TAFE ID	329428800	Result Slip No	S2519777
Student Name	Rachel Loveday	Date marked	*19/10/2021*

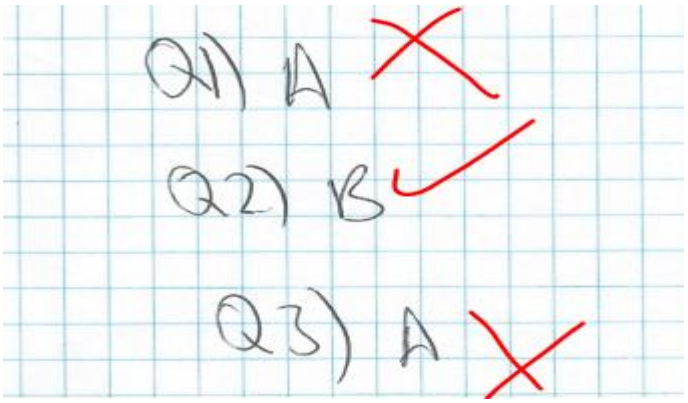
Student Feedback
Mathematics
Assignment 6492MD 3

Result	$\frac{12}{45} = 27\%$

	Max mark	mark	Teacher's Comments
Q1 to 3			
1	1	0	B (*Note: option B appears twice.*)
2	1	1	B
3	1	0	D

1 If $f(x) = (x-1)^2$ and $g(x) = x$, then an expression for $\frac{f(x)}{g(x)}$ is

A	$x-2-\frac{1}{x}$	B	$x-2+\frac{1}{x}$
~~BC~~	$x-1-\frac{1}{x}$	D	$x-1+\frac{1}{x}$



1: If $f(x) = (x-1)^2$ and $g(x) = x$,

$$\frac{f(x)}{g(x)} = \frac{(x-1)^2}{x} = \frac{x^2-2x+1}{x} = x-2+\frac{1}{x}$$

3: Differentiate x twice in terms of time to find the acceleration:
$x = 2t^2 - 3t + 1$
Differentiate x to find the velocity:

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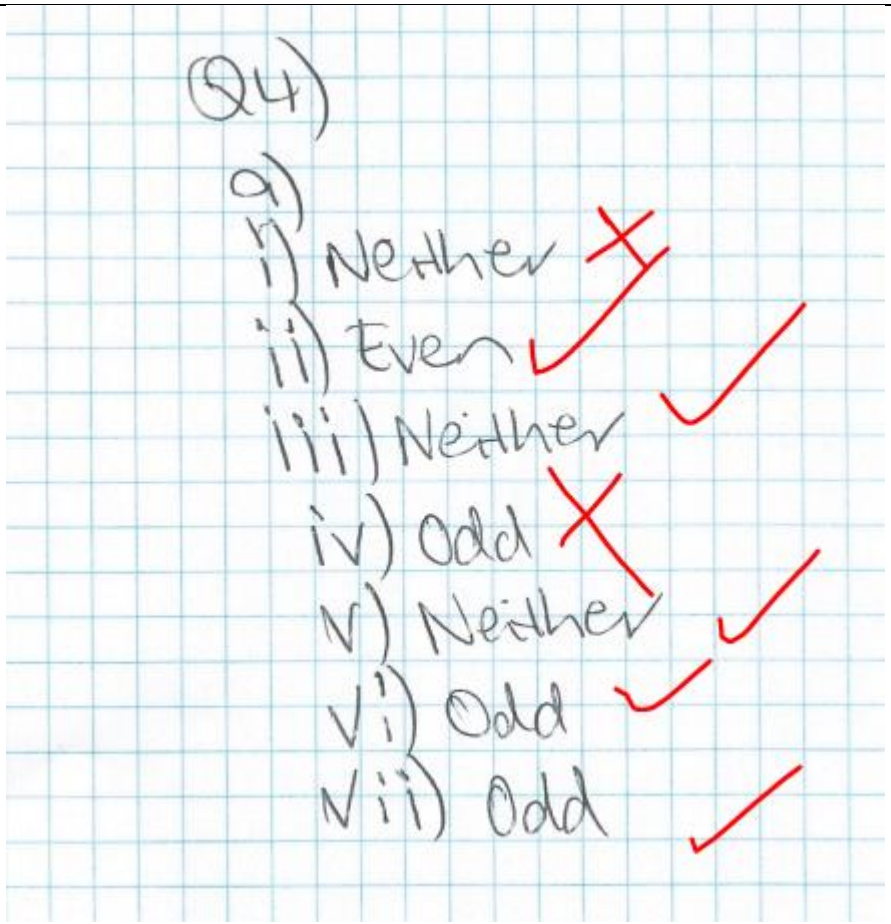
			$\frac{dx}{dt} = v = 4t - 3$ Differentiate again to find the acceleration: $\frac{dv}{dt} = a = 4\frac{m}{s^2}$
total	3	1	
Q4			
a	2	1	-0.5/error
			 *Note that question a should say relations, not functions as the circle is not a function.* ***EVEN*** relations are **symmetrical about the y-axis** or $f(-x) = f(x)$ for the whole domain. ***ODD*** relations are **symmetrical about the origin** or $f(-x) = -f(x)$.

