

REPORT ON THE PROGRESS OF THE WORK
DURING THE YEAR 1940

The work during the year 1940 has been devoted to the study of the properties of the function $f(x)$ defined by the equation $f(x) = x + f(x^2)$. The main results are contained in the following sections.

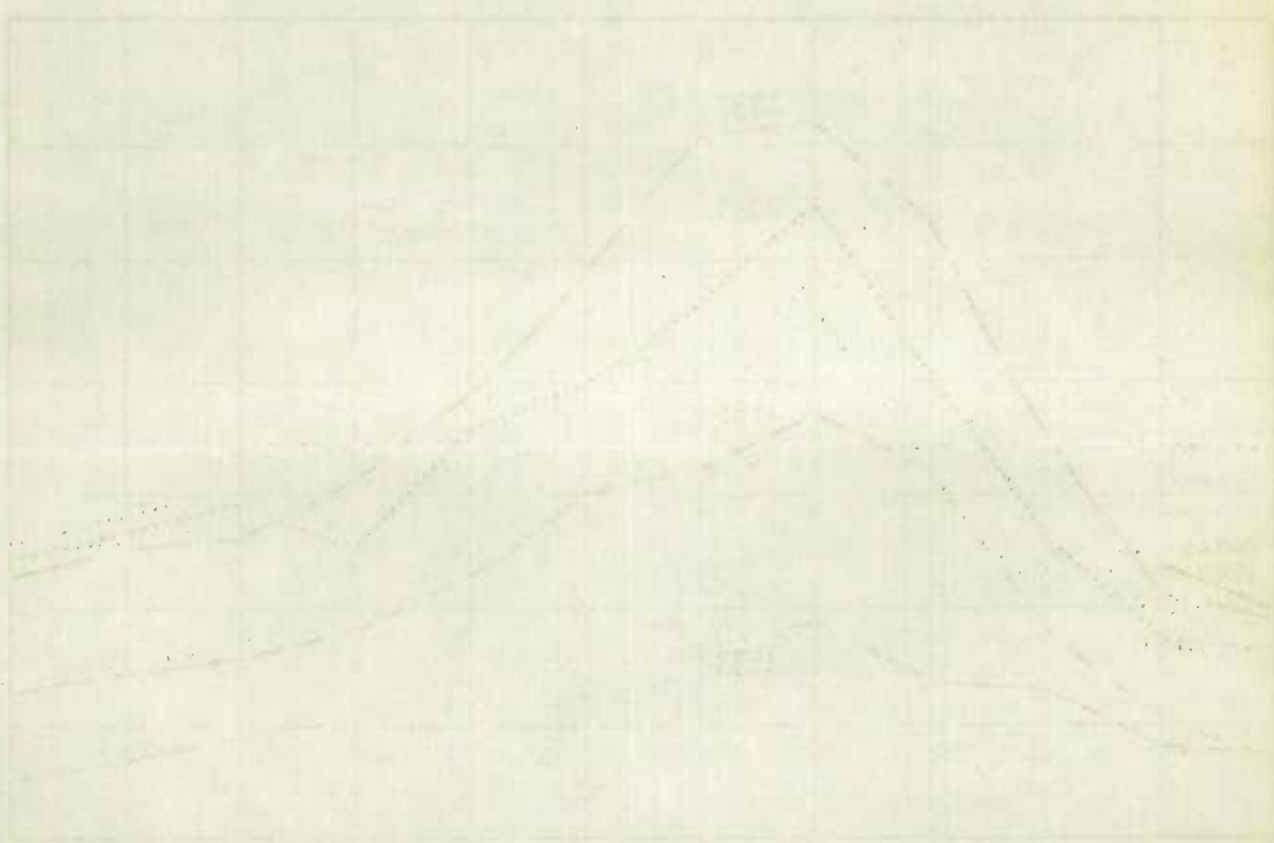
1. THE FUNCTION $f(x)$ AND ITS PROPERTIES

Let $f(x)$ be a function defined for all real numbers x and satisfying the functional equation $f(x) = x + f(x^2)$. It is easy to see that $f(x)$ is an increasing function. In fact, if $x < y$, then $x^2 < y^2$ and $f(x^2) < f(y^2)$. Hence $f(x) = x + f(x^2) < y + f(y^2) = f(y)$. Moreover, $f(x) > x$ for all $x > 0$. In fact, $f(x) = x + f(x^2) > x$ since $f(x^2) > 0$.

It is also clear that $f(x)$ is a concave function. In fact, if $x < y$, then $x^2 < y^2$ and $f(x^2) < f(y^2)$. Hence $f(x) = x + f(x^2) < y + f(y^2) = f(y)$. Moreover, $f(x) > x$ for all $x > 0$. In fact, $f(x) = x + f(x^2) > x$ since $f(x^2) > 0$.

Let us now consider the function $g(x) = f(x) - x$. It is easy to see that $g(x)$ is a decreasing function. In fact, if $x < y$, then $x^2 < y^2$ and $f(x^2) < f(y^2)$. Hence $g(x) = f(x) - x = f(x^2) < f(y^2) = g(y)$. Moreover, $g(x) > 0$ for all $x > 0$. In fact, $g(x) = f(x) - x = f(x^2) > 0$.

