1 (a) Simplify  $n^0$ 

(1)

(b) Simplify  $(3x^2y^5)^3$ 

**(2)** 

(c) Factorise fully  $2e^2 - 18$ 

(2)

(d) Make r the subject of  $m = \sqrt{\frac{6a + r}{5r}}$ 

**(4)** 

(Total for Question 1 is 9 marks)

(b) Express $x^2 - 10x + 40$ in the form $(x + a)^2 + b$ , where $a$ and $b$ are integers.	2 (a) Expand and simplify $(x + 4)(x - 2)(x + 1)$	
	(b) Express $x^2 - 10x + 40$ in the form $(x + a)^2 + b$ , where $a$	
(2) (Total for Question 2 is 5 marks)	(To	

3	(a)	Simplify	$(64p^9q^{12})$

(b) Write as a single fraction  $\frac{2}{3x} + \frac{4}{5x} - \frac{9}{10x}$ Give your answer in its simplest form.

(c) Expand and simplify $4x(x-5)(2x+3)$ Show your working clearly.	
	(2)
	(3)
	(Total for Question 3 is 7 marks)

4 Simplify fully $ \left( \frac{9t^4w^9}{18t^6w^{10}} \right)^{-2} $	
	(Total for Question 4 is 3 marks)
5 Expand and simplify $4x(3x + 1)(2x - 3)$ Show your working clearly.	(Total for Question 4 is 3 marks)
	(Total for Question 5 is 3 marks)

6	(a) Expand and simplify	5x(x+2)(3x-4)
		(3)
	(b) Simplify completely	$\left(\frac{16w^8}{y^{20}}\right)^{-\frac{3}{4}}$
		(3)
		(Total for Question 6 is 6 marks)

7	(a) Simplify fully $(8e^{15})^{\frac{2}{3}}$
	(b) Express $\left(\frac{y}{2}\right)^{-4}$ in the
	(c) Solve $\frac{4x-2}{3} - \frac{5-3}{4}$ Show clear algebraic v

the form  $ay^n$  where a and n are integers.