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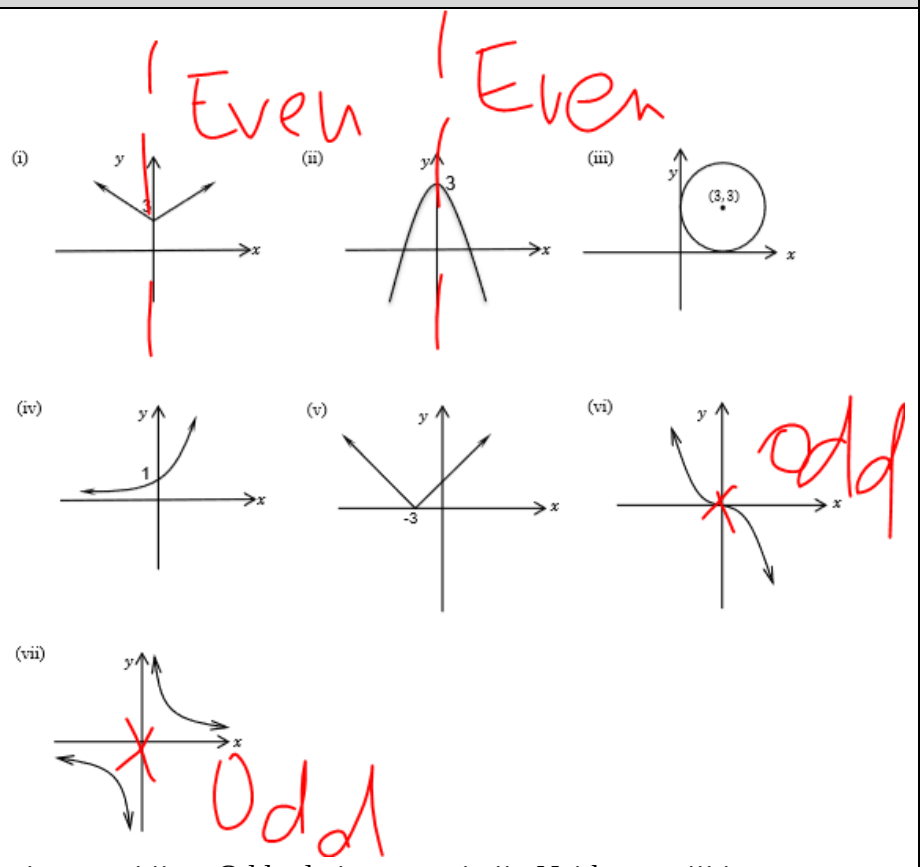
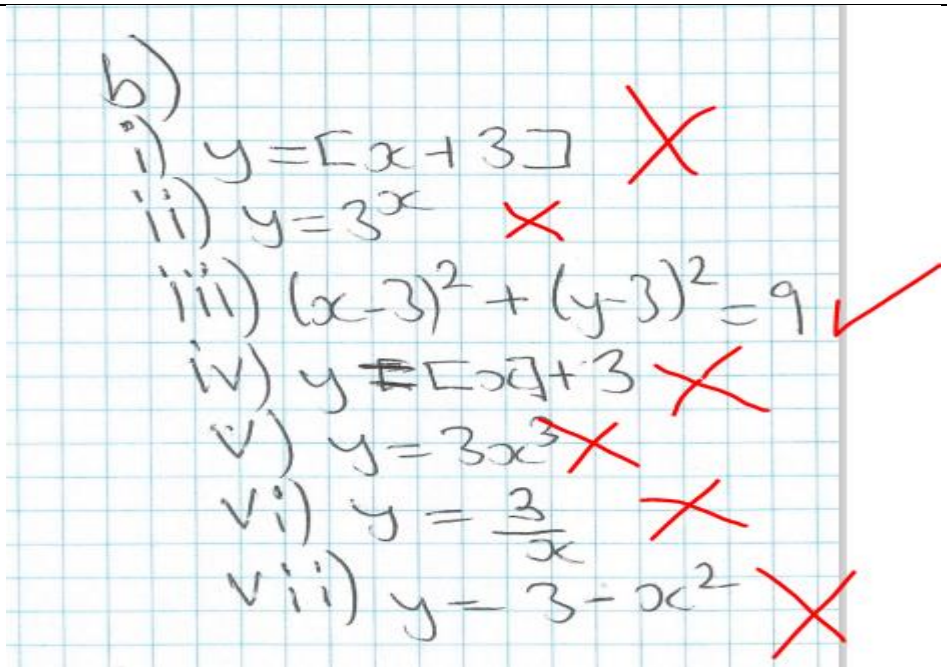
			 Even relations are i ii. Odd relations are vi vii. Neither are iii iv v.
b	3	0	-0.5/error
			

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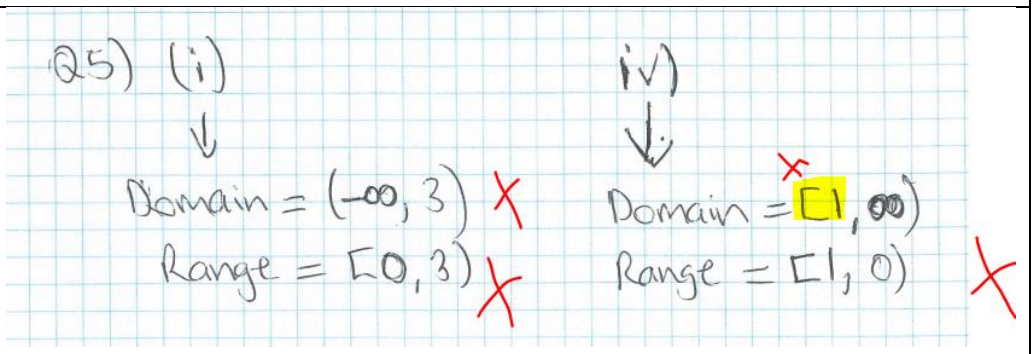
			i $y = \|x\| + 3$ ii $y = 3 - x^2$ iii $(x-3)^2 + (y-3)^2 = 9$ iv $y = 3^x$ v $y = \|x+3\|$ vi $y = -3x^3$ vii $y = \frac{3}{x}$
Q4 total	5	1	
Q5			
	2	0	−0.5/error
			 i $y = \|x\| + 3$ domain: $x \in \mathbb{R}$ *or* $(-\infty, \infty)$ range: $y \in \mathbb{R}: y \geq 3$ *or* $[3, \infty)$ ii $y = 3^x$ domain: $x \in \mathbb{R}$ *or* $(-\infty, \infty)$ range: $y \in \mathbb{R}: y > 0$ *or* $(0, \infty)$
Q5 total	2	0	
Q6			
a	3	2	1 each

