

Polynomials - End Behavior

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Describe the end behavior of each function.

1) $f(x) = x^3 + 10x^2 + 32x + 34$

2) $f(x) = -x^2 - 8x - 15$

3) $f(x) = -x^4 + x^2 + 2$

4) $f(x) = x^4 - 4x^2 - x + 3$

5) $f(x) = -x^3 + 2x^2 + 2$

6) $f(x) = x^4 - x^2 - 2$

7) $f(x) = x^3 - 3x^2 + 1$

8) $f(x) = x^5 - 4x^3 + x + 1$

9) $f(x) = -x^5 + 4x^3 - 5x - 4$

10) $f(x) = -x^3 + 3x^2 - 4$

11) $f(x) = x^4 - 3x^2 - 3x + 4$

12) $f(x) = -x^5 + 4x^3 - 2x - 2$

13) $f(x) = x^4 - 4x^2 - x + 5$

Sketch the general shape of each function.

14) $f(x) = x^3 - x^2 + 4$

15) $f(x) = x^5 - 3x^3 + 2x + 4$

16) $f(x) = -x^3 + x^2 - 1$

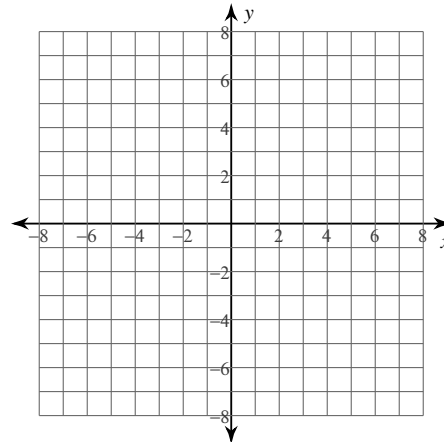
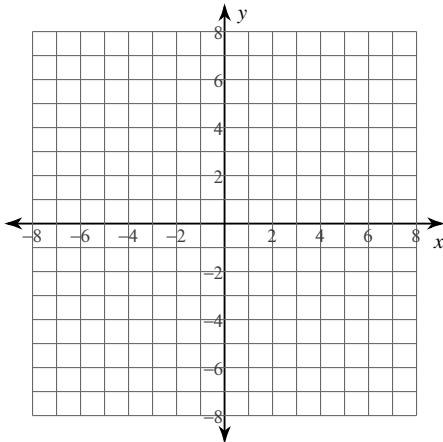
17) $f(x) = -x^4 + 3x^2 - 2x - 4$

18) $f(x) = 2x^2 - 3$

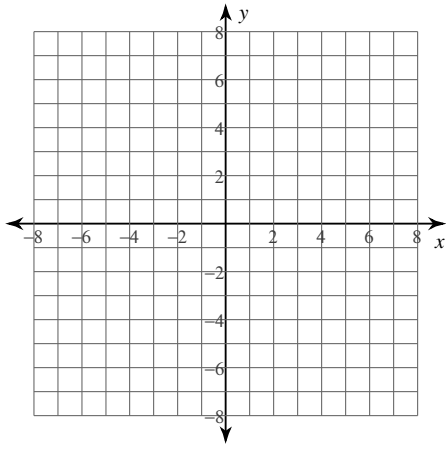
State the maximum number of turns the graph of each function could make. Then sketch the graph.

