: 1 hour 30 minutes
Total Marks:50

READ THESE INSTRUCTIONS FIRST

Instructions To Candidates :

- Answer all questions
- You are advised not to spend too much time on any one question.
- Answers are to be written on the foolscap paper provided.
- All necessary working must be shown .Omission of essential working will result in loss of marks.
- Calculators may be used in this paper.
- Use of correction fluid or tape is not allowed.

Information For Candidates

- The number of marks is given in brackets [ ] at the end of each question or part question.
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- The figures are not drawn to scale.

This paper consists of 4 printed pages

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Answer ALL the questions

1. Evaluate the following giving your answer to 3 significant figures.

$$\frac{99.85 \times \sqrt{63.8}}{24.81}$$

[2]

2. (a) The radius of a plant cell is found to be 0.0003039 cm.
Express the diameter of the cell to 2 significant figures. [1]

(b) Find in its simplest form a fraction which is halfway between $\frac{1}{6}$ and $\frac{1}{12}$ [1]

(c) Find the smallest whole number which leaves a remainder of 9 when divided by 15 or 40. [1]

3. If $3(x-1)-5(x-3)=3$, find the value of $7x-5$. [3]

4. Solve the following equation.

$$\frac{4x-2}{3}+\frac{2x+17}{6}=\frac{7x-3}{2}$$

[3]

5. Simplify

$$\frac{a+b}{5}-\frac{a-3b}{2}$$

[2]

6. (a) Find the smallest prime number p such that $6p-3 \geq 48$ [2]

(b) Find the largest rational number r such that $4r \leq 59$ [1]

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7. A car is travelling at a constant speed of 108 km/h.

(a) Find the distance the car travels in 5 minutes. [1]
(b) Find how many minutes the car takes to travel 162 kilometres. [1]
(c) Calculate the speed of the car in metres per second. [2]

8. Aminah bought x dresses for $528.

(a) Write down an expression in terms of x, for the price of one dress if all the dresses cost the same price. [1]

(b) Aminah bought 4 shirts for her husband. Each shirt costs half as much as a dress she has bought. If she paid a total of $176 for the shirts, find the value of x. [2]

9. A group of children share a box of 200 beads equally, and there were 4 beads left over. Then the children shared another box of 80 beads together with the leftover beads equally, and there was no remainder. How many children are there? [3]

10. A man left $\frac{3}{7}$ of his money to his wife, $\frac{1}{2}$ of the remainder to his sister and the rest of it to be divided equally among his three children. If each of his children received $20000 how much did his wife receive? [4]

11. In a certain park, lamp posts are placed every 25 metres apart and benches are placed 30 metres apart. Jane is standing at a directory sign where there is also a lamp post and a bench. Given that the next directory sign is erected at the spot where there is also a lamp post and a bench, find

(a) how far Jane must walk before she reaches the next directory sign. [2]

(b) how many more lamp posts Jane would pass by before she reaches the lamp post at the next directory sign. [1]

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12. A woman bought 50 eggs for $10.20. Some cost 18 cents each and the rest 22 cents each. How many of each kind of eggs did she buy? [4]

13.(a) An athlete spends $1\frac{1}{2}$ hours at a sports centre.

The ratio of the times he spends changing, warming up and running is 2 : 3 : 7.

Calculate

(i) the time he spends warming up. [2]

(ii) the percentage of the $1\frac{1}{2}$ hours at the sports centre he spends running. [2]

(b) In 2010 his best time to run 3000m was 9 minutes 30 seconds.

(i) In 2011 his best time was 10% less than his time in 2010.
Calculate, in minutes and seconds, his best time in 2011. [2]

(ii) In 2010 his time of 9 minutes 30 seconds was 5% less than his best time in 2009.
Calculate, in minutes and seconds, his best time in 2009. [2]

14. (a) Write down an expression, in terms of n, for the n^{th} term of the sequence

1, 4, 7, 10, 13, ... [1]

(b) The first four terms in a sequence of numbers, u_1, u_2, u_3, u_4, ... are given below.

$u_1 = 2^0 + 1 = 2$
$u_2 = 2^1 + 3 = 5$
$u_3 = 2^2 + 5 = 9$
$u_4 = 2^3 + 7 = 15$

(i) Write an expression for u_5 and show that $u_5 = 25$ [1]

(ii) Write down an expression for u_6, and evaluate it. [1]

(iii) Find an expression, in terms of n, for the nth term, u_n, of the sequence. [1]

(iv) Evaluate u_{10}. [1]

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Secondary School Exam Papers

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1. Express $\frac{3}{20}$ as a percentage.

