



Student Number: \_\_\_\_\_

St. Catherine's School  
Waverley

2008  
ASSESSMENT TASK 1  
(15%)

# Mathematics

## Year 11

### General Instructions

- Working time – 55 minutes
- Start each question on a new page in your answer booklet.
- If any additional booklet is used, please label it clearly and attach it to the appropriate booklet.
- Write using black or blue pen only.
- Board-approved calculators may be used.
- All necessary **working** must be shown.
- Marks may be deducted for careless or badly arranged work.

### Total marks – 50

- Attempt Questions 1–3
- Marks for each question are indicated on the back of this page.

### TEACHER'S USE ONLY

Question 1	/14
Question 2	/20
Question 3	/16
<b>TOTAL</b>	<b>/50</b>

**QUESTION 1**                      **START A NEW PAGE**                      **MARKS**

a) Simplify the following:

(i)  $13ab - 5 - 2ba + 4$                       1

(ii)  $\frac{15m^0n^4}{25m^4n^6}$                       1

b) Express in simplest terms:

(i)  $\frac{7x}{3} - \frac{x-1}{4}$                       2

(ii)  $\frac{5d^4e^2}{3xy} + \frac{de}{x^5y^2}$                       2

c) Factorise fully:

(i)  $t^2 - 10t + 21$                       1

(ii)  $2m^2 - 18$                       2

(iii)  $w - 2 + 4v - 2wv$                       2

d) Find the value of  $19^{-0.5}$  correct to two decimal places                      1

e) The radius of Mars is approximately 3 397 000 m.                      2  
Write this number in scientific notation, correct to two significant figures.

**QUESTION 2**                      **START A NEW PAGE**                      **MARKS**

a) Expand and simplify:

(i)  $2 - 3(f - 5) - 12$                       2

(ii)  $(h + 7j)(h - 4j)$                       2

(iii)  $(-2m^5n^2)^3$                       2

b) Solve the pair of simultaneous equations:

$$\begin{aligned} 2a - b &= 5 \\ a - 3b &= 2 \end{aligned}$$

3

c) Solve for  $x$  in the following equations:

(i)  $2x - (4 - x) = 5 - x$                       3

(ii)  $\frac{-5}{x-4} = \frac{2}{x-2}$                       3

d) Solve the following equations:

(i)  $2m^2 - 11m - 6 = 0$                       2

(ii)  $(2h + 1)^2 = 4$                       3

**QUESTION 3**                      **START A NEW PAGE**                      **MARKS**

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a) Solve for  $t$ , leaving your answers to 2 significant figures:

$$\frac{t}{t-5} + \frac{2}{t^2-25} = 3 \qquad 3$$

b) Solve simultaneously for  $m$  and  $n$ :

$$\begin{aligned} m^2 + n^2 &= 9 \\ m + n &= 3 \end{aligned} \qquad 4$$

c) Simplify the following:

$$\frac{x^2 - 5x - 24}{2x^2 + 11x + 5} + \frac{x^2 + 6x + 9}{x^2 + 5x} \qquad 3$$

d) Express the recurring decimal  $1.0\dot{7}\dot{4}$  as a fraction in its lowest term      3

e) Simplify:      3

$$\frac{5x+1}{x^2-1} + \frac{2}{1-x} - \frac{3}{1+x}$$

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Qn	Solutions	Marks	Comments+Criteria
1a)	(i) $13ab - 5 - 2ba + 4$ $= 11ab - 1$	1	
	(ii) $\frac{15m^0n^4}{25m^4n^6}$  $= \frac{3 \times 1 \times n^4}{5m^4 \times n^6}$  $= \frac{3}{5m^4n^2}$	1	
1b)	(i) $\frac{7x}{3} - \frac{x-1}{4}$  $= \frac{4 \times 7x - 3(x-1)}{12}$  $= \frac{28x - 3x + 3}{12}$  $= \frac{25x + 3}{12}$	1	
	(ii) $\frac{5d^4e^2}{3xy} \div \frac{de}{x^5y^2}$  $= \frac{5d^4e^2}{3xy} \times \frac{x^5y^2}{de}$  $= \frac{5d^3ex^4y}{3}$	$\frac{1}{2}$  $\frac{1}{2}$	

Qn	Solutions	Marks	Comments+Criteria
1c)	(i) $t^2 - 10t + 21$ $= (t-7)(t-3)$	1	
	(ii) $2m^2 - 18$ $= 2(m^2 - 9)$ $= 2(m-3)(m+3)$	1 1	
	(iii) $w-2 + 4v - 2wv$ $= w-2 + 2v(2-w)$ $= 1(w-2) - 2v(w-2)$ $= (1-2v)(w-2)$	$\frac{1}{2}$ $\frac{1}{2}$ 1	
1d)	$19^{-0.5} = 0.229415\dots$ $= 0.23$ (to 2 d.p.)	$\frac{1}{2}$ $\frac{1}{2}$	
1e)	$3\,397\,000$ $= 3.4 \times 10^6$ (to 2 sig. fig.)	2	1 mark for correct scientific notation 1 mark for correct to 2 sig. fig.

Qn	Solutions	Marks	Comments+Criteria
2	(a) (i) $2 - 3(f-5) - 12$ $= 2 - 3f + 15 - 12$ $= 5 - 3f$	1 1	
	(ii) $(h + 7j)(h - 4j)$ $= h^2 - 4hj + 7hj - 28j^2$ $= h^2 + 3hj - 28j^2$	1 1	
	(iii) $(-2m^5n^2)^3$ $= (-2)^3(m^5)^3(n^2)^3$ $= -8m^{15}n^6$	2	1 mark for $(-8)$ 1 mark for $m^{15}n^6$
b)	$2a - b = 5$ — (1) $a - 3b = 2$ — (2) $\times 2$		
	$2a - b = 5$ — (1) $-2a - 6b = 4$ — (2)'	1	
	$5b = 1$ $b = \frac{1}{5}$	1	
	$a - 3b = 2$ $a - 3(\frac{1}{5}) = 2 \therefore a = 2 + \frac{3}{5} = \frac{23}{5}$	1	

Qn	Solutions	Marks	Comments+Criteria
2	(c) (i) $2x - (4 - x) = (5 - x)$ $2x - 4 + x = 5 - x$ $3x - 4 = 5 - x$ $3x + x = 5 + 4$ $4x = 9$ $x = \frac{9}{4}$	1 1 1	
	(ii) $\frac{-5}{x-4} = \frac{2}{x-2}$ $-5(x-2) = 2(x-4)$ $-5x + 10 = 2x - 8$ $-5x - 2x = -8 - 10$ $-7x = -18$ $x = 2\frac{4}{7}$	$\frac{1}{2}$ $\frac{1}{2}$ 1 1	
d)	(i) $2m^2 - 11m - 6 = 0$ $(2m+1)(m-6) = 0$ $2m+1=0$   $m-6=0$ $2m=-1$   $m=6$ $m=-\frac{1}{2}$	1 1	$\frac{1}{2}$ for each correct value of m.



