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)** 

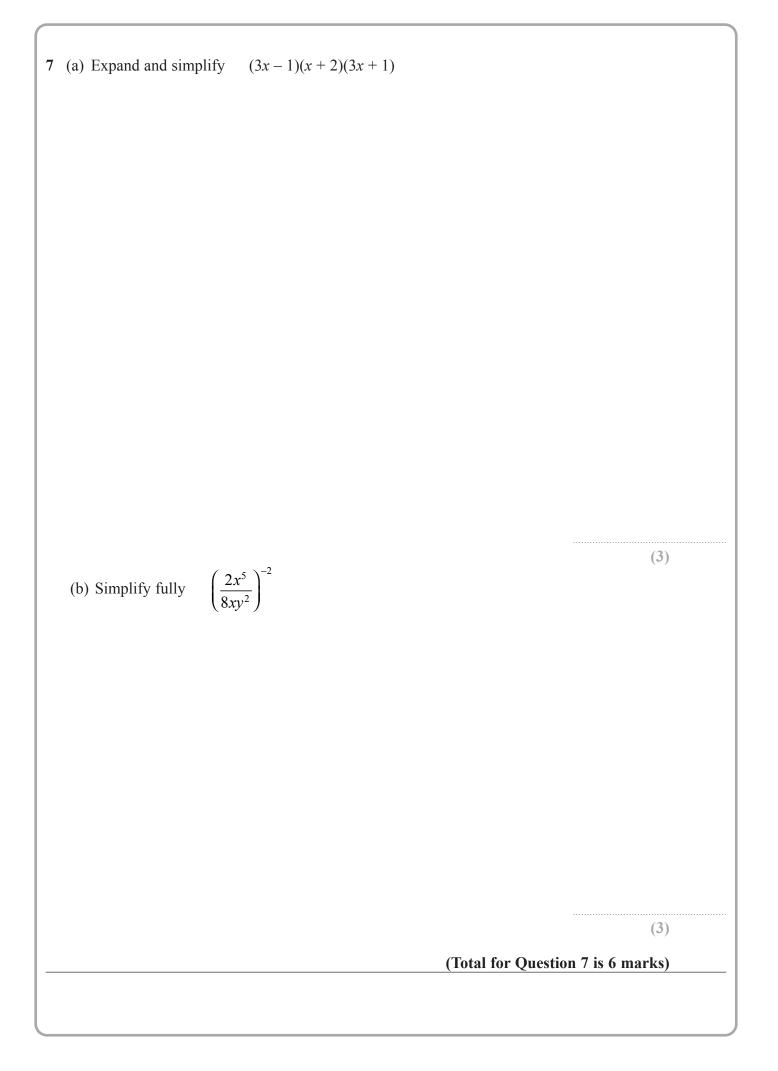
(Total for Question 1 is 9 marks)

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

5	(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 5 is 6 marks)