$\frac{3}{20} \times 100 = 15\%$ #

Ans. 15% [1]

2. Express 2547.4002 correct to

(a) 3 decimal places,

(b) 3 significant figures.

Ans. (a) 2547.400 [1]

(b) 2550 [1]

3. Express the following ratio in its simplest form.

(a) 2.4: 3.6,

(b) 25 cm to 1.5 m.

(a) $2.4 : 3.6$

$2 : 3$ #

(b) $25 : 150$

$1 : 6$ #

Ans. (a) 2:3 [1]

(b) 1:6 [1]

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4. The ratio of girls to boys in a school is 5:6.

(a) If there are 545 girls, how many boys are there?

(b) What percentages of the students are boys?

(a) Girls : Boys.
5 : 6

Girls → 5 units → 545 girls.

Boys → 6 units → $\frac{545}{5} \times 6$

$= 654$ #

No of boys is 654 #

% of students who are bo

is $\frac{6}{11} \times 100$

$= 54.5\%$ #

Ans. (a) 654 boys [1]

(b) 54.5 % [1]

5. The table below listed the land points on earth.

Land Point	Places	Sea Level
Lowest	Dead Sea [Israel and Jordan]	399 meters below sea level
	Singapore	15 metres above sea level
Highest	Mt Everest [Nepal and Tibet]	8,848 meters above sea level

(a) What is the difference in height between Singapore and Mt Everest?

(b) What is the difference in height between Dead Sea and Mt Everest?

(a) Difference in height between Singapore & Mt Everest is

$8848 - 15$

$= 8833$ m #

b) Difference in height between Dead sea & Mt Everest is

$8848 - (-399)$

$= 9247$ m #

Ans. (a) 8833m. [1]

(b) 9247m [1]

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6. Simplify ~~Simpty~~ $5a + 4(b - c) - (6b - 3a + 8c)$.

$= 5a + 4b - 4c - 6b + 3a - 8c$

$= 5a + 3a + 4b - 6b - 4c - 8c$

$= 8a - 2b - 12c$ 4

$8a - 2b - 12c$

Ans. _____ [2]

7. Estimate, correct to 1 significant figure, the positive value of $\sqrt{\frac{16.04 \times 25.38}{3.968}}$.

$\sqrt{\frac{16.04 \times 25.38}{3.968}}$

$\approx \sqrt{\frac{16 \times 25}{4}}$

$= \sqrt{100}$

$= 10$ (1 sig fig) 4

10 (1 sig fig)

Ans. _____ [2]

8. Arrange the following in ascending order:

0.9^2, 0.989, $\frac{9}{11}$, -0.999, -0.89, $\sqrt{0.09}$

$0.9^2 = 0.810$

$\frac{9}{11} = 0.\dot{8}\dot{1} \approx 0.818$

$\sqrt{0.09} = 0.3$

Ans. -0.999, -0.89, $\sqrt{0.09}$, 0.9^2, $\frac{9}{11}$, 0.989 [2]

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9 (a) Solve the inequalities $\frac{2x}{3} \leq \frac{4}{15}$.

(b) Hence what is the largest possible value of x if x is an integer.

(a) $\frac{2x}{3} \leq \frac{4}{15}$

$x \leq \frac{4}{15} \times \frac{3}{2}$

$\leq \frac{2}{5}$ #

Ans. (a) $x \leq 2/5$ [2]

(b) Largest possible value of x is 0 #.

(b) $x = 0$ [1]

10. Given the numbers 192, 72 and 126. Find

(a) HCF,

(b) LCM.

2	192, 72, 126
3	96, 36, 63
4	32, 12, 21
3	8, 3, 21
	8, 1, 7

(a) HCF $= 2 \times 3$

$= 6$ #.

(b) LCM $= 2^6 \times 3^2 \times 7$

$= 4032$ #

Ans. (a) 6 [2]

(b) 4032 [1]

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11. (a) Express 784 as product of prime factors using index notation.

(b) Hence find the value of $\sqrt{784}$.

(a)

2	784
2	392
2	196
2	98
7	49
7	7
	1

$784 = 2^4 \times 7^2$ #

(b) $\sqrt{784} = \sqrt{2^4 \times 7^2}$

$= 2^2 \times 7$

$= 28$ #

Ans. (a) $2^4 \times 7^2$ [2]

(b) 28 [1]

12. A car and a bus were travelling towards each other at different uniform speeds. They were 260 km apart at 8 a.m. and passed each other at 10 a.m. If the speed of the car is 80 km/h, calculate

(a) distance travelled by the car at the point that they met,

(b) distance travelled by the bus at the point that they met,

(c) the speed of the bus.