19) $f(x) = -x^3 + 3x^2 - 2$

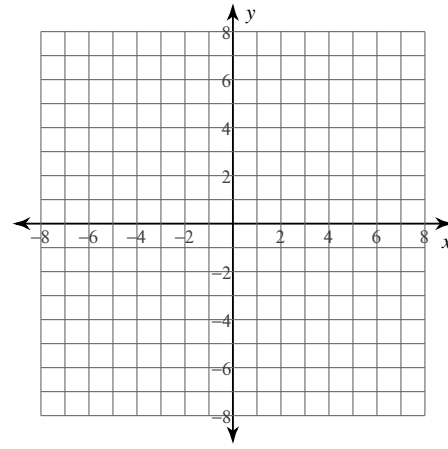
20) $f(x) = x^3 - 3x^2 + 4$



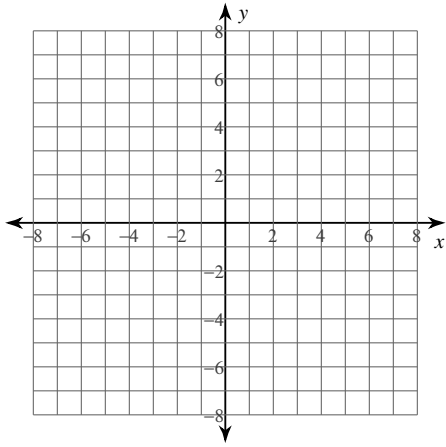
21) $f(x) = x^3 - 10x^2 + 33x - 38$



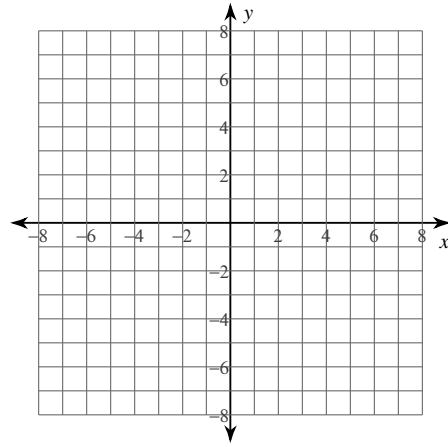
22) $f(x) = -x^3 + x^2 + 1$



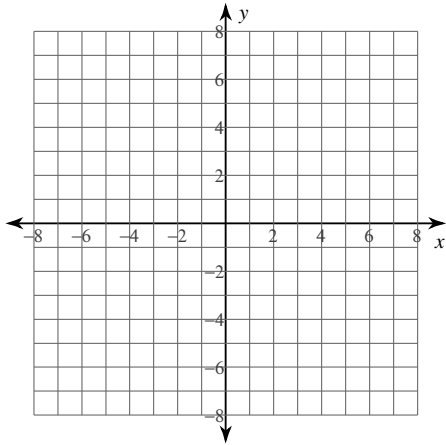
23) $f(x) = -x^3 - 7x^2 - 15x - 8$



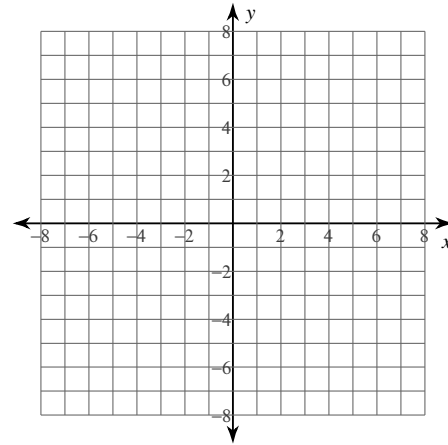
24) $f(x) = -x^5 + 2x^3 - x - 4$



25) $f(x) = x^4 - 2x^2 + x - 2$

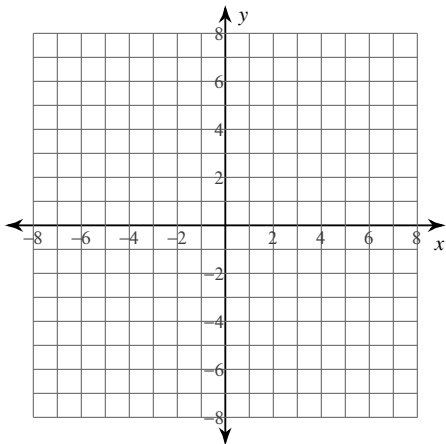


26) $f(x) = -x^3 + 2x^2 + 1$

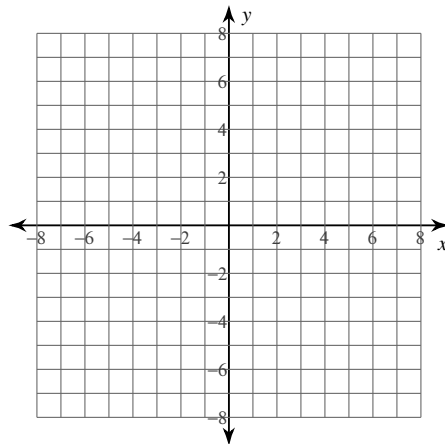