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



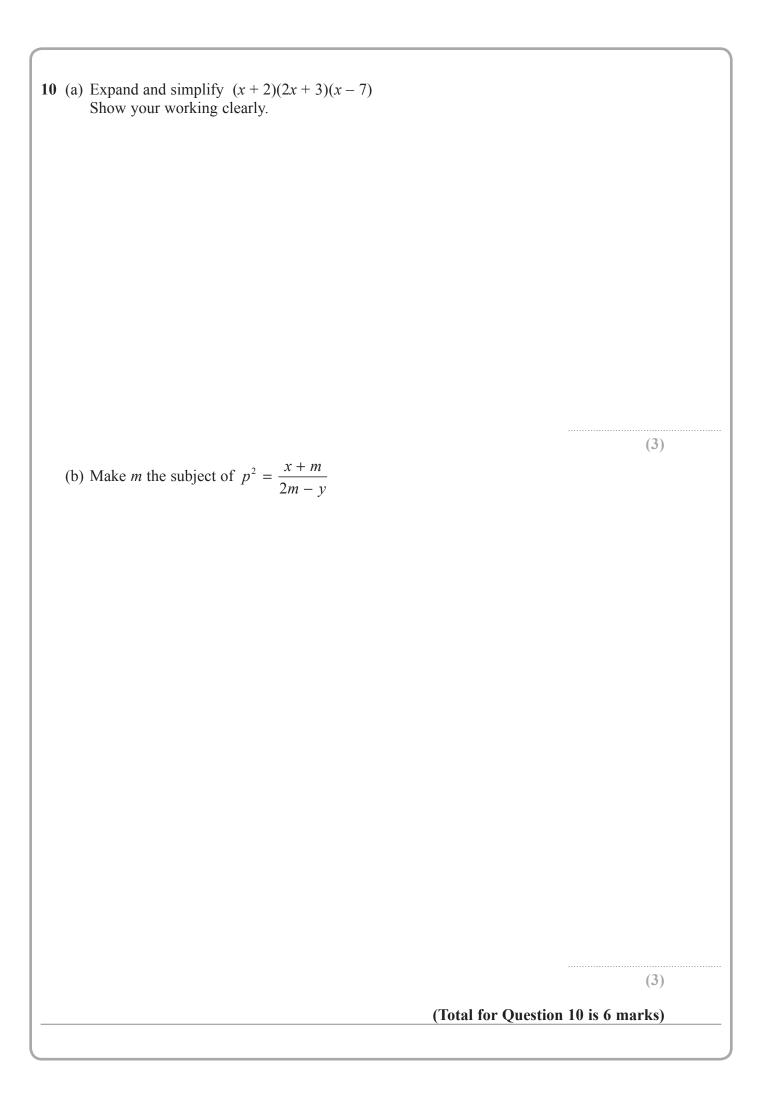
8	(a) Expand and simplify $(5-x)(2x+3)(x+4)$
	Show your working clearly.

(3)

(b) Make c the subject of 
$$g = \frac{c+3}{4+c} - 7$$

(4)

9	Expand and simplify	(4x+1)(x-3)(5x+6)	
			(Total for Overtion 0 is 2 montes)
			(Total for Question 9 is 3 marks)



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

(2)

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

(2)

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

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

(1)

(3)

(Total for Question 11 is 8 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)	

13 (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 13 is 8 marks)

			1
14	(a)	Simplify	$(16e^{10}f^6)^2$

(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 14 is 9 marks)

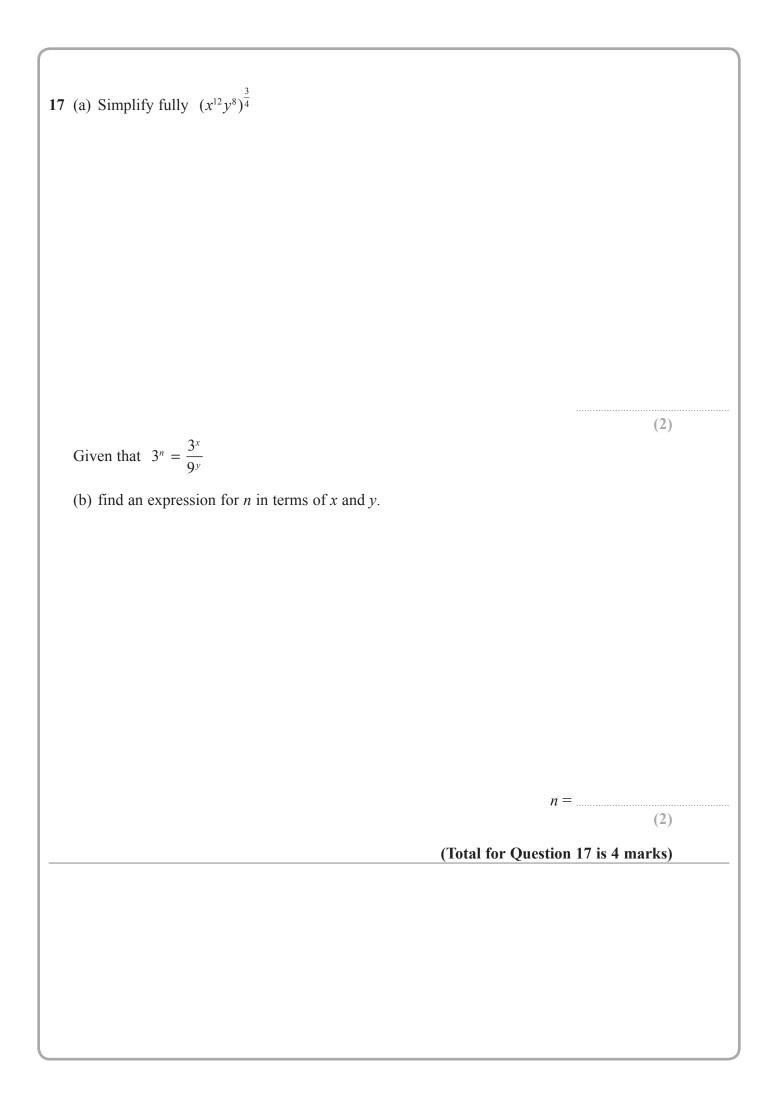
15 (a) Expand and simplify $n(n-4)(3n+5)$		
		(2)
(b) Express		
$\frac{3}{x} + \frac{x+2}{2x} + \frac{1}{4}$		
$\frac{1}{x}$ $\frac{1}{2}$ $\frac{1}{4}$		
as a single fraction in its simplest form.		
		(3)
	(Total for Questio	n 15 is 5 marks)