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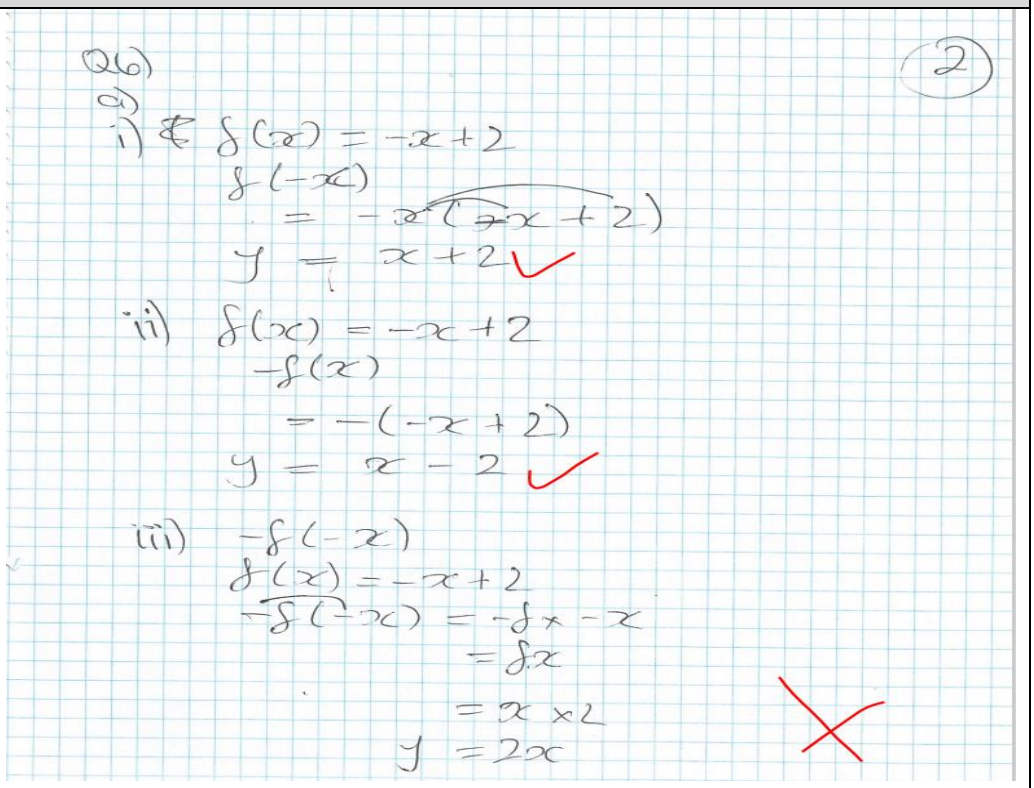
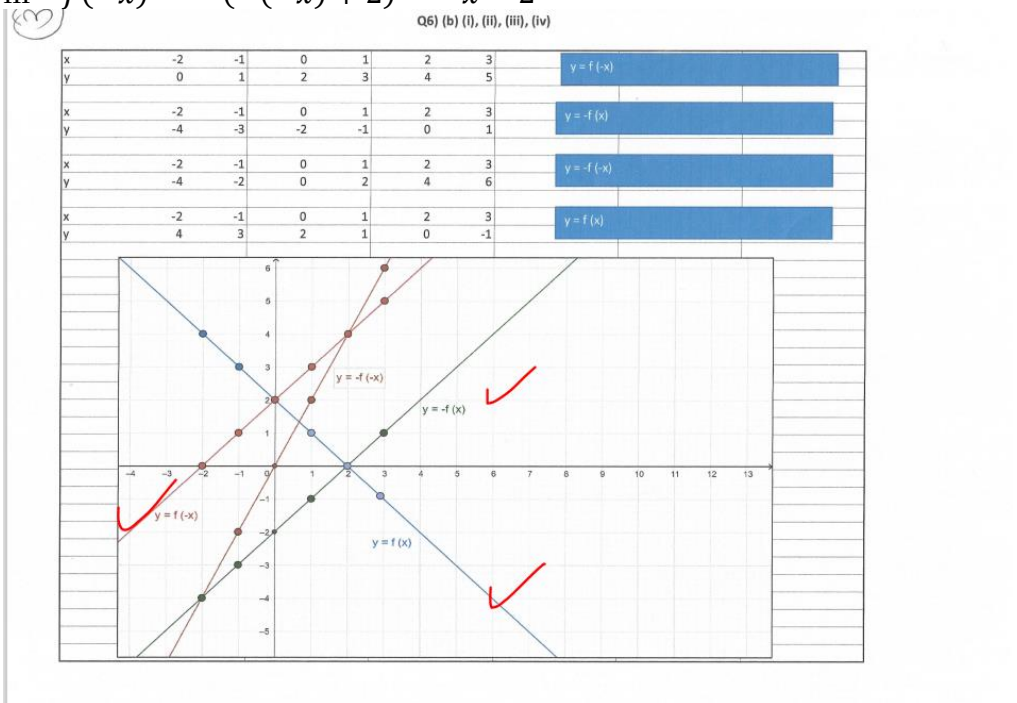
			 iii $-f(-x) = -(-(-x)+2) = -x-2$ 
b	4	3	1 each