Sketch the graph of each function. Approximate the relative minima and relative maxima to the nearest tenth.

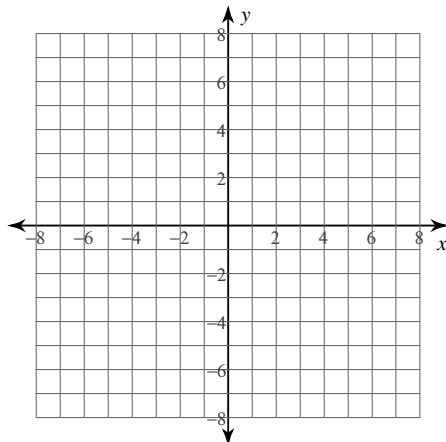
27) $f(x) = -x^3 - 6x^2 - 9x - 4$



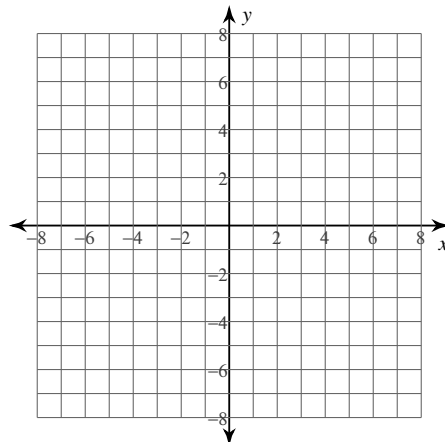
28) $f(x) = -x^3 + 4x^2 - 7$



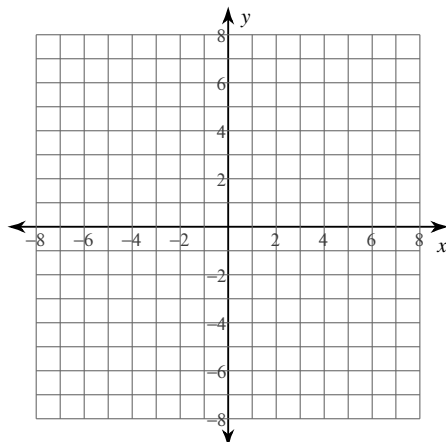
29) $f(x) = x^3 - 4x^2 + 3$



30) $f(x) = x^3 - 4x^2 + 2$

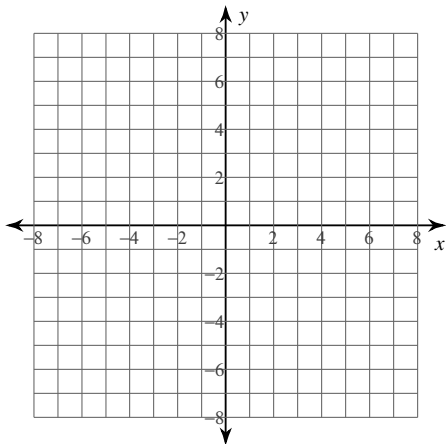


31) $f(x) = x^3 - 4x^2 + 7$

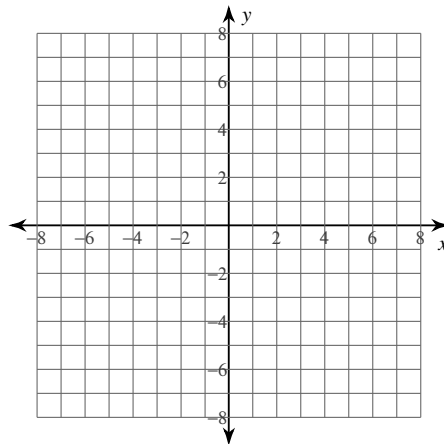


Sketch the graph of each function. Approximate each real zero to the nearest tenth. Approximate the relative minima and relative maxima to the nearest tenth.

