

Math Sheet

Name _____ Score _____ Teacher _____ Date _____

Newton's Method

Use the stated starting value and Newton update to approximate one real zero. Trigonometric arguments are in radians; carry full precision between iterations.

1. degree 3

$$f(x) = -16 + 14 \cdot x - 6 \cdot x^2 + x^3$$

Start $x_0 = 4.000000$. Complete 2 Newton iterations using full precision.

Derivative $f'(x)$: _____

i	x_i	$f(x_i)$	$f'(x_i)$	$x_{(i+1)}$
0	_____	_____	_____	_____
1	_____	_____	_____	_____

Nth iterate: _____

2. degree 5

$$f(x) = -1698 + 28 \cdot x + 40 \cdot x^2 + 32 \cdot x^3 + 13 \cdot x^4 + 2 \cdot x^5$$

Start $x_0 = 3.000000$. Complete 2 Newton iterations using full precision.

Derivative $f'(x)$: _____

i	x_i	$f(x_i)$	$f'(x_i)$	$x_{(i+1)}$
0	_____	_____	_____	_____
1	_____	_____	_____	_____

Nth iterate: _____

3. trigonometric

$$f(x) = -8 \cdot \sin(4 \cdot x + 1) + 5$$

Start $x_0 = -0.100000$. Complete 2 Newton iterations using full precision.

Derivative $f'(x)$: _____

i	x_i	$f(x_i)$	$f'(x_i)$	$x_{(i+1)}$
0	_____	_____	_____	_____
1	_____	_____	_____	_____

Nth iterate: _____

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Use the stated starting value and Newton update to approximate one real zero. Trigonometric arguments are in radians; carry full precision between iterations.

4. degree 4

$$f(x) = 194 + 304 \cdot x + 136 \cdot x^2 + 27 \cdot x^3 + 2 \cdot x^4$$

Start $x_0 = -1.000000$. Complete 2 Newton iterations using full precision.

Derivative $f'(x)$: _____

i	x_i	$f(x_i)$	$f'(x_i)$	$x_{(i+1)}$
0	_____	_____	_____	_____
1	_____	_____	_____	_____

Nth iterate: _____

5. trigonometric

$$f(x) = 6 \cdot \sin(3 \cdot x + 4) - 2$$

Start $x_0 = -1.200000$. Complete 2 Newton iterations using full precision.

Derivative $f'(x)$: _____

i	x_i	$f(x_i)$	$f'(x_i)$	$x_{(i+1)}$
0	_____	_____	_____	_____
1	_____	_____	_____	_____

Nth iterate: _____

6. degree 4

$$f(x) = -365 + 79 \cdot x + 51 \cdot x^2 + 16 \cdot x^3 + 2 \cdot x^4$$

Start $x_0 = 2.000000$. Complete 2 Newton iterations using full precision.

Derivative $f'(x)$: _____

i	x_i	$f(x_i)$	$f'(x_i)$	$x_{(i+1)}$
0	_____	_____	_____	_____
1	_____	_____	_____	_____

Nth iterate: _____

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Use the stated starting value and Newton update to approximate one real zero. Trigonometric arguments are in radians; carry full precision between iterations.

7. degree 3

$$f(x) = -216 + 78 \cdot x - 26 \cdot x^2 + 3 \cdot x^3$$

Start $x_0 = 7.000000$. Complete 2 Newton iterations using full precision.

Derivative $f'(x)$: _____

i	x_i	$f(x_i)$	$f'(x_i)$	$x_{(i+1)}$
0	_____	_____	_____	_____
1	_____	_____	_____	_____

Nth iterate: _____

8. degree 5

$$f(x) = -88 + 25 \cdot x + 33 \cdot x^2 + 26 \cdot x^3 + 11 \cdot x^4 + 2 \cdot x^5$$

Start $x_0 = 1.000000$. Complete 2 Newton iterations using full precision.

Derivative $f'(x)$: _____

i	x_i	$f(x_i)$	$f'(x_i)$	$x_{(i+1)}$
0	_____	_____	_____	_____
1	_____	_____	_____	_____

Nth iterate: _____

9. degree 5

$$f(x) = -3525 + 373 \cdot x + 327 \cdot x^2 + 146 \cdot x^3 + 33 \cdot x^4 + 3 \cdot x^5$$

Start $x_0 = 2.000000$. Complete 2 Newton iterations using full precision.

Derivative $f'(x)$: _____

i	x_i	$f(x_i)$	$f'(x_i)$	$x_{(i+1)}$
0	_____	_____	_____	_____
1	_____	_____	_____	_____

Nth iterate: _____

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Newton's Method

Use the stated starting value and Newton update to approximate one real zero. Trigonometric arguments are in radians; carry full precision between iterations.

10. degree 3

$$f(x) = -80 + 10 \cdot x + 5 \cdot x^2 + x^3$$

Start $x_0 = 3.000000$. Complete 2 Newton iterations using full precision.

Derivative $f'(x)$: _____

i	x_i	$f(x_i)$	$f'(x_i)$	$x_{(i+1)}$
0	_____	_____	_____	_____
1	_____	_____	_____	_____

Nth iterate: _____

11. degree 4

$$f(x) = -270 - 7 \cdot x + 13 \cdot x^2 - 10 \cdot x^3 + 3 \cdot x^4$$

Start $x_0 = 4.000000$. Complete 2 Newton iterations using full precision.

Derivative $f'(x)$: _____

i	x_i	$f(x_i)$	$f'(x_i)$	$x_{(i+1)}$
0	_____	_____	_____	_____
1	_____	_____	_____	_____

Nth iterate: _____

12. trigonometric

$$f(x) = -5 \cdot \sin(5 \cdot x - 2) + 3$$

Start $x_0 = 0.600000$. Complete 2 Newton iterations using full precision.

Derivative $f'(x)$: _____

i	x_i	$f(x_i)$	$f'(x_i)$	$x_{(i+1)}$
0	_____	_____	_____	_____
1	_____	_____	_____	_____

Nth iterate: _____