

4.1 • Variable Rates of Change

Find successive rates of change to determine if the function is linear, quadratic, or neither.

1. $f(x)$

x	$f(x)$	FIRST DIFFERENCES	SECOND DIFFERENCES
0	1		
1	3	_____	_____
2	9	_____	_____
3	19	_____	_____
4	33		

2. $g(x)$

x	$g(x)$	FIRST DIFFERENCES	SECOND DIFFERENCES
2	-1		
4	-10	_____	_____
6	-1	_____	_____
8	26	_____	_____
10	71		

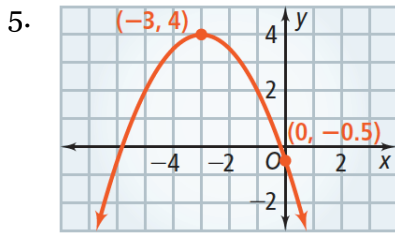
3. $h(x)$

x	$h(x)$	FIRST DIFFERENCES	SECOND DIFFERENCES
5	2		
6	4	_____	_____
7	6	_____	_____
8	8	_____	_____
9	10		

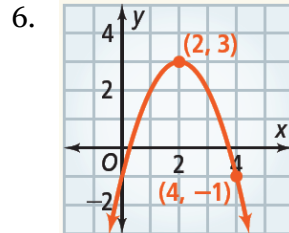
4. $j(x)$

x	$j(x)$	FIRST DIFFERENCES	SECOND DIFFERENCES
4	5		
5	10	_____	_____
6	20	_____	_____
7	40	_____	_____
8	80		

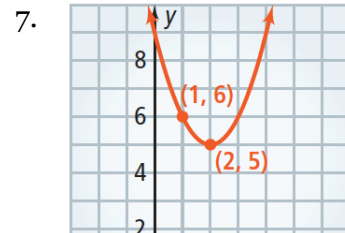
APK: Is the function concave up or concave down? Identify intervals where the function is increasing and/or decreasing. Recall that intervals are written $(x \text{ start}, x \text{ end})$. What is the function's domain and range? Does the function have a maximum or a minimum value?



CONCAVITY:
 INCREASING:
 DECREASING:
 DOMAIN:
 RANGE:
 MAX OR MIN?



CONCAVITY:
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CONCAVITY:
 INCREASING:
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 RANGE:
 MAX OR MIN?

Find successive rates of change to determine if the function is linear, quadratic, or neither. Identify intervals where the function is increasing and/or decreasing. Is the function concave up, concave down, or neither?

8. $f(x)$

x	$f(x)$	FIRST DIFFERENCES	SECOND DIFFERENCES
-2	14		
-1	19	_____	_____
0	22	_____	_____
1	23	_____	_____
2	22		

LINEAR / QUADRATIC / NEITHER

INCREASING INTERVAL: ____ < x < ____

DECREASING INTERVAL: ____ < x < ____

CONCAVE UP / CONCAVE DOWN / NEITHER

9. $g(x)$

x	$g(x)$	FIRST DIFFERENCES	SECOND DIFFERENCES
-2	18		
-1	26	_____	_____
0	38	_____	_____
1	56	_____	_____
2	83		

LINEAR / QUADRATIC / NEITHER

INCREASING INTERVAL: ____ < x < ____

DECREASING INTERVAL: ____ < x < ____

CONCAVE UP / CONCAVE DOWN / NEITHER

10. $h(x)$

x	$h(x)$	FIRST DIFFERENCES	SECOND DIFFERENCES
-4	39		
-3	36	_____	_____
-2	33	_____	_____
-1	30	_____	_____
0	27		

LINEAR / QUADRATIC / NEITHER

INCREASING INTERVAL: ____ < x < ____

DECREASING INTERVAL: ____ < x < ____

CONCAVE UP / CONCAVE DOWN / NEITHER

11. $j(x)$

x	$j(x)$	FIRST DIFFERENCES	SECOND DIFFERENCES
0	-80		
1	-40	_____	_____
2	-16	_____	_____
3	-8	_____	_____
4	-16		

LINEAR / QUADRATIC / NEITHER

INCREASING INTERVAL: ____ < x < ____

DECREASING INTERVAL: ____ < x < ____

CONCAVE UP / CONCAVE DOWN / NEITHER