2. THE LIMIT OF $f(x)$ AS x APPROACHES INFINITY



FINANCING OF MOTOR VEHICLE SALES IN CANADA, 1938 - 1940

(Figures for the current year are subject to final revision)

Month	Number of Vehicles				Amount of Financing			
	1938	1939	1940	% of Change, 1940/39	1938	1939	1940	% of Change, 1940/39
					\$	\$	\$	
New Vehicles(a)								
January	2,265	1,721	2,405	+ 39.7	1,740,832	1,247,446	1,802,707	+ 44.5
February ...	2,304	1,663	2,594	+ 56.0	1,741,945	1,271,563	1,969,380	+ 54.9
2 months ...	4,569	3,384	4,999	+ 47.7	3,482,777	2,519,009	3,772,087	+ 49.7
March	3,568	2,642			2,594,953	1,963,902		
April	6,809	4,688			5,012,238	3,372,364		
May	7,024	6,046			5,318,246	4,515,982		
June	5,050	4,209			3,817,376	3,246,659		
July	3,605	3,145			2,719,524	2,405,739		
August	3,219	2,992			2,501,978	2,267,915		
September ..	2,978	2,405			2,228,910	1,793,221		
October	2,921	2,472			2,035,587	1,749,308		
November ...	2,674	2,618			1,940,071	1,908,245		
December ...	2,850	2,719			2,049,964	2,110,283		
12 months ..	45,267	37,320			33,701,624	27,852,627		
Used Vehicles(a)								
January	4,461	4,814	5,516	+ 14.6	1,464,853	1,562,067	1,758,468	+ 12.6
February ...	5,811	5,234	6,923	+ 32.3	1,817,042	1,648,774	2,219,543	+ 34.6
2 months ...	10,272	10,048	12,439	+ 23.8	3,281,895	3,210,841	3,978,011	+ 23.9
March	9,007	7,834			2,746,365	2,386,624		
April	14,101	11,535			4,390,244	3,540,931		
May	15,616	15,881			4,829,349	4,832,390		
June	14,575	14,506			4,455,952	4,259,442		
July	12,599	12,656			3,748,860	3,702,965		
August	10,719	11,202			3,231,692	3,354,598		
September ..	8,885	7,778			2,660,351	2,329,244		
October	8,472	9,228			2,549,356	2,710,322		
November ...	7,130	8,025			2,178,540	2,397,918		
December ...	6,060	7,094			1,911,625	2,190,844		
12 months ..	117,436	115,787			35,984,229	34,916,119		
TOTAL - New and Used Vehicles(a)								
January	6,726	6,535	7,921	+ 21.2	3,205,685	2,809,513	3,561,175	+ 26.8
February ...	8,115	6,897	9,517	+ 38.0	3,558,987	2,920,337	4,188,923	+ 43.4
2 months ...	14,841	13,432	17,438	+ 29.8	6,764,672	5,729,850	7,750,098	+ 35.3
March	12,575	10,476			5,341,318	4,350,526		
April	20,910	16,223			9,402,482	6,913,295		
May	22,640	21,927			10,147,595	9,348,372		
June	19,625	18,715			8,273,328	7,506,101		
July	16,204	15,801			6,468,384	6,108,704		
August	13,938	14,194			5,733,670	5,622,513		
September ..	11,863	10,183			4,889,261	4,122,465		
October	11,393	11,700			4,584,943	4,459,630		
November ...	9,804	10,643			4,118,611	4,306,163		
December ...	8,910	9,813			3,961,589	4,301,127		
12 months ..	162,703	153,107			69,685,853	62,768,746		

(a) Includes passenger cars, trucks and buses.

STATE OF TEXAS
 DEPARTMENT OF COMMERCE
 OFFICE OF THE COMMISSIONER

No.	Name	Address	City	State	Capital	Stock	Total
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FINANCING OF MOTOR VEHICLE SALES IN CANADA, BY PROVINCES, FEBRUARY 1939 and 1940

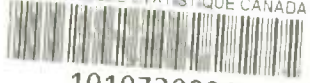
Province	Number of Vehicles			Amount of Financing		
	February 1939	February 1940	% Change 1940/39	February 1939	February 1940	% Change 1940/39

New Vehicles(a)						
CANADA	1,633	2,594	+ 56.0	1,271,563	1,969,380	+ 54.9
Maritime Provinces	87	147	+ 69.0	65,748	119,715	+ 82.1
Quebec	267	379	+ 41.9	208,513	284,063	+ 36.2
Ontario	709	1,049	+ 48.0	513,558	796,403	+ 55.1
Manitoba & Saskatchewan	118	451	+282.2	82,549	320,936	+288.8
Alberta	222	340	+ 53.2	170,928	250,239	+ 46.4
British Columbia	260	228	- 12.3	230,267	198,024	- 14.0

Used Vehicles(a)						
CANADA	5,234	6,923	+ 32.3	1,648,774	2,219,543	+ 34.6
Maritime Provinces	247	379	+ 53.4	83,775	116,036	+ 38.5
Quebec	605	686	+ 13.4	218,013	230,604	+ 5.8
Ontario	2,635	3,370	+ 27.9	792,081	998,079	+ 26.0
Manitoba & Saskatchewan	342	752	+119.9	119,089	255,608	+114.6
Alberta	407	720	+ 76.9	139,287	249,255	+ 79.0
British Columbia	998	1,016	+ 1.8	296,529	369,961	+ 24.8

TOTAL - New and Used Vehicles(a)						
CANADA	6,897	9,517	+ 38.0	2,920,337	4,188,923	+ 43.4
Maritime Provinces	334	526	+ 57.5	149,523	235,751	+ 57.7
Quebec	872	1,065	+ 22.1	426,526	514,667	+ 20.7
Ontario	3,344	4,419	+ 32.1	1,305,639	1,794,482	+ 37.4
Manitoba & Saskatchewan	460	1,203	+161.5	201,638	576,544	+185.9
Alberta	629	1,060	+ 68.5	310,215	499,494	+ 61.0
British Columbia	1,258	1,244	- 1.1	526,796	567,985	+ 7.8

(a) Includes passenger cars, trucks and buses.



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NO FURTHER ATTENTION
NECESSARY