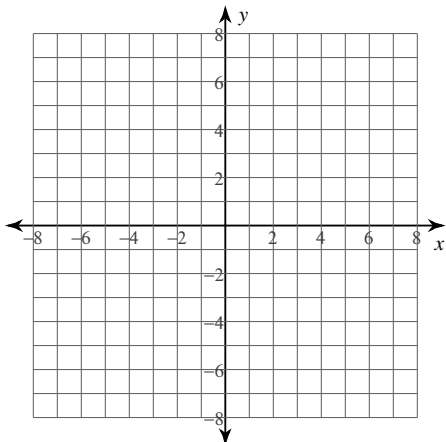
32) $f(x) = x^4 - 3x^2 + 3x - 1$



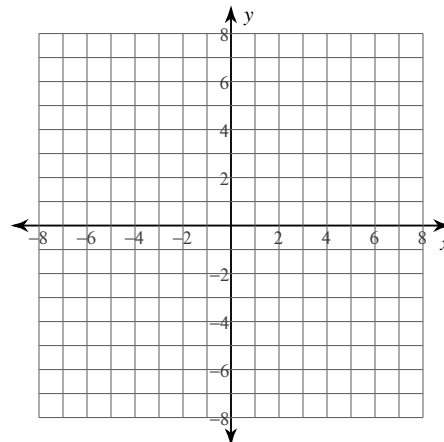
33) $f(x) = -x^4 + 4x^3 - 4x^2 - 1$



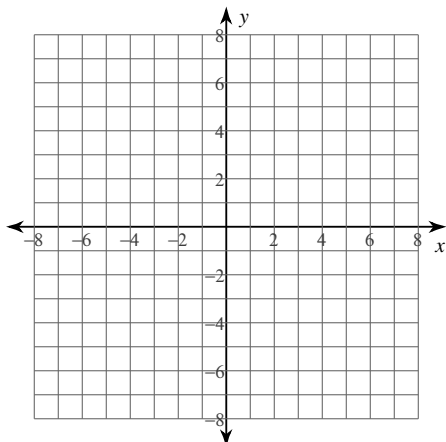
34) $f(x) = -x^5 + 4x^3 - x - 1$



35) $f(x) = x^5 - 4x^3 + 5x + 4$



36) $f(x) = x^5 - 4x^3 + x$



Name each polynomial by degree and number of terms.

37) $x^8 + 4 + 6x^3$

38) $-4 + 5m$

39) $6n^4 + 10 - 9n^2 - 9n^3$

Polynomials - End Behavior

Date _____ Period _____

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Describe the end behavior of each function.

