



SYDNEY BOYS HIGH
MOORE PARK, SURRY HILLS

2010
YEAR 7 YEARLY EXAMINATION

Mathematics

Directions to Candidates:

- Answer all questions in the spaces provided in this question booklet.
- If additional working space is needed, use the spare pages at the end of the booklet. Show clearly which question you are continuing.
- Full marks may not be awarded for careless or badly arranged work.
- Answers should be given in simplest exact form unless otherwise stated.
- Use black or blue pen for written answers, but pencil for diagrams and graphs.
- Board-approved calculators may be used.

Time allowed: 90 minutes
Examiner: Mr PBigelow

Your name: _____

Your Mathematics Class (Tick the box)	
7E Mr Gainford	
7F Ms Kilmore	
7M Mr Boros	
7R Mr Choy	
7S Ms Roessler	
7T Mr Choy	

Markers' Use Only	
Question 1	/20
Question 2	/20
Question 3	/16
Question 4	/16
Question 5	/16
Question 6	/16
Total	/104

Question 1 (20 marks)

Answers

Marks

(a) Convert 0.15 to a fraction in simplest form.

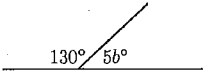
1

(b) Find 4% of \$2.

1

(c) Convert 0.32 m to millimetres.

1

(d)  Write down the value of b .

1

(e) 120% of a number is 144.
What is the number?

1

(f) Express 0.4349 correct to two decimal places.

1

(g) Sketch a right-angled isosceles triangle.

1

(h) A letter is chosen at random from the word ALGEBRA. What is the probability of choosing a vowel?

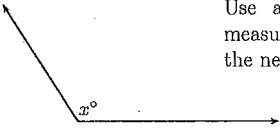
1

(i) Convert $\frac{5}{8}$ to a percentage.

1

(j)  What is the value of x ?

1

(k)  Use a protractor to measure x° correct to the nearest degree.

1

(l) _____ [1]
 Measure this interval in millimetres.

(m) Write down the even multiples of seven between 110 and 150. [1]

(n) Draw the net of a square pyramid. [1]

(o) True or false? [1]
 $C \times C = 2C$

(p) How many edges does a triangular pyramid have? [1]

(q) Which of the following is closest to 0.6? [1]
 $\left\{ 0.54, 63\%, \frac{83}{150} \right\}$

(r) Write down the reciprocal of $3\frac{1}{7}$. [1]

(s) Simplify $24 + (6 - 4) \times 5$. [1]

(t) What fraction (in simplest form) of 2 m is 65 cm? [1]

Question 2 (20 marks)

Answers

Marks

(a) State whether acute (*A*), obtuse (*O*), or reflex (*R*): [3]
 (i) 189°
 (ii) 89°
 (iii) 289°

(b) Express 8.20 p.m. in 24 hour time. [1]

(c) Simplify the following: [3]
 (i) $7a + 3b - 6b$,
 (ii) $x \times 2x \times 3y$,
 (iii) $11a^2 - 3ab - 3a^2 + 2ba$

(d) Solve $3a + 4 = 13$. [1]

(e) Given $V = lbh$, find h when $V = 200$, $l = 8$ and $b = 5$. [1]

(f) Complete the table for $b = 3 - a$. [2]

<i>a</i>	-3	-1	4
<i>b</i>			

(g) Express 56 as the sum of two prime numbers. 1

.....

(h) List the set of composite numbers between 60 and 70. 2

.....

(i) Use a calculator to evaluate $\frac{\sqrt{4.89}}{2.61 \times 0.37}$ (correct to two decimal places). 1

.....

(j) Solve $|x - 1| = 6$. 1

.....

(k) Find $\sqrt{9a^4b^2}$. 1

.....

(l) What is the L.C.M. of 5, 6 and 8? 1

.....

(m) Sketch the following shapes: 2
 (i) an obtuse-angled scalene triangle,

(ii) a trapezium.

Question 3 (16 marks)

Answers Marks

(a) What is the average of six lots of 8 and eight lots of 6? 1

.....

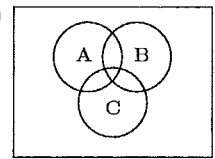
(b) Give an example of 2
 (i) an empty set,

.....