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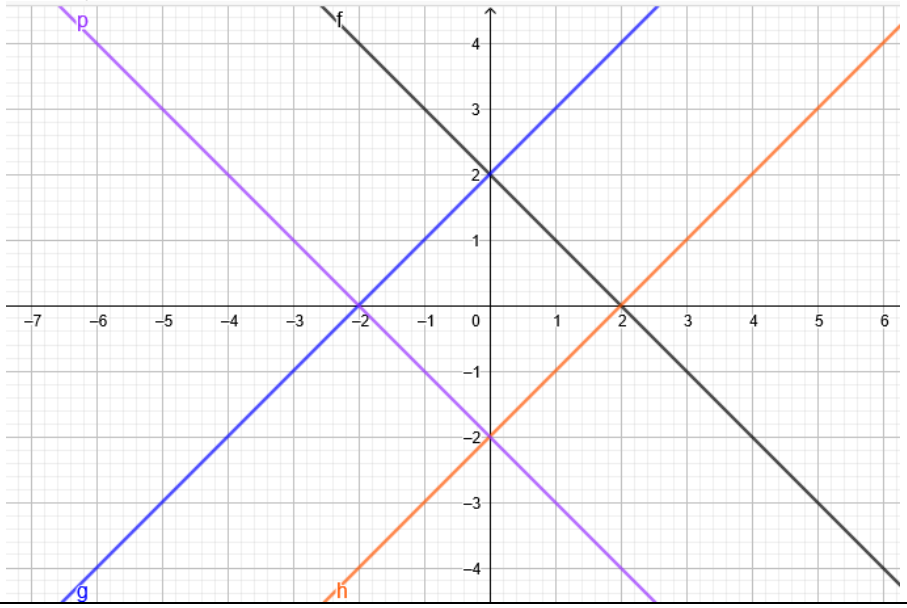
			$f(x) = -x + 2$ $g(x) = f(-x)$ $\rightarrow -(-x) + 2$ $h(x) = -f(x)$ $\rightarrow -(-x + 2)$ $p(x) = -f(-x)$ $\rightarrow -(-(-x) + 2)$ 
Q6 total	7	5	
Q7			
a	1	1	Correct answer Substitute 5 in t: $\frac{5}{5-1} = \frac{5}{4} = 1\frac{1}{4}$
b	1	1	Correct answer Substitute $x + 1$ into t: $\frac{x+1}{(x+1)-1} = \frac{x+1}{x}$ is correct or you may simplify and get $\frac{x+1}{x} = \frac{x}{x} + \frac{1}{x} = 1 + \frac{1}{x}$
c	1	0	Correct answer

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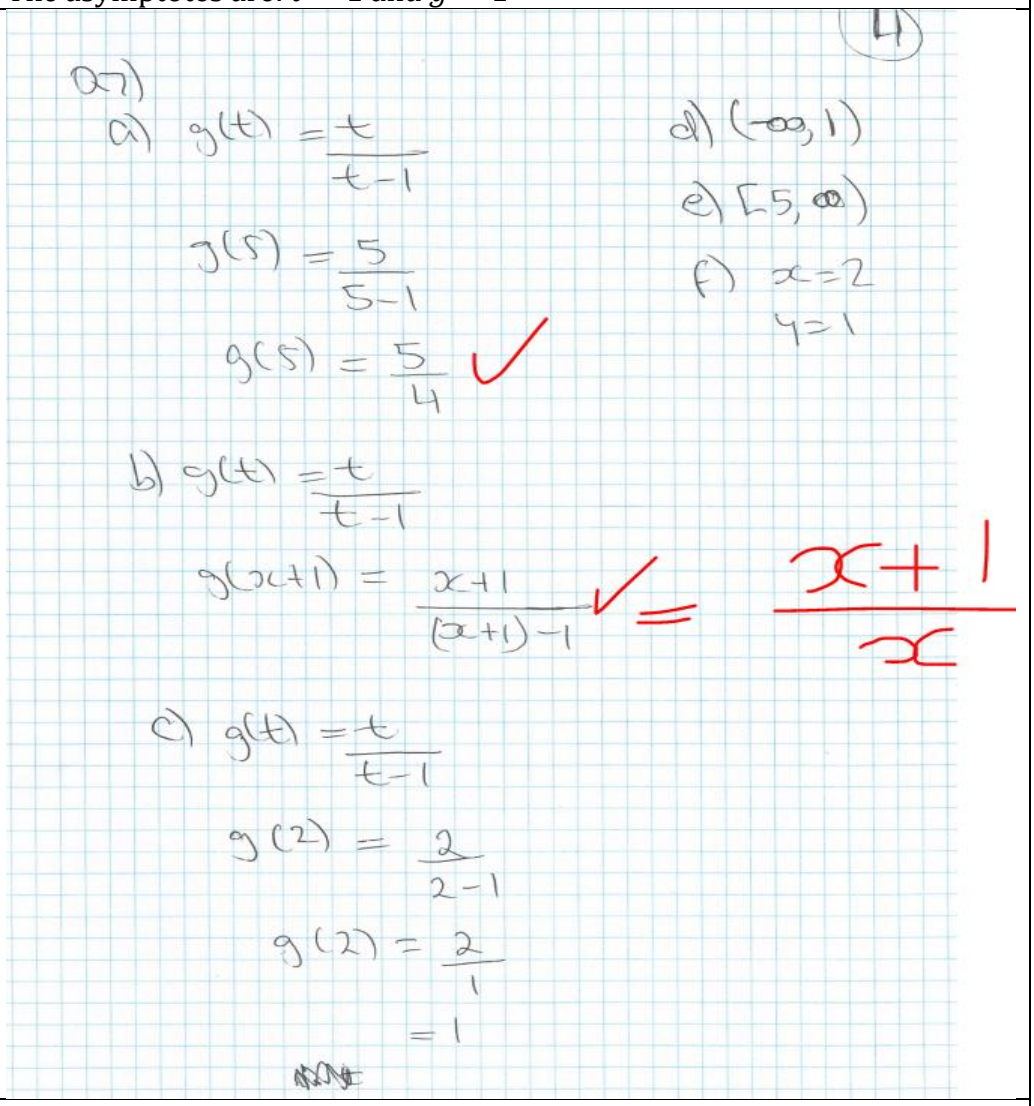
			$\frac{t}{t-1} = 2$ $t = 2(t-1)$ $t = 2t - 2$ $t = 2$
d	1	0	Correct domain $t \neq 1$ (The denominator cannot equal to zero since dividing by zero is not defined.)
e	1	0	Correct range $g \neq 1$ The range is all real g values except for 1.
f	1	0	Correct asymptotes $(-0.5/\text{error})$ The asymptotes are: $t = 1$ and $g = 1$
			