- | | | | |
|------------------------------------|---|-----------------------------------|---|
| 1) $f(x) = x^3 + 10x^2 + 32x + 34$ | $f(x) \rightarrow -\infty$ as $x \rightarrow -\infty$ | 2) $f(x) = -x^2 - 8x - 15$ | $f(x) \rightarrow -\infty$ as $x \rightarrow -\infty$ |
| | $f(x) \rightarrow +\infty$ as $x \rightarrow +\infty$ | | $f(x) \rightarrow -\infty$ as $x \rightarrow +\infty$ |
| 3) $f(x) = -x^4 + x^2 + 2$ | $f(x) \rightarrow -\infty$ as $x \rightarrow -\infty$ | 4) $f(x) = x^4 - 4x^2 - x + 3$ | $f(x) \rightarrow +\infty$ as $x \rightarrow -\infty$ |
| | $f(x) \rightarrow -\infty$ as $x \rightarrow +\infty$ | | $f(x) \rightarrow +\infty$ as $x \rightarrow +\infty$ |
| 5) $f(x) = -x^3 + 2x^2 + 2$ | $f(x) \rightarrow +\infty$ as $x \rightarrow -\infty$ | 6) $f(x) = x^4 - x^2 - 2$ | $f(x) \rightarrow +\infty$ as $x \rightarrow -\infty$ |
| | $f(x) \rightarrow -\infty$ as $x \rightarrow +\infty$ | | $f(x) \rightarrow +\infty$ as $x \rightarrow +\infty$ |
| 7) $f(x) = x^3 - 3x^2 + 1$ | $f(x) \rightarrow -\infty$ as $x \rightarrow -\infty$ | 8) $f(x) = x^5 - 4x^3 + x + 1$ | $f(x) \rightarrow -\infty$ as $x \rightarrow -\infty$ |
| | $f(x) \rightarrow +\infty$ as $x \rightarrow +\infty$ | | $f(x) \rightarrow +\infty$ as $x \rightarrow +\infty$ |
| 9) $f(x) = -x^5 + 4x^3 - 5x - 4$ | $f(x) \rightarrow +\infty$ as $x \rightarrow -\infty$ | 10) $f(x) = -x^3 + 3x^2 - 4$ | $f(x) \rightarrow +\infty$ as $x \rightarrow -\infty$ |
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| | $f(x) \rightarrow +\infty$ as $x \rightarrow +\infty$ | | $f(x) \rightarrow -\infty$ as $x \rightarrow +\infty$ |
| 13) $f(x) = x^4 - 4x^2 - x + 5$ | $f(x) \rightarrow +\infty$ as $x \rightarrow -\infty$ | | |
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Sketch the general shape of each function.