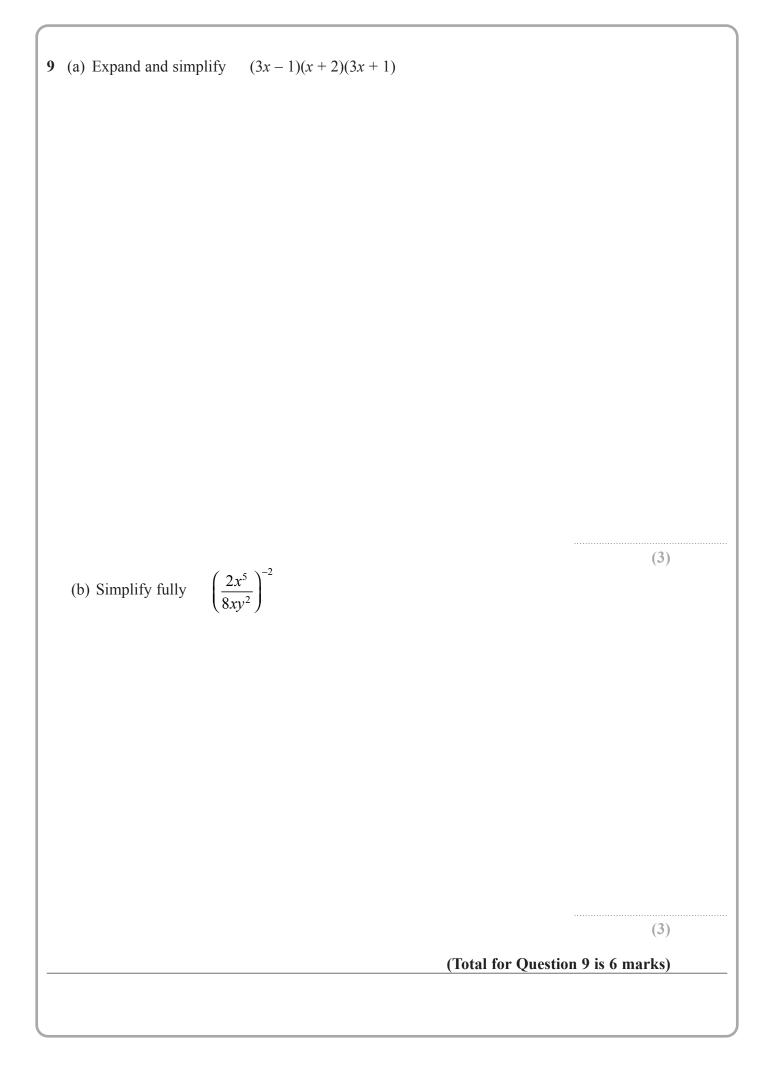
**(2)** 

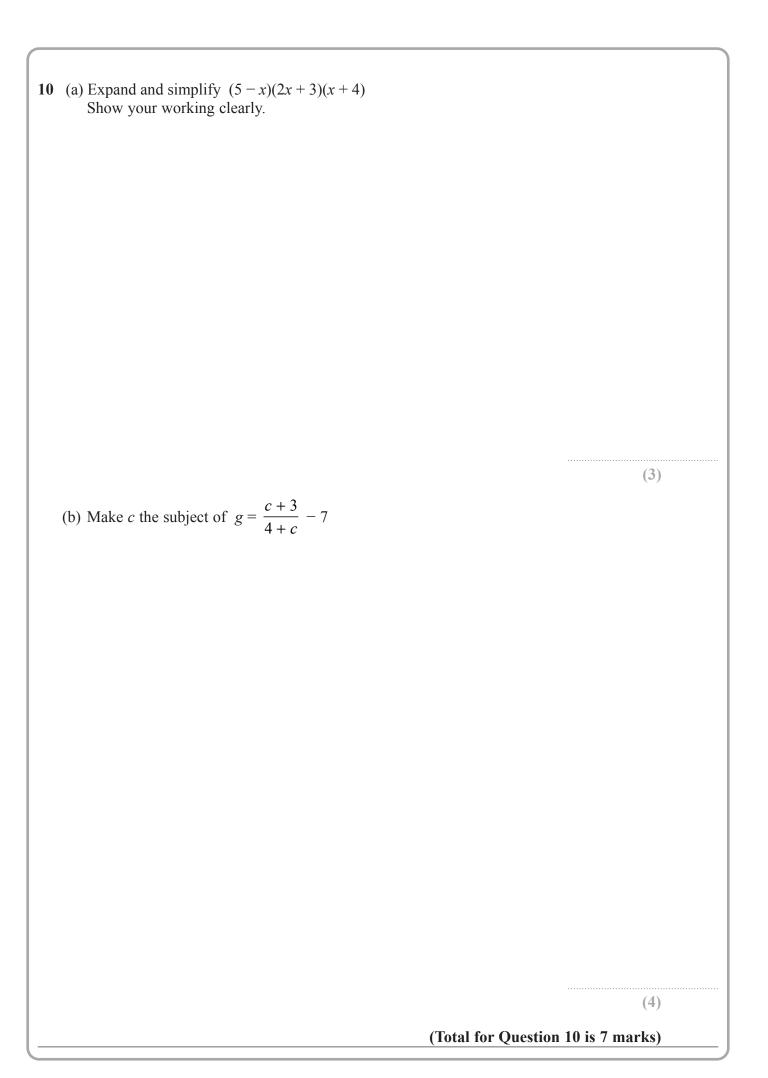
 $\frac{5-3x}{4}=6$ 

aic working.