Q7 total	6	2	

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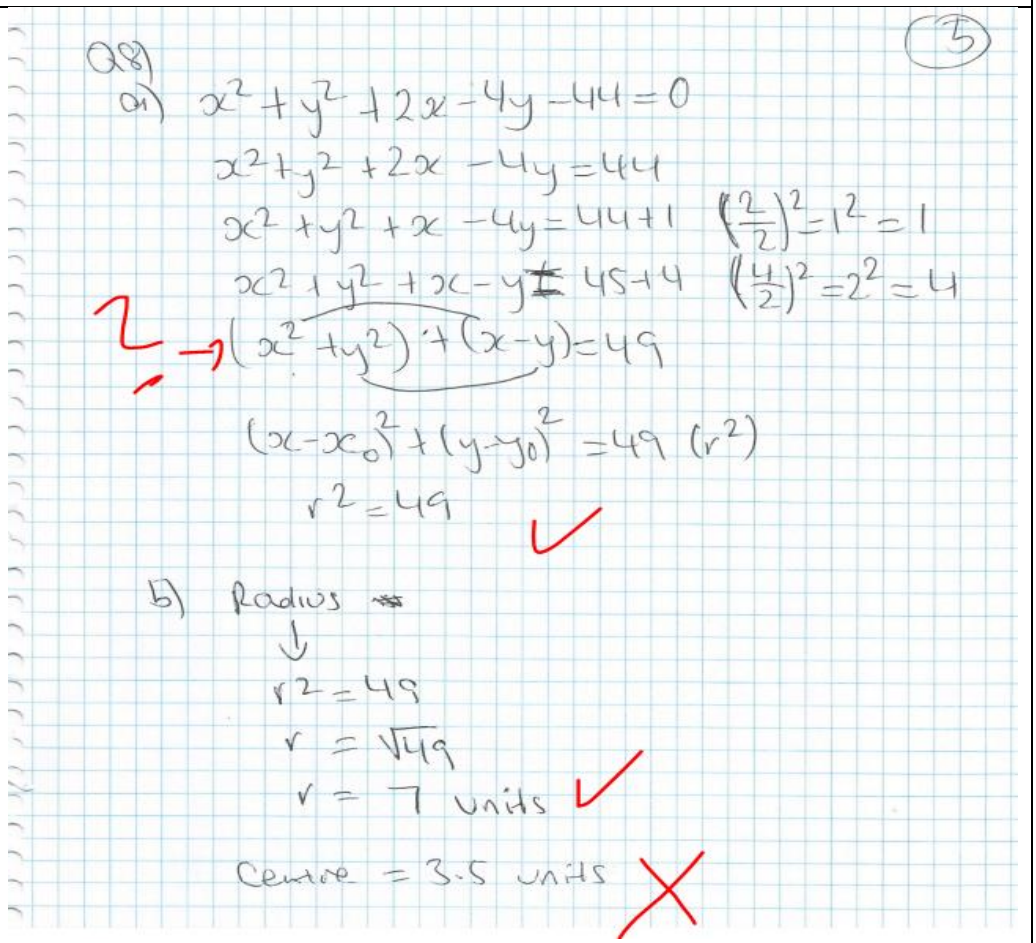
	Max mark	mark	Teacher's Comments
Q8			
a	2	0	1 for correct completing of squares, 1 for rearranging
b	2	1	Correct coordinates for centre and correct radius (1 each)
			 $(x+1)^2-1+(y-2)^2-4-44=0$ $(x+1)^2+(y-2)^2=49$ Centre is $(-1,2)$ and radius $r=7$
Q8 total	4	1	
Q9			
a	2	0	Correct coordinates for P and Q $(-0.5/\text{error})$
b	2	0	Correct gradient of PQ
c	1	0	Correct limit of gradient