14) $f(x) = x^3 - x^2 + 4$

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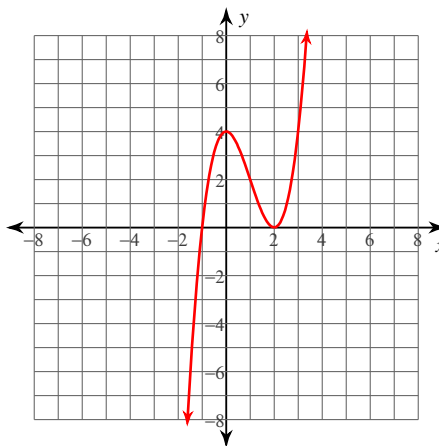
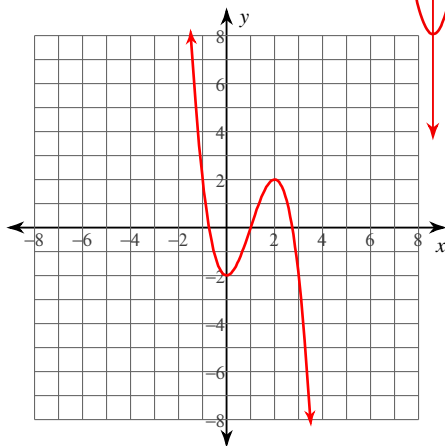
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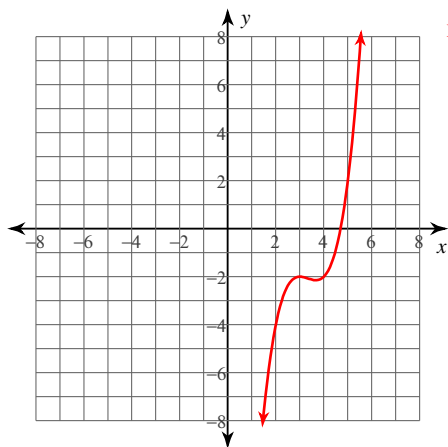
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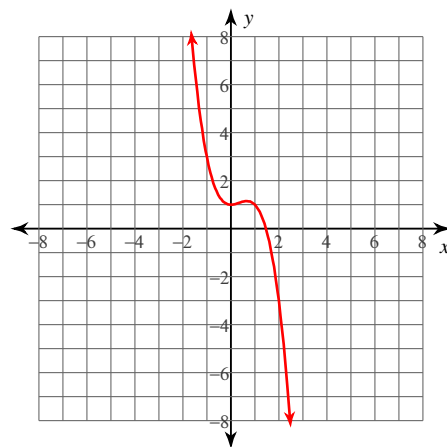
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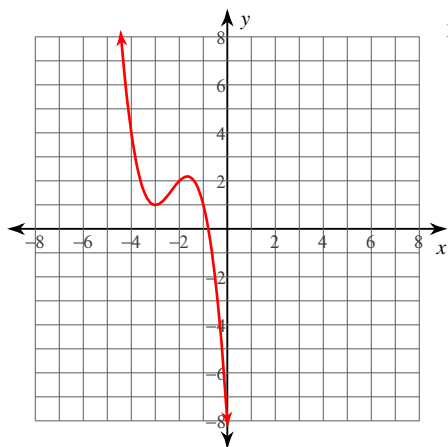
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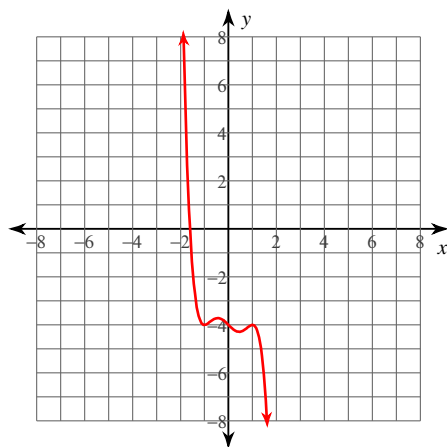
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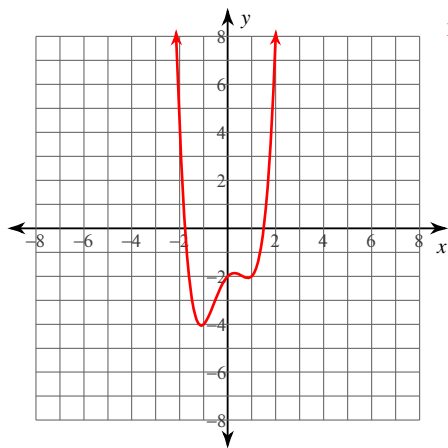
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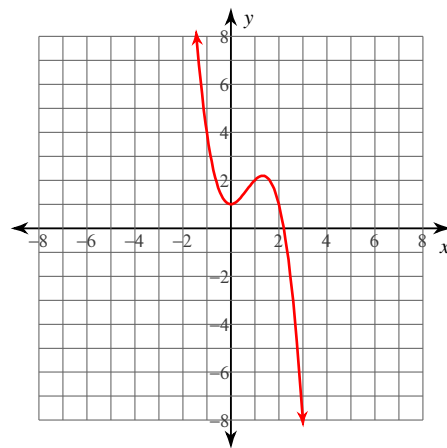
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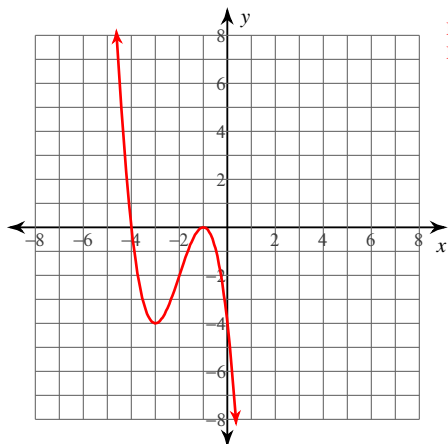


