$\frac{Grade\ 12-Book\ B}{(First\ edition-CAPS)}$

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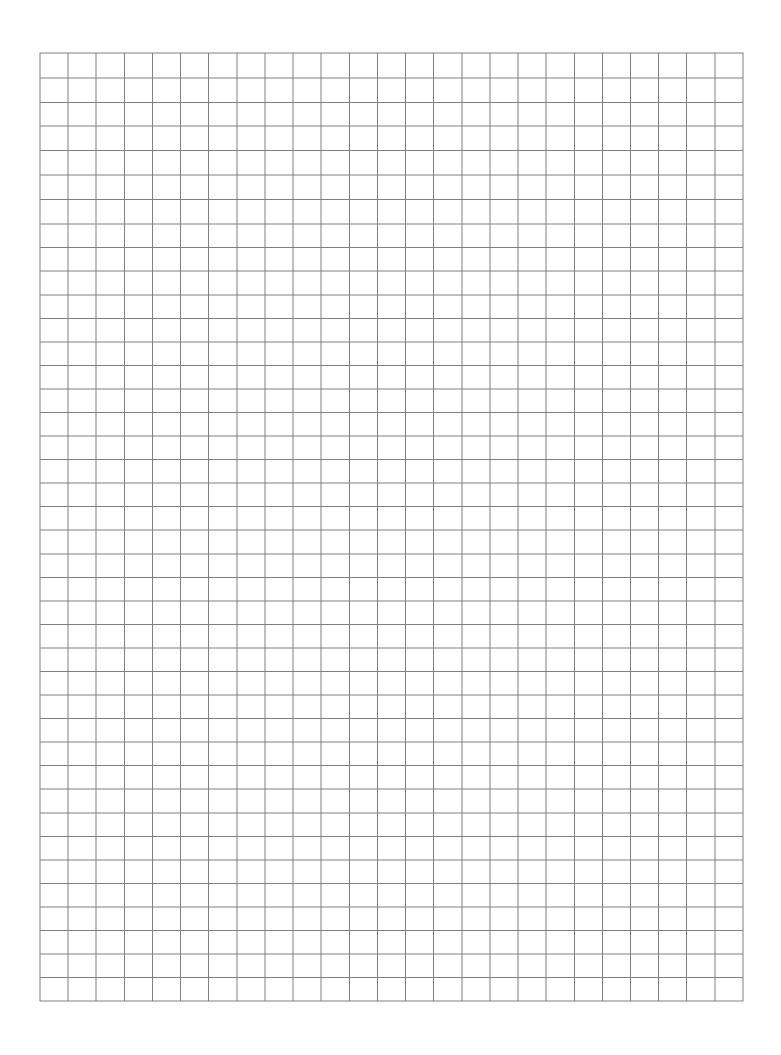
WITH SPECIAL THANKS AND ACKNOWLEDGMENT TO THE DEPARTMENT OF EDUCATION FOR THE USE OF EXTRACTS FROM OLD PAPERS.

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Also visit <u>www.abcmathsandscience.co.za</u> for extra exercise, tests and exam papers.

REVISION FROM PAST PAPERS:

E	kerc18	se A: Date:	
(1)		Use the definition to differentiate $f(x) = 1 - 3x^2$. (Use first principles.)	(4)
	(b)	Calculate $D_x \left[4 - \frac{4}{x^3} - \frac{1}{x^4} \right]$	(3)
	(c)	Determine $\frac{dy}{dx}$ if $y = (1 + \sqrt{x})^2$	(3)
(2)	(a)	Given: $g(x) = (x - 6)(x - 3)(x + 2)$ Calculate the y-intercept of g.	(1)
	(b)	Write down the x -intercepts of g .	(2)

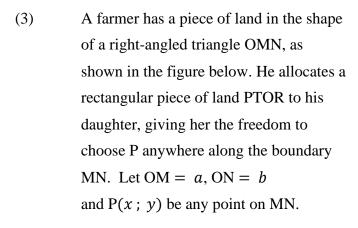


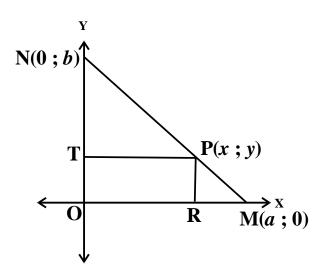
(c)	Determine	the	turning	points	of	g.
` /				1		0

(6)

(d) Sketch the graph of
$$g$$
.