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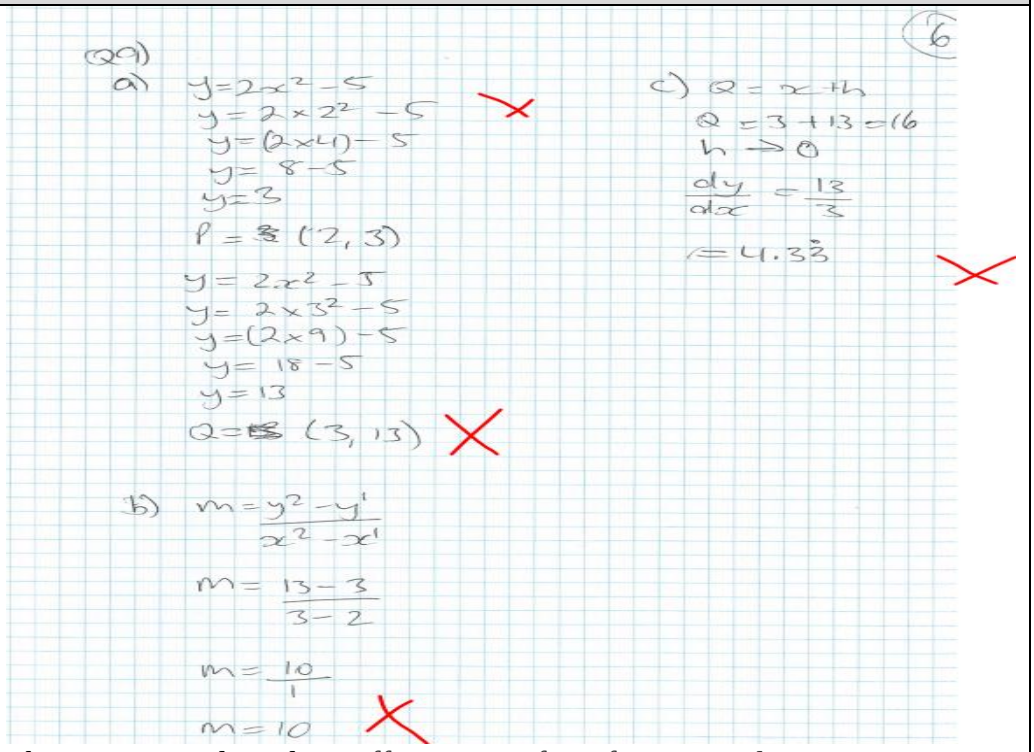
	Max mark	mark	Teacher's Comments
			 This topic is explained in Differentiation from first principles. a: $P\left(x,\ 2x^2-5\right)\quad,\quad Q\left(x+h,\ 2(x+h)^2-5\right)$ b: $m_{PQ}=\dfrac{2(x+h)^2-5-\left(2x^2-5\right)}{x+h-x}$ $=\dfrac{2\left(x^2+2xh+h^2\right)-5-2x^2+5}{h}$ $=\dfrac{4xh+2h^2}{h}$ $=\dfrac{2h(2x+h)}{h}$ $=2(2x+h)$ c: $\lim_{h\to 0}\left[2(2x+h)\right]=2(2x)$ $=4x$
Q9 total	5	0	

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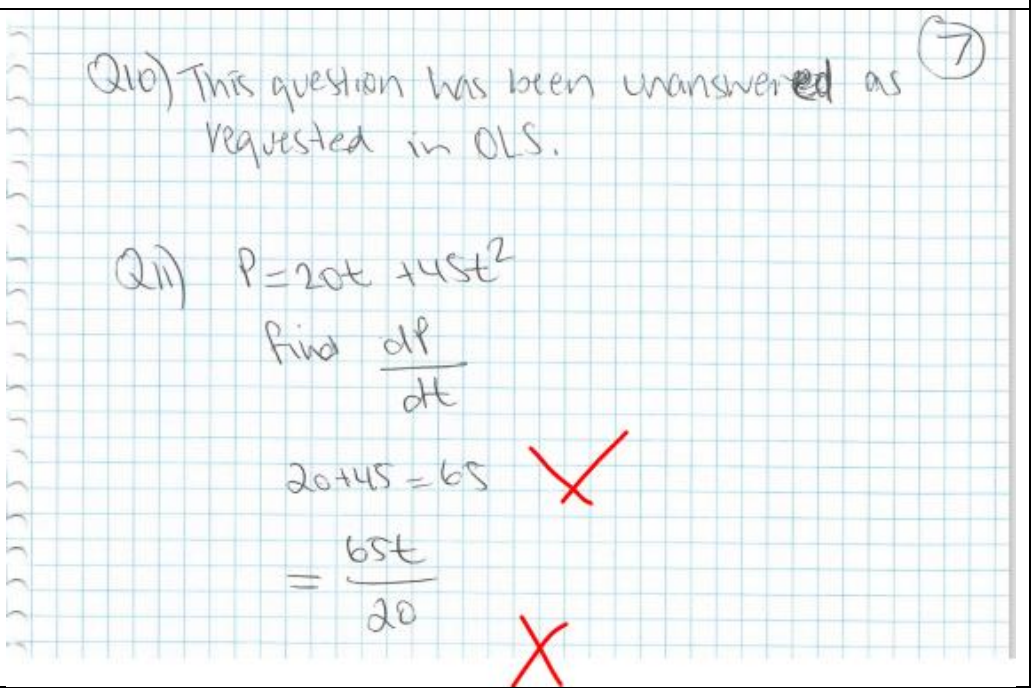
Q10 deleted question			
	~~2~~		~~Factorises the expression $\frac{3x-3}{x^2-1}$ and obtains correct limit~~
	~~2~~		~~Divides both numerator and denominator with x^2, and obtains correct limit~~
			$LHS = \lim_{x\to 1} \frac{3(x-1)}{(x-1)(x+1)}$ $= \lim_{x\to 1}\left(\frac{3}{x+1}\right)$ $= \frac{3}{2}$ $= 1\frac{1}{2}$
Q10 total	~~4~~		deleted
Q11			
	2	0	Correct differentiation of P with respect to r
			