(ii) an infinite set.

.....

(c) 1



Shade the region representing $(A \cup C) \cap B$.

(d) If $A = \{4, 6, 8, 10\}$, 2
 $B = \{1, 2, 7, 9\}$,

$C = \{\text{Single digit prime numbers}\}$,

List

(i) $A \cup B$,

.....

.....

(ii) $B \cap C$

.....

.....

.....

(e) Simplify $5(2x - 1) - 2(3x - 4)$. 2

.....

.....

.....

.....

(f) Write in algebraic form: 1
 The sum of six and x , divided
 by the product of five and x .

(g) Write $3 \times t \times 4 \times t \times 5 \times t$ in simplest form. 1

(h) What fraction when added to $4\frac{7}{10}$ gives $7\frac{1}{2}$? 1

(i) A number when added to half itself is 144.
 What is the number? 1

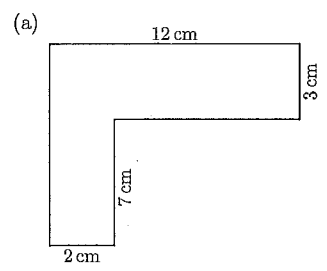
(j) If $a = -3$, and $b = -7$, evaluate $\frac{3a + b}{b - a}$. 1

(k) What is the H.C.F. of 36 and 64? 1

(l) The sum of three consecutive even
 numbers is 360. 2
 What are the numbers?

Question 4 (16 marks)

Marks



2

Find the
 (i) perimeter,

(ii) area of the shape.

(b) Express 1260 as a product of primes
 (use index notation). 2

2

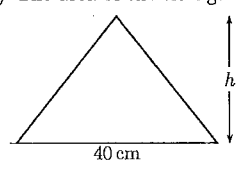
(c) Convert
 (i) 3.5 cm^2 to mm^2 ,

2

(ii) 4.3 km^2 to hectares.

(d) The area of the triangle is 70 cm^2 . 1

1



What is the
 height, h ?

(e) A spinner has eight equally sized sectors coloured: red, black, blue, yellow, green, brown, white, and orange. It is spun once. What is the probability of

(i) green?

2

(ii) any colour except red or white?

(f) Give an example of an event E such that

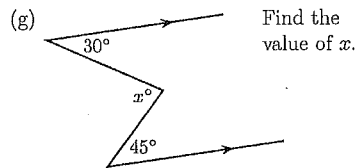
(i) $P(E) = \frac{1}{2}$,

(ii) $P(E) = 0$,

(iii) $P(E) = 1$,

3

where $P(E)$ is the probability of the event occurring.



1

(h)

x	0	1	2	3
y	-2	1	4	7

 Find the rule which connects x and y .

1

(i) Express 1 micro-century to the nearest minute.
(Take 1 year = $365\frac{1}{4}$ days.)
N.B. 1 micro-century is 1 millionth of a century.

2

Marks

Question 5 (16 marks)

(a) Find the next element in the following sets.

3

(i) $\{1, 4, 9, 16, \dots\}$

(ii) $\{1, 1, 2, 3, 5, \dots\}$

(iii) $\{3, 4, 6, 8, 12, 14, \dots\}$

(b) Find the missing digit in the following division.

2

$$\begin{array}{r} 377 \\ 9 \overline{) 33\Box 3} \end{array}$$

(c) What is the smallest four digit number which is exactly divisible by 3, 7 and 13?

1

(d) Write down the supplement of the complement of 75° .

1

(e) If the 5th of July is a Friday, what day of the week is the 18th of November in the same year?

2

(f) Find a if :—

$$\frac{1}{a} = \frac{3}{7} + \frac{7}{3}$$

1

(g) Construct a triangle ABC where $AB = 6$ cm,
 $AC = 5.5$ cm and $BC = 5$ cm.

2

(h) How many 7s are used in numbering the pages
of a book which has 463 pages?

.....
.....
.....
.....

2

(i) What fraction is half way between $\frac{2}{5}$ and $\frac{7}{8}$?

.....

1

(j) A number when divided by 0.4 gives 60. What
is the number?