(2)

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

(3)



18	(a)	Simplify fully	$(8e^{15})$



(b) Express  $\left(\frac{y}{2}\right)^{-4}$  in the form  $ay^n$  where a and n are integers.

															(		2	)	)	)												

(c) Solve 
$$\frac{4x-2}{3} - \frac{5-3x}{4} = 6$$

Show clear algebraic working.

$$x =$$
 (4)

19	(a)	Simplify	$8^2 \times$	$\sqrt[3]{4^6}$
1)	(a)	Simping	0 ^	V -

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.

η = .....

(Total for Question 19 is 7 marks)

			3
<b>20</b>	(a)	Simplify	$(64p^9q^{12})^{\frac{1}{2}}$

(2)

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

.....

<b>21</b> (a)	Show that	$\left(6+2\sqrt{12}\right)^2$	$=12(7+4\sqrt{3}$
	Show each	stage of you	r working.

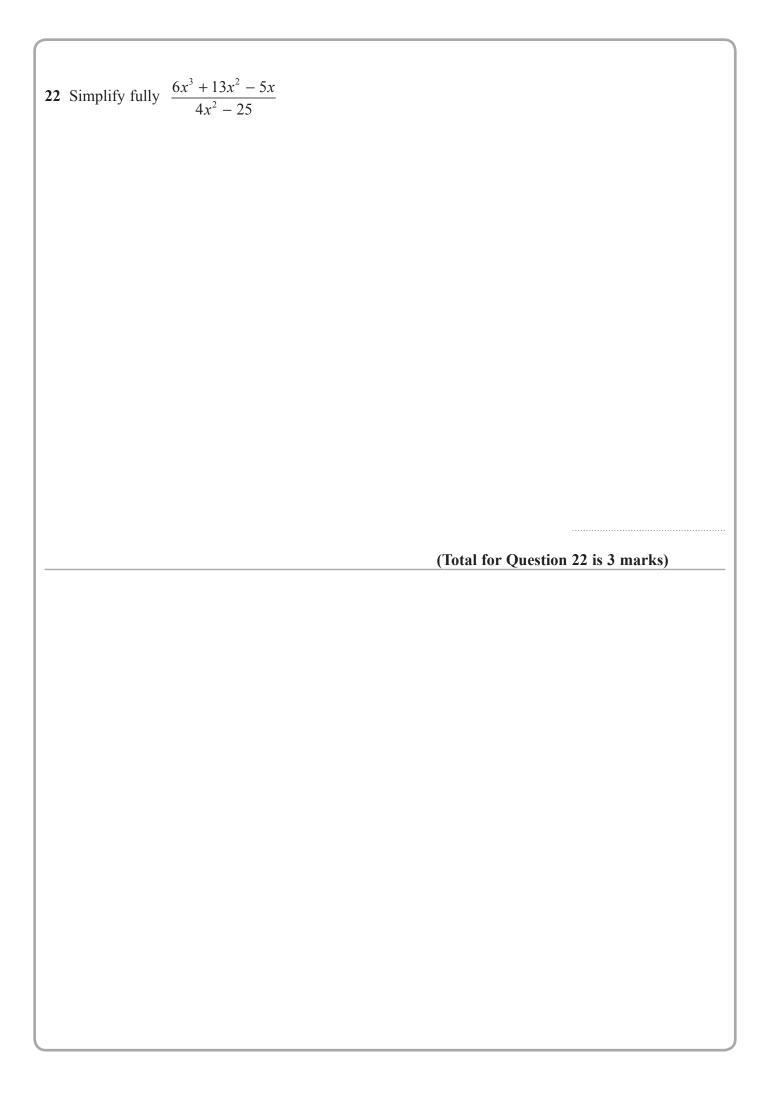
(b) Simplify fully 
$$\left(\frac{27a^{12}}{t^{15}}\right)^{-\frac{2}{3}}$$