(4)





(a)	Determine an	equation	of MN i	in terms	of a and b
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(2)

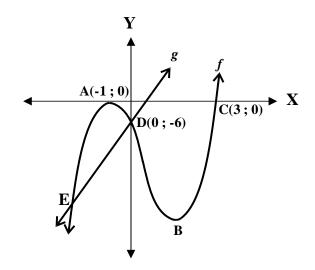
Evere	sa R. Data	
	Se B: Date: Determine $f'(x)$ from first principles if $f(x) = 9 - x^2$	
Exerci		
	Determine $f'(x)$ from first principles if $f(x) = 9 - x^2$	

 	 · · · · · · · · · · · · · · · · · · ·

\dots dy \cdot	$8 - 3x^6$		
(ii) $\frac{dy}{dx}$ if $y =$	0.45		

(2) The graphs of g(x) = 6x - 6 and $f(x) = ax^3 + bx^2 + cx + d$ are sketched alongside. A(-1; 0) and C(3; 0) are the *x*-intercepts of *f*. The graph of *f* has turning points at A and B. D(0; -6) is the *y*-intercept of *f*. E and D are the points of intersection

of the graphs of f and g.



(4)

(5)

(a) Show that a = 2; b = -2; c = -10 and d = -6. (5)

(b) Calculate the coordinates of the turning point B.

(c)	h(x) is the vertical distance between $f(x)$ and $g(x)$, that is, $h(x) = f(x) - g(x)$. Calculate x such that $h(x)$ is a maximum, where $x < 0$.	(5
	The tangent to the curve of $g(x) = 2x^3 + px^2 + qx - 7$ at $x = 1$ has	
(a)	the equation of $y = 5x - 8$. Show that (1; -3) is the point of contact of the tangent to the graph.	(
(b)	Hence or otherwise, calculate the values of p and q .	(
*	A cubic function f has the following properties: $f\left(\frac{1}{2}\right) = f(3) = f(-1) = 0$,
*	$f'(2) = f'\left(-\frac{1}{3}\right) = 0$	
*	f decreases for $x \in \left[-\frac{1}{3}; 2\right]$ Draw a possible sketch graph of f , clearly indicating the x -coordinates of the turning	
	points and ALL the x -intercepts.	

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Date:_____

(1) (a) Determine f'(x) from first principles if $f(x) = 2x^2 - 5$

		(5)

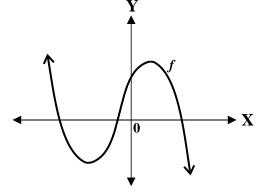
(b) Evaluate:

 $\frac{dy}{dx} \text{ if } y = x^{-4} + 2x^3 - \frac{x}{5} \tag{3}$

- (c) Given: $g(x) = \frac{x^2 + x 2}{x 1}$ (i) Calculate g'(x) for $x \neq 1$. (2)
 - (ii) Explain why it is not possible to determine g'(1). (1)
- (2) The graph of the function $f(x) = -x^3 x^2 + 16x + 16$ Y
 - (a) Calculate the *x*-coordinates of the turning. (4)

is sketched alongside.