(Total for Question 7 is 8 marks)

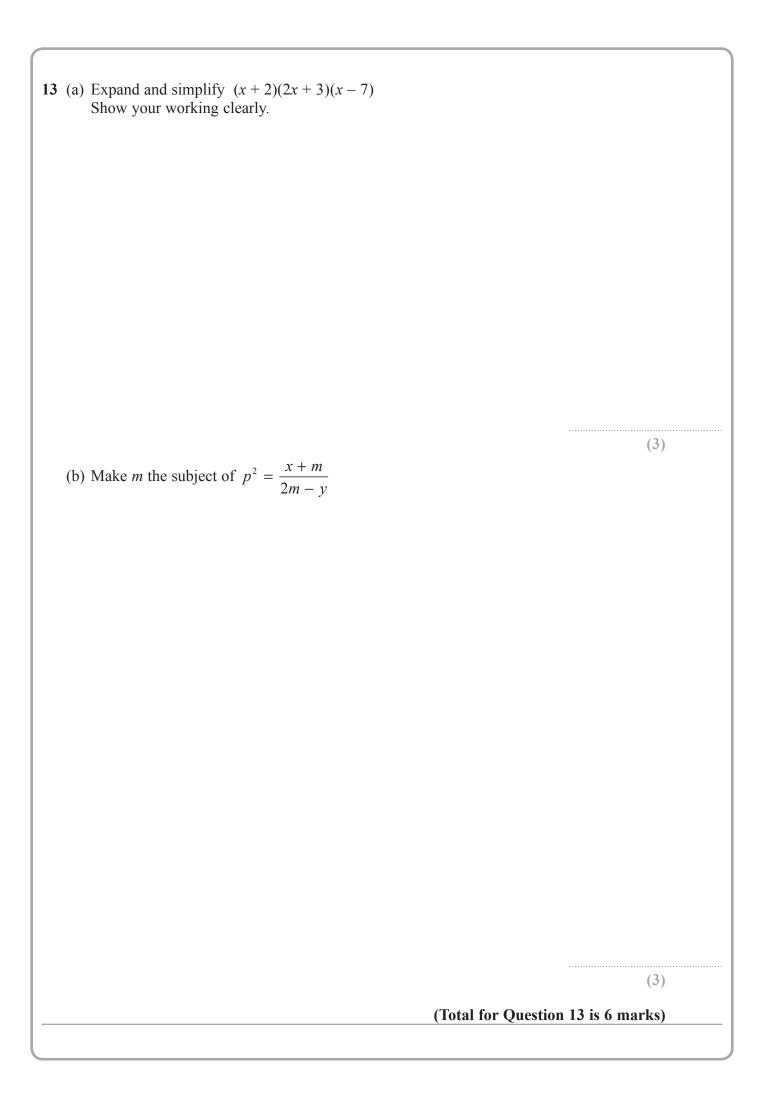
8	(a) Expand and simplify $(2x-1)(x+3)(x-5)$	
		(3)
	(b) Solve $3x^2 + 6x - 5 = 0$	
	Show your working clearly.  Give your solutions correct to 3 significant figures.	
		(3)
_		(Total for Question 8 is 6 marks)





11 Expand and simplify	(4x+1)(x-3)(5x+6)	
		(Total for Question 11 is 3 marks)

12 (a) Express $\frac{4}{x-2} - \frac{3}{x+1}$ as a single fraction. Give your answer in its simplest form.		
	(3)	
(b) Expand and simplify $2x(x-5)(x-3)$		
	(3)	
	(Total for Question 12 is 6 marks)	



**14** (a) Simplify  $(3x^2y^5)^4$ 

(2)

(b) Expand and simplify 4n(n-3)(n+5)

(2)

(c) Factorise  $4c^2 - 9d^2$ 

(1)