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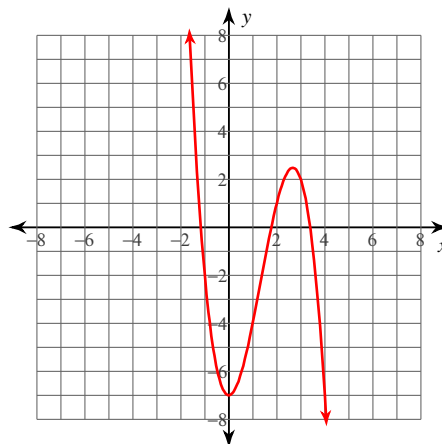
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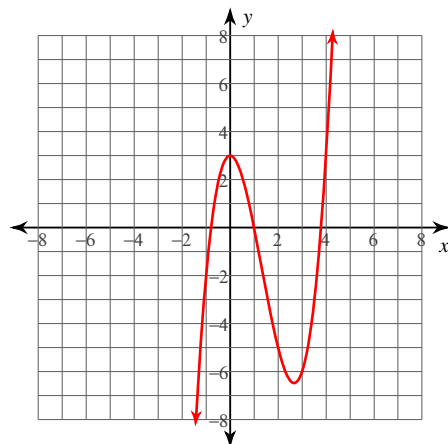
Minima: $(-3, -4)$
Maxima: $(-1, 0)$