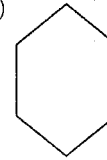
.....

1

Question 6 (16 marks)

Marks

(a) If all the diagonals are drawn in a
hexagon, how many would there
be?



.....

2

(b) In a box there are 10 marbles (2 red, 2 yellow, 2
green, 2 blue, and 2 black). If I cannot see inside
the box, what is the least number of marbles I
must take out to be sure of getting two of the
same colour?

.....

1

(c) Use the following pattern to find the value of

$$2 + 4 + 6 + 8 + \dots + 38 + 40.$$

$$\begin{aligned} 2 &= 2 = 1 \times 2 \\ 2 + 4 &= 6 = 2 \times 3 \\ 2 + 4 + 6 &= 12 = 3 \times 4 \\ 2 + 4 + 6 + 8 &= 20 = 4 \times 5 \end{aligned}$$

.....
.....
.....

2

(d) Two candles of equal length are lit at the same
time. Candle A takes 10 hours to burn down,
while candle B takes 5 hours. When will candle
 A be exactly three times as long as candle B ?

.....
.....
.....

2

(e) What is the perimeter of a square of area
 1.96 cm^2 ?

.....
.....

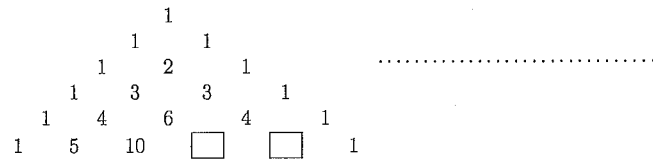
1

(f) Write in the missing numbers in the following patterns.

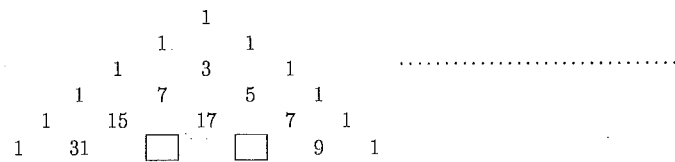
4

Extra working page

(i)

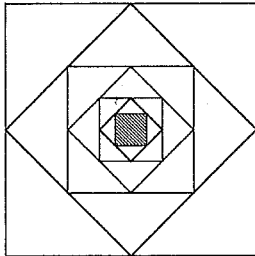


(ii)



(g) The area of the smallest shaded square is 1 square unit. How many square units is the area of the largest square?

2



(h) If $a * b = a + b^2$,

2

(i) write down the value of $5 * 7$.

.....

(ii) If $x * 6 = 94$, find x .

.....

End of Paper

Extra working page

Extra working page

Question 1 (20 marks)

(a) Convert 0.15 to a fraction in simplest form.

Answers

$\frac{3}{20}$

Marks

1

(b) Find 4% of \$2.

8 cents

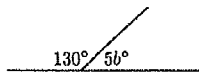
1

(c) Convert 0.32 m to millimetres.

320

1

(d) Write down the value of b .



10

1

(e) 120% of a number is 144. What is the number?

120

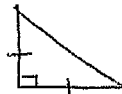
1

(f) Express 0.4349 correct to two decimal places.

0.43

1

(g) Sketch a right-angled isosceles triangle.



1

(h) A letter is chosen at random from the word ALGEBRA. What is the probability of choosing a vowel?

$\frac{3}{7}$

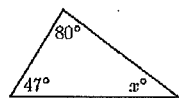
1

(i) Convert $\frac{5}{8}$ to a percentage.

62.5%

1

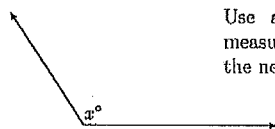
(j) What is the value of x ?



53

1

(k) Use a protractor to measure x° correct to the nearest degree.



122/124

1

(l) Measure this interval in millimetres.

44 mm

1

(m) Write down the even multiples of seven between 110 and 150.

112, 126, 140

1

(n) Draw the net of a square pyramid.



1

(o) True or false?

$$C \times C = 2C$$

FALSE

1

(p) How many edges does a triangular pyramid have?

6

1

(q) Which of the following is closest to 0.6?

$$\left\{ 0.54, 63\%, \frac{83}{150} \right\}$$

63%

1

(r) Write down the reciprocal of $3\frac{1}{7}$.