(a) 8am ← 2hr → 10am



Distance travelled by car

$= 8 \times 7$

$= 80 \times 2$

$= 160$ km #

(b) Distance travelled by bus

$= 260 - 160$

$= 100$ km #

(c) Speed of the bus.

$= \frac{D}{T}$

$= \frac{100}{2}$

$= 50$ km/h #

Ans. (a) 160 km [1]

(b) 100 km [1]

(c) 50 km/h [1]

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13. Elyanna bought a new car for $125,300. Calculate

(a) the decrease in value if it is worth 18% less than its original value after one year,

(b) its percentage decrease from its original value if the car is worth only $92,722 on its second year.

(a) Decrease in value.

$= \frac{18}{100} \times 125,300$

$= \$\ 22554$ #

(b) Decrease in value

$125300 - 92722$

$= \$32578$

(b) continue

Percentage decrease

$= \frac{32578}{125300} \times 100$

$= 26\%$

Ans. (a) $ 22554. [1]

(b) 26 %. [2]

14. Factorise the following:

(a) 12ab - 6bc,

(b) 24ax + 9bx + 32ay + 12by.

(a) $12ab - 6bc$

$= 6b(2a - c)$ #.

(b) $24ax + 9bx + 32ay + 12by$

$= 3x(8a + 3b) + 4y(8a + 3b)$

$= (8a + 3b)(3x + 4y)$ #

Ans. (a) 6b(2a-c) [1]

(b) (8a+3b)(3x+4y) [2]

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15. Using as much of the information below as necessary, without the use of a calculator, find the value of $\sqrt{17750}$. Show all workings clearly.

$$[\sqrt{1.775} = 1.332, \sqrt{17.75} = 4.213]$$

$\sqrt{17750}$

$= \sqrt{17750 \times 10000}$

$= 1.332 \times 100$

$= 133.2$ #

Ans. 133.2 [2]

16. A Christmas tree has 3 sets of fairy lights that flash at intervals of 2 seconds, 3, and 15 seconds respectively, If they flash at 8 p.m., at what time will they flash together again?

3 | 2, 3, 15
2, 1, 5

LCM = 3 x 2 x 5

= 30 #

8 pm + 30 sec

= 30 sec past 8 pm

= 20 : 00 : 30

= 08 : 00 : 30 pm.

Ans. _____ [3]

17. Evaluate the following without the use of a calculator, showing all workings clearly.

(a) $23 - (36 - 54) \div 6 \times (-5)$,

(b) $2\frac{3}{5} - 3\frac{1}{4} + \frac{1}{5} \div 4$, giving your answer as a fraction in its simplest form.

(a) $23 - (36 - 54) \div 6 \times (-5)$

$= 23 - (-18) \div 6 \times (-5)$

$= 23 - (-3) \times (-5)$

$= 23 - 15$

$= 8$ #

(b) $2\frac{3}{5} - 3\frac{1}{4} + \frac{1}{5} \div 4$

$= 2\frac{3}{5} - 3\frac{1}{4} + \frac{1}{20}$

$= \frac{52}{20} - \frac{65}{20} + \frac{1}{20}$

$= \frac{-13}{20} + \frac{1}{20}$

$= \frac{-12}{20}$

$= -\frac{3}{5}$ #

Ans. (a) 8 [2]

(b) $-\frac{3}{5}$ [2]

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18. If a = 2.2, b = $-\frac{2}{7}$, c = -5, d = 3 and e = 2, find the value of each of the following:

(a) c – 2d + 5e,

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

(a) $c - 2d + 5e$

$= (-5) - 2(3) + 5(2)$

$= -1$ #

(b) $\frac{2a+c}{c-d} = \frac{2(2.2) + (-5)}{-5 - (-2/7)}$

$= \frac{4.4 - 5}{-4\,5/7}$

$= \frac{0.127}{}$ #

Ans. (a) -1 [2]

(b) 0.127 [2]

19. Solve the following equations.

(a) 8a – 4 = 5a + 20,

(b) $\frac{m}{3} - \frac{2m}{5} = \frac{m}{6} + \frac{7}{10}$.

(a) $8a - 4 = 5a + 20$

$8a - 5a = +4 + 20$

$3a = 24$

$a = \frac{24}{3}$

$= 8$ #

(b) $\frac{m}{3} - \frac{2m}{5} = \frac{m}{6} + \frac{7}{10}$.