28) $f(x) = -x^3 + 4x^2 - 7$



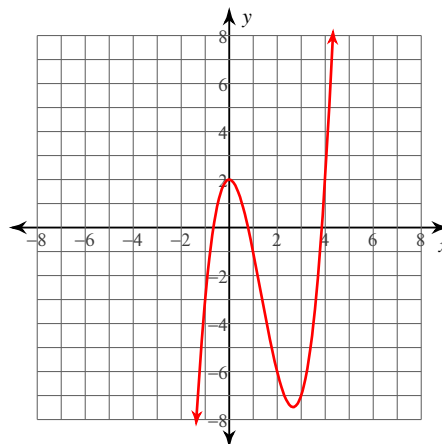
Minima: $(0, -7)$
Maxima: $(2.7, 2.5)$

29) $f(x) = x^3 - 4x^2 + 3$



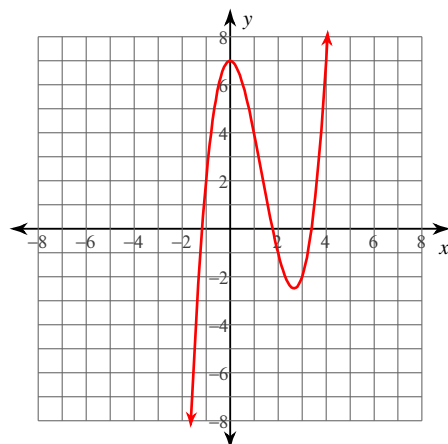
Minima: $(2.7, -6.5)$
Maxima: $(0, 3)$

30) $f(x) = x^3 - 4x^2 + 2$



Minima: $(2.7, -7.5)$
Maxima: $(0, 2)$

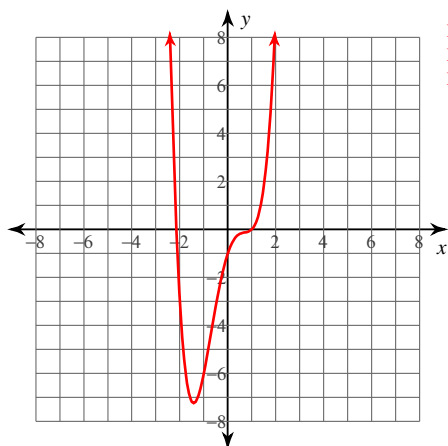
31) $f(x) = x^3 - 4x^2 + 7$



Minima: $(2.7, -2.5)$
Maxima: $(0, 7)$

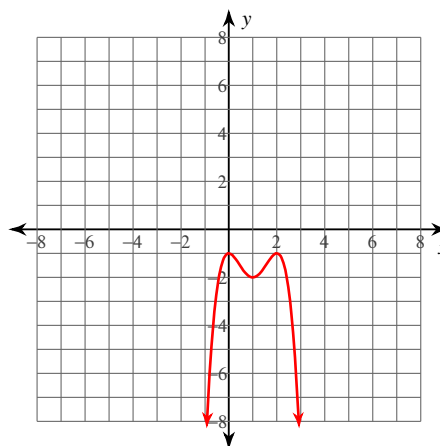
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32) $f(x) = x^4 - 3x^2 + 3x - 1$



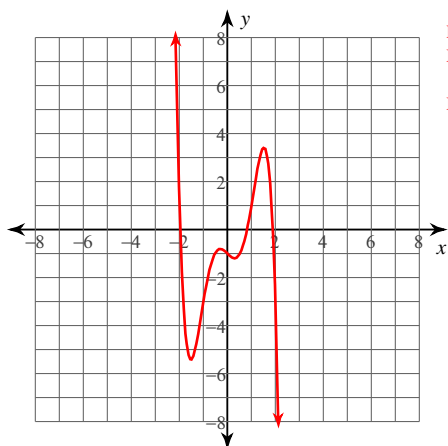
Real Zeros: -2.1, 1
Minima: (-1.4, -7.2)
Maxima: None

33) $f(x) = -x^4 + 4x^3 - 4x^2 - 1$



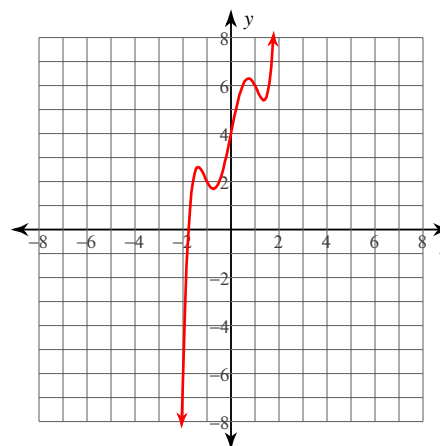
Real Zeros: None
Minima: (1, -2)
Maxima: (0, -1)
(2, -1)

34) $f(x) = -x^5 + 4x^3 - x - 1$



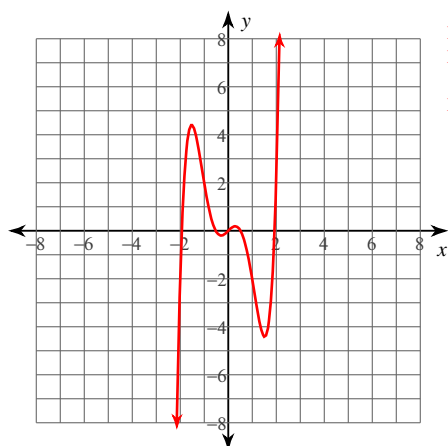
Real Zeros: -2, 0.8, 1.9
Minima: (-1.5, -5.4)
(0.3, -1.2)
Maxima: (-0.3, -0.8)
(1.5, 3.4)

35) $f(x) = x^5 - 4x^3 + 5x + 4$



Real Zeros: -1.8
Minima: (-0.7, 1.7)
(1.4, 5.4)
Maxima: (-1.4, 2.6)
(0.7, 6.3)

36) $f(x) = x^5 - 4x^3 + x$



Real Zeros: -1.9, -0.5, 0.5, 0, 1.9
Minima: (-0.3, -0.2)
(1.5, -4.4)
Maxima: (-1.5, 4.4)
(0.3, 0.2)

Name each polynomial by degree and number of terms.

37) $x^8 + 4 + 6x^3$

eighth degree trinomial

38) $-4 + 5m$

linear binomial

39) $6n^4 + 10 - 9n^2 - 9n^3$

quartic polynomial with four terms