$\frac{7}{22}$

1

(s) Simplify $24 + (6 - 4) \times 5$.

34

1

(t) What fraction (in simplest form) of 2 m is 65 cm?

$\frac{13}{40}$

1

Question 2 (20 marks)

Answers

Marks

(a) State whether acute (A), obtuse (O), or reflex (R):

- (i) 189° R ✓
 (ii) 89° A ✓
 (iii) 289° R ✓

3

(b) Express 8.20 p.m. in 24 hour time.

2020h ✓

1

(c) Simplify the following:

(i) $7a + 3b - 6b$,

$7a - 3b$ ✓

3

(ii) $x \times 2x \times 3y$,

$6x^2y$ ✓

(iii) $11a^2 - 3ab - 3a^2 + 2ba$.

$8a^2 - ab$ ✓

(d) Solve $3a + 4 = 13$.

$3a = 9$

$a = 3$ ✓

1

(e) Given $V = lbh$, find h when $V = 200$, $l = 8$ and $b = 5$.

$200 = 8 \times 5 \times h$
 $h = \frac{200}{40}$

$h = 5$ ✓

1

(f) Complete the table for $b = 3 - a$.

a	-3	-1	4
b	6	4	-7

✓✓

2

(g) Express 56 as the sum of two prime numbers.

$31 + 25$
 $37 + 19$

$37 + 19, 43 + 13$
 $53 + 3$

1

(h) List the set of composite numbers between 60 and 70.

62, 63, 64, 65, 66,
~~68, 69~~

2

(i) Use a calculator to evaluate $\frac{\sqrt{4.89}}{2.61 \times 0.37}$ (correct to two decimal places).

$2.289 = 2.29$

1

(j) Solve $|x - 1| = 6$.

$x - 1 = 6$ or $x - 1 = -6$
 $x = 7$ or $x = -5$

1

(k) Find $\sqrt{9a^4b^2}$.

$3a^2b$

1

(l) What is the L.C.M. of 5, 6 and 8?

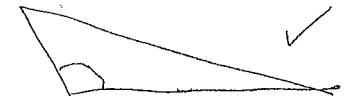
$5 = 5$
 $6 = 2 \times 3$
 $8 = 2 \times 2 \times 2$

$5 \times 2 \times 2 \times 2 \times 3$
 $= 120$

1

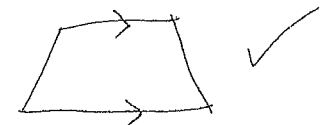
(m) Sketch the following shapes:

(i) an obtuse-angled scalene triangle,



2

(ii) a trapezium.



Question 3 (16 marks)

(a) What is the average of six lots of 8 and eight lots of 6?

Answers

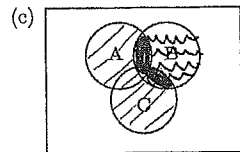
$$\frac{6 \times 8 + 8 \times 6}{2} = 48 \quad [1]$$

(b) Give an example of
(i) an empty set,

odd numbers divisible
by 2

(ii) an infinite set.

counting numbers



Shade the region representing

$$(A \cup C) \cap B.$$

(d) If $A = \{4, 6, 8, 10\}$,
 $B = \{1, 2, 7, 9\}$,
 $C = \{\text{Single digit prime numbers}\}$,

List

(i) $A \cup B$,

$\{1, 2, 4, 6, 7, 8, 9, 10\}$

(ii) $B \cap C$.

$\{2, 7\}$

(e) Simplify $5(2x - 1) - 2(3x - 4)$.

$$10x - 5 - 6x + 8 = 4x + 3$$

(f) Write in algebraic form:

The sum of six and x , divided by the product of five and x .

$$\frac{6 + x}{5x} \quad [1]$$

(g) Write $3 \times t \times 4 \times t \times 5 \times t$ in simplest form.

$$60t^3 \quad [1]$$

(h) What fraction when added to $4\frac{7}{10}$ gives $7\frac{1}{5}$?

$$7\frac{5}{10} - 4\frac{7}{10} = 2\frac{4}{10} \quad [1]$$

(i) A number when added to half itself is 144. What is the number?

$$x + \frac{x}{2} = 144$$

$$x = 96 \quad [1]$$

(j) If $a = -3$, and $b = -7$, evaluate $\frac{3a+b}{b-a}$.

$$\frac{3 \times -3 - 7}{-7 - (-3)} = \frac{-16}{-4} = 4 \quad [1]$$

(k) What is the H.C.F. of 36 and 64?