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	Max mark	mark	Teacher's Comments
			436 MATHS IN FOCUS 11. Mathematics Extension 1 ISBN 9780170413299 **EXAMPLE 10** h Differentiate $S = 6r^2 - 12r$ with respect to r. h Differentiating with respect to r rather than x: $S = 6r^2 - 12r$ $\frac{dS}{dr} = 12r - 12$ As in the textbook example above, differentiate P with respect to t: $\frac{dP}{dt} = 20 + 90t$
Q11 total	2	0	
Q12			
	1	0	Rewrites *y* in index form
	2	0	Correct differentiation

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			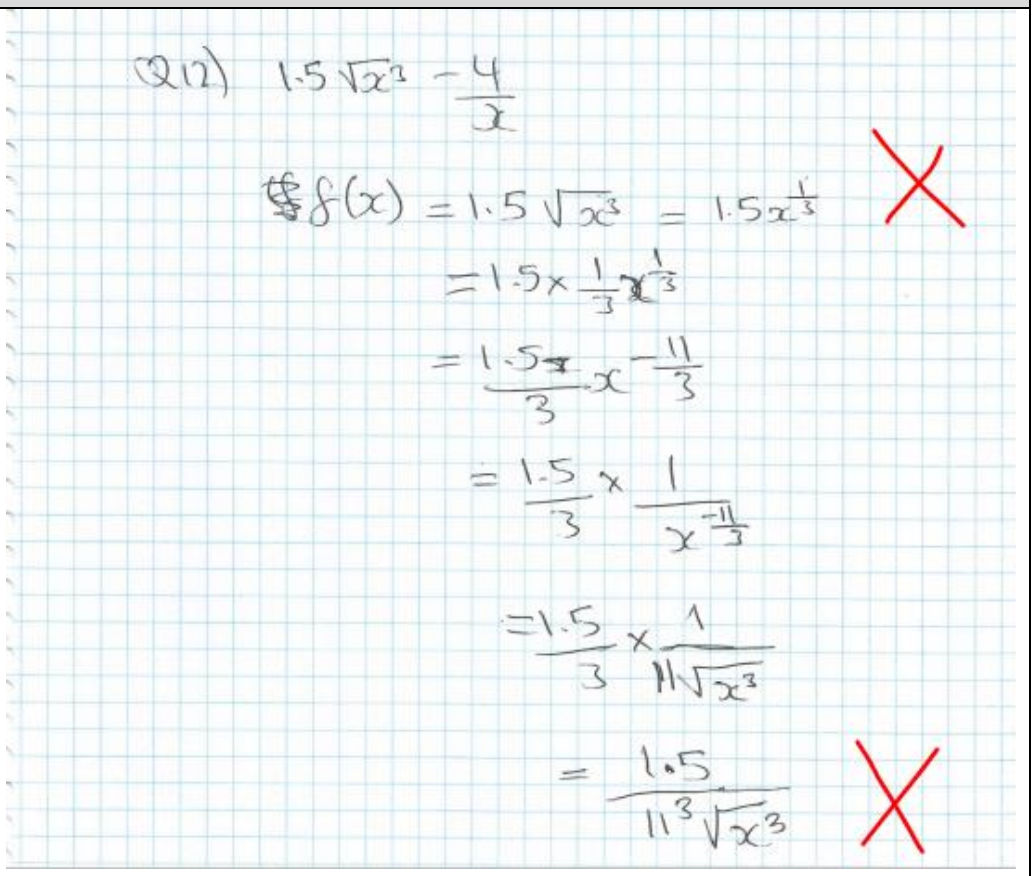 First, write both terms in the expression in index form, then apply the index rule of differentiation. In the textbook, these two topics cover what you need to know. Short methods of differentiation and Derivatives and indices. $\frac{d}{dx}\left(1.5\sqrt{x^3} - \frac{4}{x}\right) = \frac{d}{dx}\left(1.5x^{\frac{3}{2}} - 4x^{-1}\right)$ $= 2.25x^{\frac{1}{2}} + 4x^{-2}$ $= 2.25\sqrt{x} + \frac{4}{x^2}$
Q12 total	3	0	
Q13			
	2	0	Correct u' and v'

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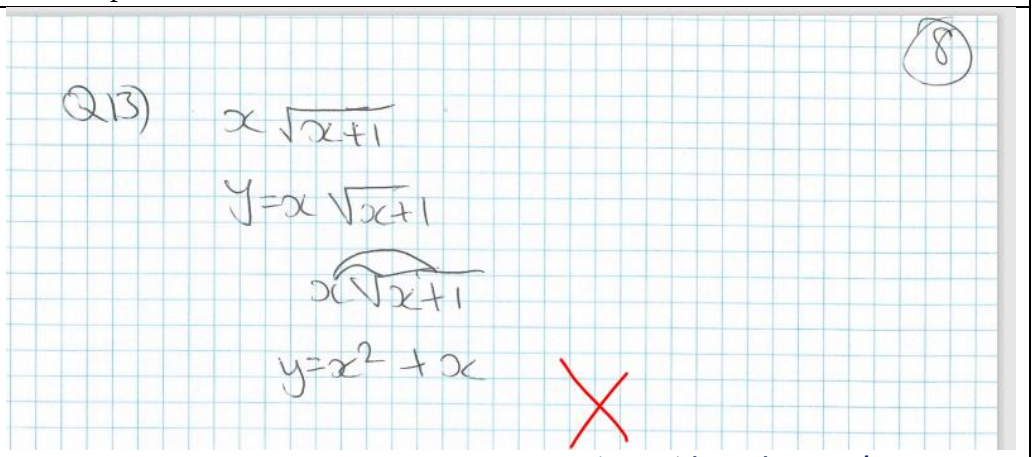
	2	0	Correct product rule
			 Rachel, you needed to apply the product rule $(u \times v)' = u'v + uv'$, where: $x = u$ and $v = \sqrt{x+1}$ $x' = 1$ $v' = \frac{1}{2\sqrt{x+1}}$ $\frac{d}{dx} x\sqrt{x+1} = \frac{d}{dx} x(x+1)^{\frac{1}{2}}$ $= x.\frac{1}{2}(x+1)^{-\frac{1}{2}} + (x+1)^{\frac{1}{2}}.1$ $= \frac{x}{2\sqrt{x+1}} + \frac{\sqrt{x+1}}{1}$ $= \frac{x+2(x+1)}{2\sqrt{x+1}}$ $= \frac{3x+2}{2\sqrt{x+1}}$
Q13 total	4	0	
Q14			
	1	0	Correct u' and v'
	3	2	Correct quotient rule