$\frac{10m}{3} - \frac{12m}{5} - \frac{m}{6} = \frac{7}{10}$

$\frac{10m}{30} - \frac{12m}{30} - \frac{5m}{30} = \frac{21}{30}$

$-\frac{7m}{30} = \frac{21}{30}$

$-7m = 21$

$m = -\frac{21}{7}$

$= -3$ #

Ans. (a) 8 [2]

(b) -3 [2]

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1. Express $\frac{3}{20}$ as a percentage.

$\frac{3}{20} \times 100 = 15\%$ #

Ans. 15% [1]

2. Express 2547.4002 correct to

(a) 3 decimal places,

(b) 3 significant figures.

Ans. (a) 2547.400 [1]

(b) 2550 [1]

3. Express the following ratio in its simplest form.

(a) 2.4: 3.6,

(b) 25 cm to 1.5 m.

(a) $2.4 : 3.6$

$2 : 3$ #

(b) $25 : 150$

$1 : 6$ #

Ans. (a) 2:3 [1]

(b) 1:6 [1]

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4. The ratio of girls to boys in a school is 5:6.

(a) If there are 545 girls, how many boys are there?

(b) What percentages of the students are boys?

(a) Girls : Boys
5 : 6

Girls → 5 units → 545 girls.

Boys → 6 units → $\frac{545}{5} \times 6$

$= 654$ #

No of boys is 654 #

% of students who are bo

is $\frac{6}{11} \times 100$

$= 54.5\%$ #

Ans. (a) 654 boys. [1]

(b) 54.5 % [1]

5. The table below listed the land points on earth.

Land Point	Places	Sea Level
Lowest	Dead Sea [Israel and Jordan]	399 meters below sea level
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(a) What is the difference in height between Singapore and Mt Everest?

(b) What is the difference in height between Dead Sea and Mt Everest?

(a) Difference in height between Singapore & Mt Everest is

$8848 - 15$

$= 8833$ m #

b) Difference in height between Dead Sea & Mt Everest is

$8848 - (-399)$

$= 9247$ m #

Ans. (a) 8833m. [1]

(b) 9247m [1]

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6. Simply 5a + 4(b – c) – (6b – 3a + 8c).

$= 5a + 4b - 4c - 6b + 3a - 8c$

$= 5a + 3a + 4b - 6b - 4c - 8c$

$= 8a - 2b - 12c$ 4

$8a - 2b - 12c$

Ans. _____ [2]

7. Estimate, correct to 1 significant figure, the positive value of $\sqrt{\frac{16.04 \times 25.38}{3.968}}$.

$\sqrt{\frac{16.04 \times 25.38}{3.968}}$

$\approx \sqrt{\frac{16 \times 25}{4}}$

$= \sqrt{100}$

$= 10$ (1 sig fig) 4

10 (1 sig fig)

Ans. _____ [2]

8. Arrange the following in ascending order:

0.9^2, 0.989, $\frac{9}{11}$, -0.999, -0.89, $\sqrt{0.09}$

0.810 0.818 0.3

$0.9^2 = 0.810$

$\frac{9}{11} = 0.8\dot{1} \approx 0.818$

$\sqrt{0.09} = 0.3$

Ans. -0.999, 0.89, $\sqrt{0.09}$, 0.9^2, $\frac{9}{11}$, 0.989 [2]

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9. (a) Solve the inequalities $\frac{2x}{3} \leq \frac{4}{15}$.

(b) Hence what is the largest possible value of x if x is an integer.

(a) $\frac{2x}{3} \leq \frac{4}{15}$

$x \leq \frac{4}{15} \times \frac{3}{2}$

$\leq \frac{2}{5}$ #

Ans. (a) $x \leq 2/5$ [2]

(b) Largest possible value of x is 0 #.

(b) $x = 0$ [1]

10 Given the numbers 192, 72 and 126. Find

(a) HCF,

(b) LCM.

2	192, 72, 126
3	96, 36, 63
4	32, 12, 21
3	8, 3, 21
	8, 1, 7

(a) HCF $= 2 \times 3$

$= 6$ #.

(b) LCM $= 2^6 \times 3 \times 7$

$= 4032$ #

Ans. (a) 6 [2]

(b) 4032 [1]

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11. (a) Express 784 as product of prime factors using index notation.

(b) Hence find the value of $\sqrt{784}$.