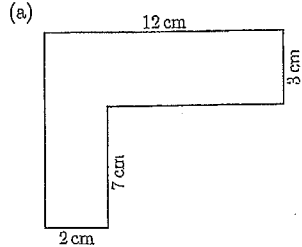
$$4 \quad [1]$$

(l) The sum of three consecutive even numbers is 360. What are the numbers?

$$118, 120, 122 \quad [2]$$

Question 4 (16 marks)

Marks



Find the
(i) perimeter,

$$P = 2(12+10) = 44 \text{ cm}$$

2

(ii) area of the shape.

$$A = 12 \times 3 + 7 \times 2 = 50 \text{ cm}^2$$

$$= 36 + 14$$

1

(b) Express 1260 as a product of primes
(use index notation).

$$2^2 \times 3^2 \times 5 \times 7$$

2

(c) Convert

(i) 3.5 cm^2 to mm^2 ,

$$3.5 \times 100 = 350 \text{ mm}^2$$

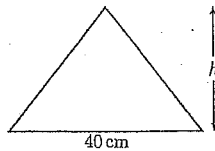
2

(ii) 4.3 km^2 to hectares.

$$430 \text{ ha}$$

1

(d) The area of the triangle is 70 cm^2 .



What is the
height, h ?

$$70 = \frac{1}{2} \times 40 \times h$$

$$h = \frac{70}{20}$$

$$3.5 \text{ cm}$$

1

(e) A spinner has eight equally sized sectors coloured: red, black, blue, yellow, green, brown, white, and orange. It is spun once. What is the probability of
(i) green?

$$\frac{1}{8}$$

2

(ii) any colour except red or white?

$$\frac{3}{4}$$

1

(f) Give an example of an event E such that

(i) $P(E) = \frac{1}{2}$,

Toss 1 coin, get a H 1

(ii) $P(E) = 0$,

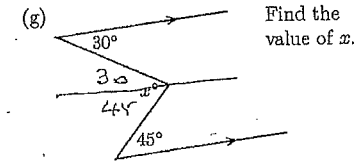
Roll 1 die, get a 7 1

(iii) $P(E) = 1$,

Roll 1 die, get a n. < 7 1

3

where $P(E)$ is the probability of the event occurring.



Find the
value of x .

$$x = 75^\circ$$

1

(h)

x	0	1	2	3
y	-2	1	4	7

Find the rule which
connects x and y .

$$y = 3x - 2$$

1

(i) Express 1 micro-century to the nearest minute.
(Take 1 year = $365\frac{1}{4}$ days.)
N.B. 1 micro-century is 1 millionth of a century.

$$(52.596) \div 60 = 53 \text{ min}$$

2

Solutions YR7 2010 Yearly. Question 6.

16

(a) 6 vertices
diagonal goes to 2 vertices.
Various methods.

Answer = 9 diagonals. (2)

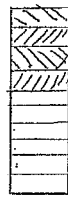
(b) If your 1st pick is red.
2nd " is yellow
3rd " " green
4th " " blue
5th " " black

then your 6th pick will be assured
of then getting 2 marbles the same colour.
Answer: 6 (1)

(c) $2+4+6+8+\dots+38+40$

$\Rightarrow 20$ terms

\Rightarrow pattern is $20 \times 21 = 420$ (2)



A



B

hour 1 ratio (left) 9 to 8
hour 2 8 to 6 (4:3)
hour 3 7 to 4
hour 4 6 to 2 \Rightarrow 3 to 1

after 4 hours (2)

(d)



(e) $d^2 = 1.96 \text{ cm}^2$
 $d = \sqrt{1.96} = 1.4 \text{ cm}$
 $P = 4 \times 1.4 = 5.6 \text{ cm}$ (1)

Question 5 (16 marks)

(a) Find the next element in the following sets:

(i) {1, 4, 9, 16, ...}

..... 25

[3]

(ii) {1, 2, 3, 5, ...}

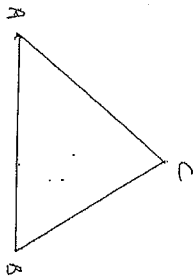
..... Prime no + 1
..... 8
..... 18

.....