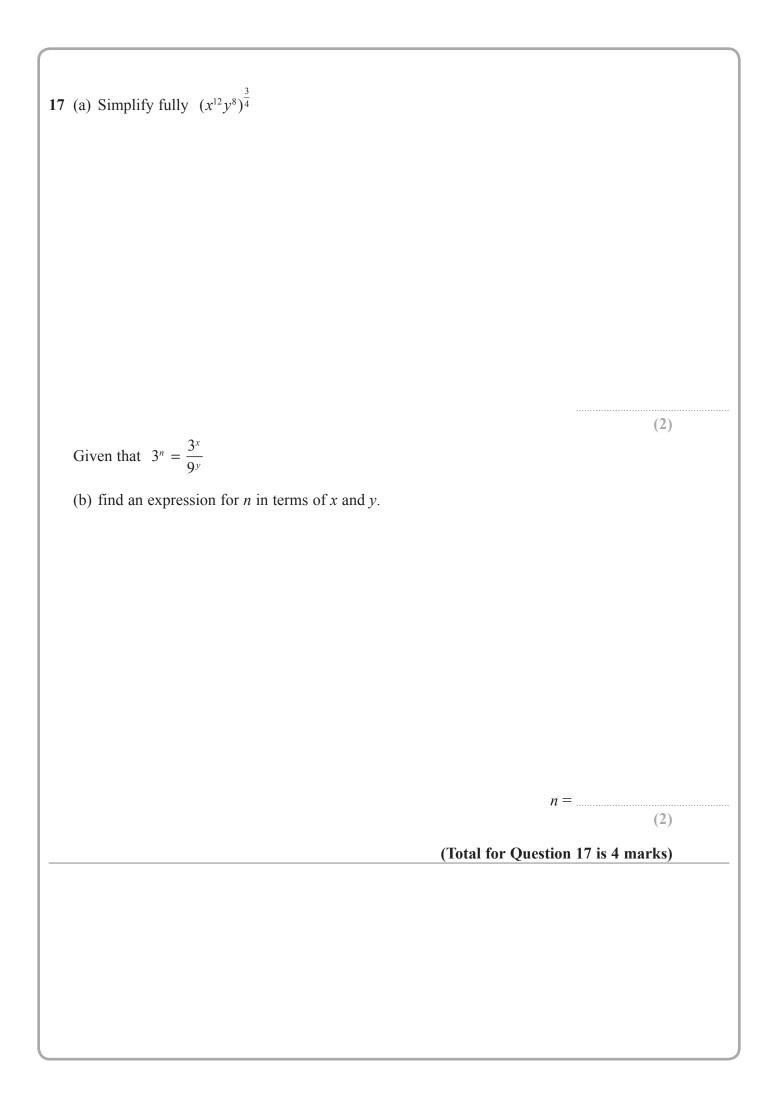
(d) Simplify fully  $\frac{x^2 - 7x + 12}{4x - x^2}$ 

15 (a) Expand and simplify $n(n-4)(3n+5)$		
		(2)
(b) Express		
$\frac{3}{x} + \frac{x+2}{2x} + \frac{1}{4}$		
$\frac{1}{x}$ $\frac{1}{2x}$ $\frac{1}{4}$		
as a single fraction in its simplest form.		
		(3)
	(Total for Questio	on 15 is 5 marks)



(b) Express  $\frac{1}{9x^2 - 25} - \frac{1}{6x + 10}$  as a single fraction in its simplest form.

(3)



<b>18</b> (a) Simplify $(2e^2 f^3)^3$	
(b) Expand and simplify $(3x - 4y)(x + 3y)$	(2)
$\frac{\sqrt{a} \times a}{a^{-2}}$ can be written in the form $a^k$ (c) Find the value of $k$ .	(2)
(d) Simplify $\frac{2^n - 1}{4^n - 1}$	$k = \dots (2)$
	(2) (Total for Question 18 is 8 marks)

19	(a)	Simplify	$(16e^{10}f^6)^2$

(b) Write 
$$\frac{2x+1}{4} + \frac{x-2}{3}$$
 as a single fraction in its simplest form.

(3)

Given that  $4^{k+3} = 16 \times 2^k$ 

(c) find the value of *k*. Show your working clearly.

k = .....

(Total for Question 19 is 9 marks)

20	(a)	Simplify	$8^2 \times \sqrt[3]{4^6}$
20	(a)	Simplify	$8^{-} \times \sqrt{4}$

Give your answer in the form  $2^a$  where a is an integer. Show each stage of your working clearly.

(3)

Given that  $n^{\left(-\frac{4}{5}\right)} = \left(\frac{1}{2}\right)^4$  where n > 0

(b) find the value of n.

*i* = .....