(a)

2	784
2	392
2	196
2	98
7	49
7	7
	1

$784 = 2^4 \times 7^2$ #

(b) $\sqrt{784} = \sqrt{2^4 \times 7^2}$

$= 2^2 \times 7$

$= 28$ #

Ans. (a) $2^4 \times 7^2$ [2]

(b) 28 [1]

12. A car and a bus were travelling towards each other at different uniform speeds. They were 260 km apart at 8 a.m. and passed each other at 10 a.m. If the speed of the car is 80 km/h, calculate

(a) distance travelled by the car at the point that they met,

(b) distance travelled by the bus at the point that they met,

(c) the speed of the bus.

(a) 8am ← 2hr → 10am



Distance travelled by car

$= 8 \times 7$

$= 80 \times 2$

$= 160$ km #

(b) Distance travelled by bus

$= 260 - 160$

$= 100$ km #

(c) Speed of the bus.

$= \frac{D}{T}$

$= \frac{100}{2}$

$= 50$ km/h #

Ans. (a) 160 km [1]

(b) 100 km [1]

(c) 50 km/h [1]

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13. Elyanna bought a new car for $125,300. Calculate

(a) the decrease in value if it is worth 18% less than its original value after one year,

(b) its percentage decrease from its original value if the car is worth only $92,722 on its second year.

(a) Decrease in value.

$= \frac{18}{100} \times 125,300$

$= \$22554$ #

(b) Decrease in value

$125300 - 92722$

$= \$32578$

(b) continue

Percentage decrease

$= \frac{32578}{125300} \times 100$

$= 26\%$

Ans. (a) $22554. [1]

(b) 26 %. [2]

14. Factorise the following:

(a) 12ab - 6bc,

(b) 24ax + 9bx + 32ay + 12by.

(a) $12ab - 6bc$

$= 6b(2a - c)$ #.

(b) $24ax + 9bx + 32ay + 12by$

$= 3x(8a + 3b) + 4y(8a + 3b)$

$= (8a + 3b)(3x + 4y)$ #

Ans. (a) 6b(2a-c) [1]

(b) (8a+3b)(3x+4y) [2]

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15. Using as much of the information below as necessary, without the use of a calculator, find the value of $\sqrt{17750}$. Show all workings clearly.

$[\sqrt{1.775} = 1.332, \sqrt{17.75} = 4.213]$

$\sqrt{17750}$

$= \sqrt{17750 \times 10000}$

$= 1.332 \times 100$

$= 133.2$ #4

Ans. 133.2 [2]

16. A Christmas tree has 3 sets of fairy lights that flash at intervals of 2 seconds, 3, and 15 seconds respectively. If they flash at 8 p.m., at what time will they flash together again?

3 | 2, 3, 15
  | 2, 1, 5

LCM = 3 × 2 × 5

= 30 #4

8 pm + 30 sec

= 30 sec past 8 pm

= 20 : 00 : 30

= 08 : 00 : 30 pm.

Ans. [3]

17. Evaluate the following without the use of a calculator, showing all workings clearly.

(a) $23 - (36 - 54) \div 6 \times (-5)$,

(b) $2\frac{3}{5} - 3\frac{1}{4} + \frac{1}{5} \div 4$, giving your answer as a fraction in its simplest form.

(a) $23 - (36 - 54) \div 6 \times (-5)$

$= 23 - (-18) \div 6 \times (-5)$

$= 23 - (-3) \times (-5)$

$= 23 - 15$

$= 8$ #4

(b) $2\frac{3}{5} - 3\frac{1}{4} + \frac{1}{5} \div 4$

$= 2\frac{3}{5} - 3\frac{1}{4} + \frac{1}{20}$

$= \frac{52}{20} - \frac{65}{20} + \frac{1}{20}$

$= -\frac{13}{20} + \frac{1}{20}$

$= -\frac{12}{20}$

$= -\frac{3}{5}$ #4

Ans. (a) 8 [2]

(b) $-\frac{3}{5}$ [2]

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18. If a = 2.2, $b = -\frac{2}{7}$, c = -5, d = 3 and e = 2, find the value of each of the following:

(a) c – 2d + 5e,

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

(a) $c - 2d + 5e$

$= (-5) - 2(3) + 5(2)$

$= -1$ #

(b) $\frac{2a+c}{c-d} = \frac{2(2.2) + (-5)}{-5 - (-2\frac{2}{7})}$

$= \frac{4.4 - 5}{-4\frac{5}{7}}$

$= \frac{0.127}{}$ #

Ans. (a) -1 [2]

(b) 0.127 [2]

19. Solve the following equations.

(a) 8a – 4 = 5a + 20,

(b) $\frac{m}{3} - \frac{2m}{5} = \frac{m}{6} + \frac{7}{10}$.