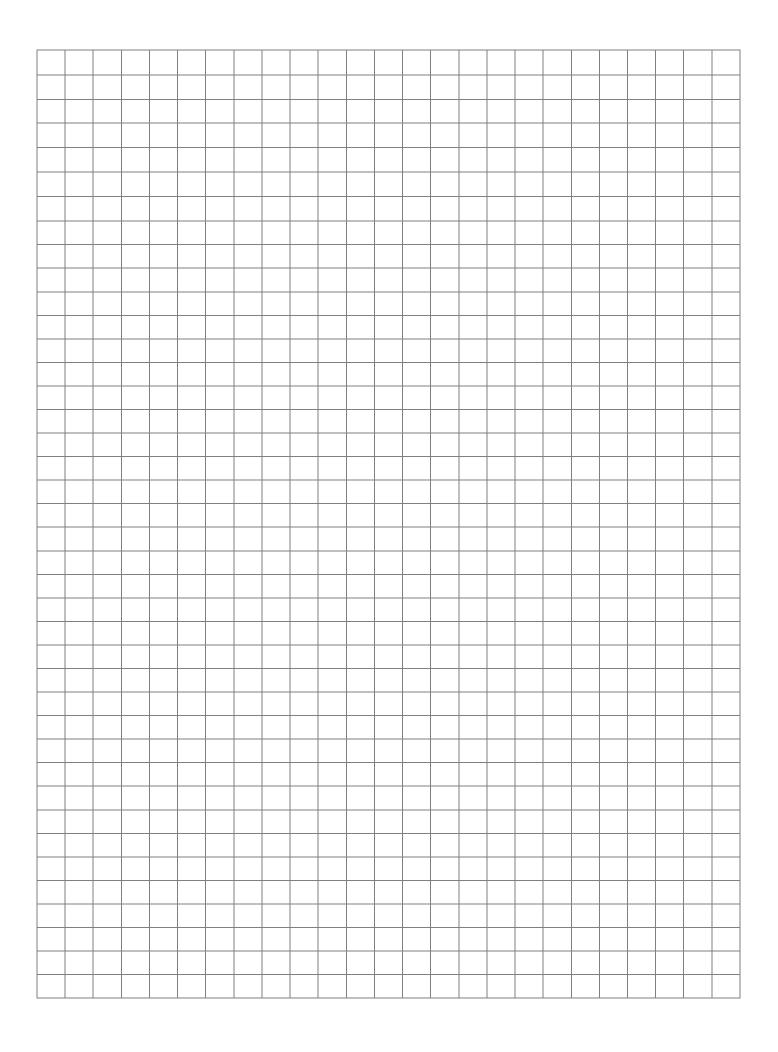
	(b)	Calculate the x -coordinate of the point at which $f'(x)$ is a maximum.	(3 - -
(3)	(a)	Consider the graph of $g(x) = -2x^2 - 9x + 5$. Determine the equation of the tangent to the graph of g at $x = -1$.	(4)
			_ _ _
	4.)		
	(b)	For which values of q will the line $y = -5x + q$ not intersect the parabola?	(3) - -
			- - -
(4)		Given: $h(x) = 4x^3 + 5x$ Explain whether it is possible to draw a tangent to the graph of h that has a negative gradient. Show ALL your calculations.	(3)
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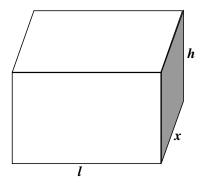
(5)	A particle moves along a straight line. The distance, s (in metres) of the particle from a fixed point on the line at time t seconds ($t \ge 0$) is given by $s(t) = 2t^2 - 18t + 45$.	
(a)		(3)
(b)	Determine the rate at which the velocity of the particle is changing at <i>t</i> seconds.	(1)
(c)	After how many seconds will the particle be closest to the fixed point?	(2)
<u>Exerci</u>	se D: Date:	_
(1) (a)	Use the definition of the derivative (first principles) to determine $f'(x)$ if $f(x) = 2x^2$.	(5)
		- -
		- -
		-
(b)	Determine $\frac{dy}{dx}$ if $y = \frac{2\sqrt{x} + 1}{x^2}$	(4)
		- -
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(c)	Calculate the values of a and b if $f(x) = ax^2 + bx + 5$ has a tangent at $x = -1$	
	which is defined by the equation $y = -7x + 3$.	
	Given: $f(x) = -x^3 - x^2 + x + 10$	
(a)	Write down the coordinates of the y-intercept of f .	
	• • •	
(b)	Show that $(2; 0)$ is the only x-intercept of f .	
(c)	Calculate the coordinates of the turning points of f .	
		



- (d) Sketch the graph of f. Show all intercepts with the axes and all turning points. (3)
- (3) A rectangular box is constructed in such a way that the length (l) of the base is three times as long as its width. The material used to construct the top and the bottom of the box costs R100 per square metre. The material used to construct the sides of the box costs R50 per square metre. The box must have a volume of 9 m³. Let the width of the box be x metres.



Determine an expression for the height (h) of the box in terms of x .	

Show that the cost to construct the box can be expressed as $K = \frac{1200}{x} + 600x^2$.

(b)

(3)