(Total for Question 20 is 7 marks)

21	(a)	Show that	$\left(6 + 2\sqrt{12}\right)^2 = 12\left(7 + 4\sqrt{3}\right)$
		Show each	stage of your working.

(b) Simplify fully 
$$\left(\frac{27a^{12}}{t^{15}}\right)^{-\frac{2}{3}}$$

(3)

(3)

(Total for Question 21 is 6 marks)

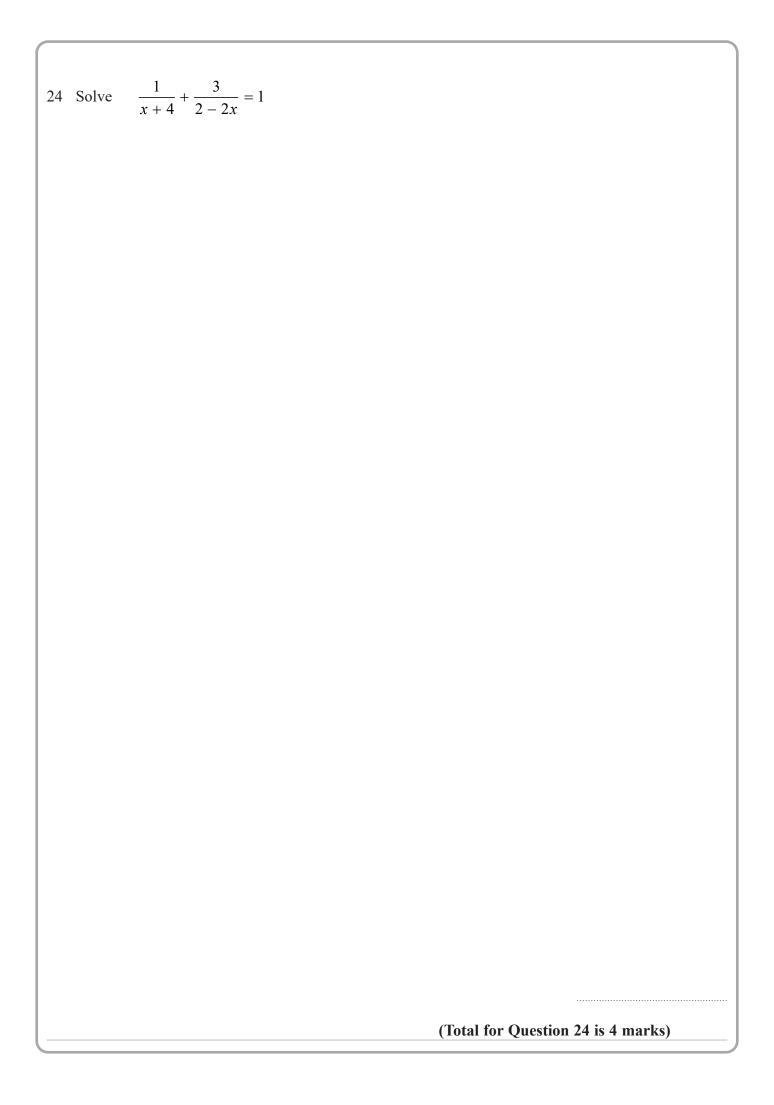




Solve 
$$\frac{1}{x} - \frac{1}{x+1} = 4$$

Give your answer in the form  $a \pm b\sqrt{2}$  where a and b are fractions.

(Total for Question 23 is 5 marks)



(a) (i) Write $x^2 - 8x + 3$ in the form $(x - a)^2 - b$ where a and b are integers.	
	(2)
(ii) Hence, write down the coordinates of the turning point on the graph of $y = x^2 - 8x + 3$	(-)
(	(1)
(b) Solve $7x^2 + 8x - 5 = 0$	
Give your solutions correct to 3 significant figures.	
	(3)
Alex has to find the solutions of the quadratic equation $3k^2 + 10k - 8 = 0$	(3)
Here is his working and answer.	
(3k-2)(k+4) = 0	
k = 2  or  k = -4	
(c) What mistake has Alex made?	
	(1)
(Total for Question 25 is	