(a) $8a - 4 = 5a + 20$

$8a - 5a = +4 + 20$

$3a = 24$

$a = \frac{24}{3}$

$= 8$ #

(b) $\frac{m}{3} - \frac{2m}{5} = \frac{m}{6} + \frac{7}{10}$.

$\frac{10m}{3} - \frac{12m}{5} - \frac{m}{6} = \frac{7}{10}$

$\frac{10m}{30} - \frac{12m}{30} - \frac{5m}{30} = \frac{21}{30}$

$-\frac{7m}{30} = \frac{21}{30}$

$-7m = 21$

$m = -\frac{21}{7}$

$= -3$ #

Ans. (a) 8 [2]

(b) -3 [2]

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Sec. 1E MYE Mathematics Paper 2

1. $\frac{99.85 \times \sqrt{63.8}}{24.81} =$ **32.1** (to 3 Sig. fig.)

2. (a) Diameter = 0.0003039 x 2 cm

$$= \mathbf{0.00061} \text{ cm (to 2 Sig. fig.)}$$

3. (b) $\frac{1}{12} = \frac{2}{24}$

$\frac{1}{6} = \frac{4}{24}$

Fraction halfway between $\frac{1}{12}$ and $\frac{1}{6}$ is $\frac{3}{24}$ or $\frac{1}{8}$

4. $\frac{4x-2}{3} + \frac{2x+17}{6} = \frac{7x-3}{2}$

x = **2**

5. $\frac{a+b}{5} - \frac{a-3b}{2}$

$= \frac{17b-3a}{10}$

6. (a) $6p - 3 \geq 48$

p ≥8.5

Smallest prime number p is **11**

(b) 4r ≤59

r ≤14$\frac{3}{4}$

The largest rational number is $14\frac{3}{4}$

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7. (a) Distance the car travels in 5 minutes $= (108 \times \frac{5}{60})$ km

$= \mathbf{9\ km}$

(b) Time taken $= \frac{162}{108}$ h

$= 1.5$ h $= \mathbf{90\ min.}$

(c) 108 km/h $= \frac{108 \times 1000}{60 \times 60}$

$= \mathbf{30\ m/s}$

8. (a) Price of 1 dress $= \$ \frac{528}{x}$

(b)

$$\frac{264}{x} = 44$$

$$264 = 44x$$

$$x = \frac{264}{44} = \mathbf{6}$$

9. Number of beads shared in the first box $= 200 - 4 = 196$

Number of beads shared in the second box $= 80 + 4 = 84$

HCF of 196 and 84 $= 2 \times 2 \times 7 = 28$

There are **28** children.

10. Amount left to sister $= \frac{1}{2} \times \frac{4}{7} = \frac{2}{7}$

Fraction left to children $= 1 - \frac{3}{7} - \frac{2}{7} = \frac{2}{7}$

$\frac{3}{7}$ of money $= \$\ 60000 \times \frac{3}{2}$

$= \$\ 90000$

His wife received **$ 90000**

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11. (a) LCM of 25 and 30 = 150

Jane must walk **150 m**

(b) Number of lamp posts Jane would pass = (150 ÷ 25) – 1
= **5**

12. Let the number of 18 cents eggs be x.

$18x + 22(50 - x) = 1020$
$x = 20$
She bought 20 **18** cents eggs and 30 **22** cents.

13.(a) (i) Time spent warming up = $\frac{3}{12} \times 1\frac{1}{2}$ h

= **22.5 min**

(ii) Percentage of $1\frac{1}{2}$ h spent running = $(\frac{7}{12} \times 100)$ %

= $58\frac{1}{3}$ %

(b) (i) Best time in 2011 = 90% of 9.5 min
= 8 min 33 s

(ii) 95 % of best time in 2009 = 95 min
100 % of best time in 2009 = $(\frac{95}{9.5} \times 100)$ min
= 10 min
Time in 2009 = **10 min 0 s**

14.(a) T_n = **3n – 2**

(b) (i) $u_5 = 2^4 + 9$
= **25**

(ii) $u_6 = 2^5 + 11$ = **43**

(iii) $u_n = 2^{n-1} + n + n - 1$
= $\mathbf{2^{n-1} + 2n - 1}$

(iv) $u_{10} = 2^9 + 19$
= **531**

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