(g) Construct a triangle ABC where AB = 6 cm,

AC = 5.5 cm and BC = 5 cm.

[2]



(b) Find the missing digits in the following division.

$$\begin{array}{r} 9 \\ 3 \\ \underline{3 } \\ 7 \\ \underline{7 } \\ 0 \\ \underline{0 } \\ 3 \\ \underline{3 } \\ 0 \end{array}$$

..... 9

[2]

(c) What is the smallest four digit number which is exactly divisible by 3, 7 and 13?

..... 1092

[1]

(d) Write down the supplement of the complement of 75°.

..... 165°

[1]

(e) If the 8th of July is a Friday, what day of the week is the 18th of November in the same year?

..... Monday

[2]

(f) Find a if:—

$$\frac{1}{a} = \frac{3}{7} + \frac{7}{3}$$

[1]

..... $\frac{1}{a} = \frac{3+49}{21}$
..... $a = \frac{21}{58}$

(h) How many '7's are used in numbering the pages of a book which has 453 pages?

..... 86

[2]

(i) What fraction is half way between $\frac{2}{5}$ and $\frac{7}{8}$?

..... $\frac{1}{2} \times \frac{51}{40} = \frac{51}{80}$

[1]

(j) A number when divided by 0.4 gives 60. What is the number?

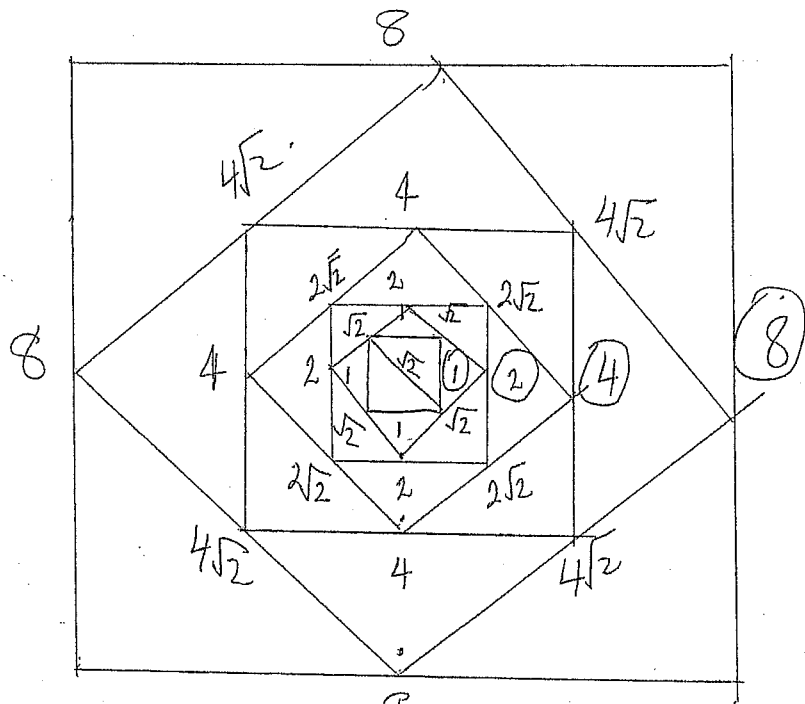
..... 24

[1]

(f) (i) $6+4 = \underline{10}$ ①
 $4+1 = \underline{5}$ ①

(ii) $15+2 \times 17 = \underline{49}$ ①
 $17+2 \times 7 = \underline{31}$ ①

(g) Various methods -
 answer $8 \times 8 = \underline{64}$ square units ②



(h) $a * b = a + b^2$ ②. 8
 (i) $5 * 7 = 5 + 7^2 = \underline{54}$ ①
 (ii) $x * 6 = 94$
 $x + 36 = 94$
 $x = \underline{58}$ ①