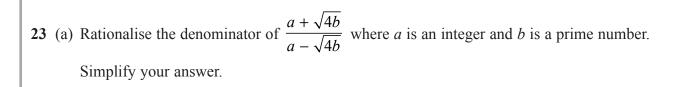
(3)

(3)

(Total for Question 19 is 6 marks)

(c) Expand and simplify $4x(x-5)(2x+3)$ Show your working clearly.	
	(3)
	(Total for Question 20 is 7 marks)





(b) Given that 
$$\left(\sqrt{\frac{y}{x}}\right)^{-5} = \frac{x^m}{y^m}$$
 where  $x \neq y$ 

find the value of m.

$$m =$$
 (1)

(Total for Question 23 is 4 marks)

	4
,	/

(a) Simplify fully 
$$\frac{10x^2 + 23x + 12}{4x^2 - 9}$$

$$2^{2y} \times 2^{3y+2} = \frac{8^{5y}}{4^n}$$

(b) Find an expression for *n* in terms of *y*. Show clear algebraic working and simplify your expression.

(4)

(Total for Question 24 is 7 marks)

1	_
,	-

$$\frac{18 \times \left(\sqrt{27}\right)^{4n+6}}{6 \times 9^{2n+8}} = 3^{x}$$

Express x in terms of nShow your working clearly and simplify your expression.

(Total for Question 25 is 3 marks)

26	Express each of $a$ , $b$ and $c$ in terms of $q$ so that		
		$q + 12x - qx^2$	
	can be written as $a - b(x - c)^2$		
			<i>a</i> =
			<i>b</i> =
			c =
		(Total for Ques	stion 26 is 4 marks)

**27** 
$$a = \frac{14}{3x - 7}$$
  $x = \frac{7}{4y - 3}$ 

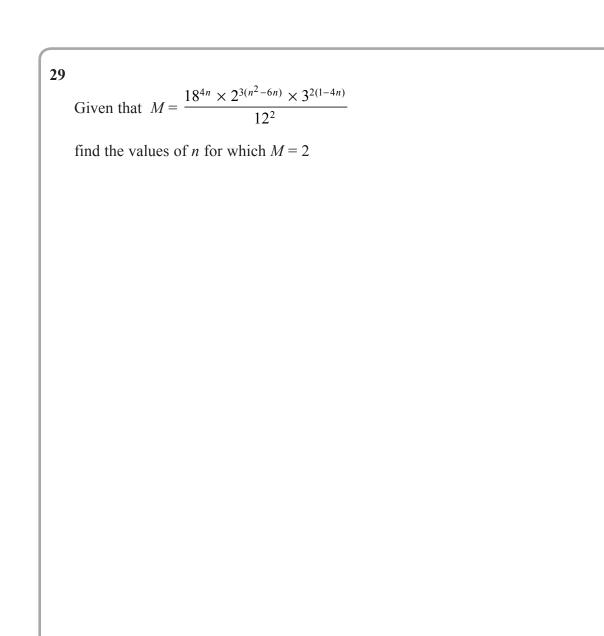
Express a in the form  $\frac{py+q}{ry+s}$  where p, q, r and s are integers.

Give your answer in its simplest form.

a =

(Total for Question 27 is 3 marks)





(Total for Question 29 is 5 marks)



$$\frac{1}{3x-2} \times \frac{9x^2-4}{3x^2-13x-10} - \frac{7}{x-1}$$

as a single fraction in its simplest form.

(Total for Question 30 is 5 marks)