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			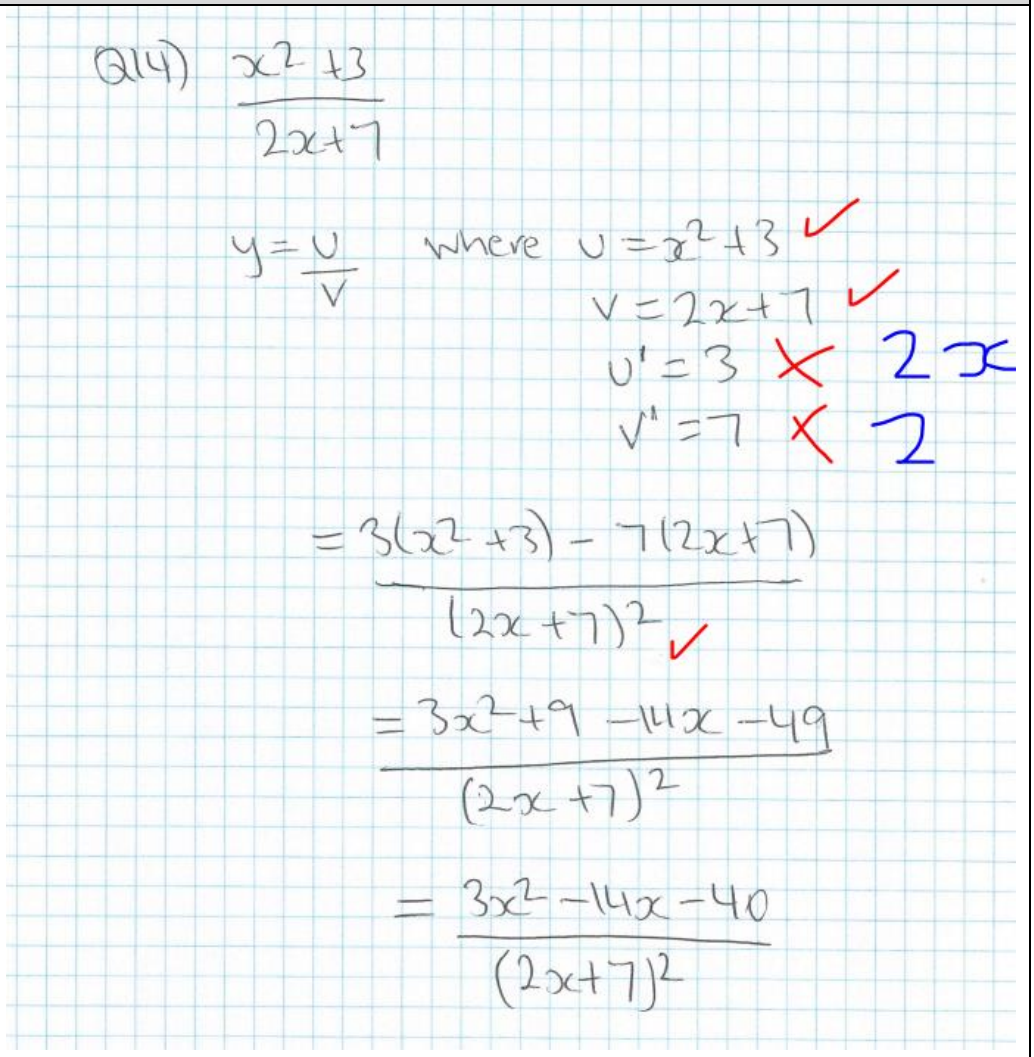

Q14) $\frac{x^2+3}{2x+7}$

$y = \frac{u}{v}$ where $u = x^2+3$ ✓

$v = 2x+7$ ✓

$u' = 3$ ✗ $2x$

$v' = 7$ ✗ 2

$= \frac{3(x^2+3) - 7(2x+7)}{(2x+7)^2}$ ✓

$= \frac{3x^2+9-14x-49}{(2x+7)^2}$

$= \frac{3x^2-14x-40}{(2x+7)^2}$

Apply the quotient rule:

$$\left(\frac{u}{v}\right)' = \frac{u'v - uv'}{v^2}$$

$$\frac{d}{dx}\left(\frac{x^2+3}{2x+7}\right) = \frac{(2x+7).2x - (x^2+3).2}{(2x+7)^2}$$

$$= \frac{4x^2+14x-2x^2-6}{(2x+7)^2}$$

$$= \frac{2x^2+14x-6}{(2x+7)^2}$$

Q14 total	4	2	

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Teacher's Comment

Rachel,

The assignment was based on Further Functions and Introduction to Calculus Chapters. Calculus is a foundation for the all the calculus-based topics.

Regards,

Anna Fazekas
Maths Teacher