Algebra 2 Honors - Mr. Allen-Black Name_____

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Polynomial Review - Show all work on a separate sheet! Date_____ Period____

Classify each by Degree and Number of terms, and then describe the end behavior of each function.

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

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

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

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

Factor each.

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

6) $f(x) = x^6 + 2x^4 - 16x^2 - 32$

7) $f(x) = x^4 - x^2 - 12$

8) $f(x) = x^4 - 13x^2 + 36$

9) $f(x) = x^3 + 125$

10) $f(x) = 3x^3 - 192$

Factor each and find all zeros.

11) $f(x) = 3x^3 + 8x^2 + 4x$

12) $f(x) = 2x^3 - x^2 - 6x$

13) $f(x) = 3x^3 + 4x^2 + 15x + 20$

14) $f(x) = 2x^3 + x^2 + 10x + 5$

15) $f(x) = 5x^3 - 25x^2 + 4x - 20$

16) $f(x) = 4x^3 - 20x^2 - 3x + 15$

17) $f(x) = x^3 + 27$

18) $f(x) = x^3 - 125$

Divide.

19) $(4m^3 + 28m^2 + 34m + 60) \div (m + 6)$

20) $(2n^3 - 20n^2 + 51n - 63) \div (n - 7)$

21) $(2n^4 - 19n^3 - n^2 + 9n) \div (2n - 1)$

22) $(4x^4 + 5x^3 + 19x^2 - 82x + 21) \div (4x - 7)$

Find all zeros. One zero has been given.

23) $f(x) = x^4 - 10x^3 + 32x^2 - 32x;\ 2$

24) $f(x) = x^4 + x^3 - 4x^2 + 6x;\ -3$

25) $f(x) = x^4 - 4x^3 + 9x^2 - 10x;\ 2$

26) $f(x) = x^4 - 5x^2 + 4;\ 2$

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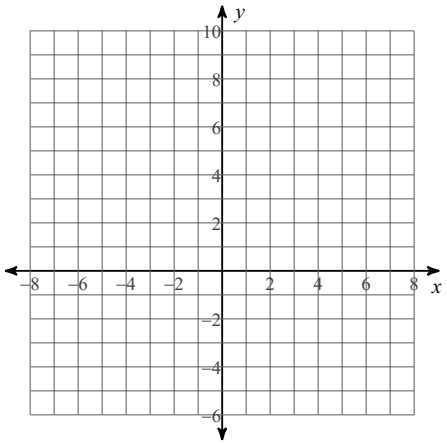
27) $f(x) = x^4 - x^3 - 34x^2 - 20x;\ -5$

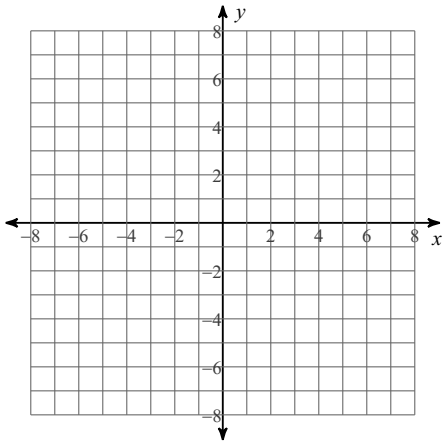
28) $f(x) = x^4 - 24x^2 - 40x;\ -2$

Sketch the graph of each polynomial. Consider y-intercept, x-intercepts (and multiplicity), and end behavior.

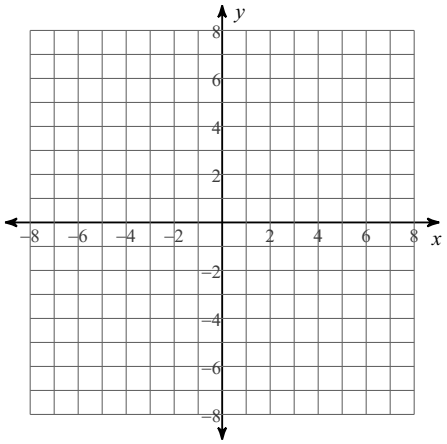
29) $y = (x+1)^2(x-3)(x-2)$



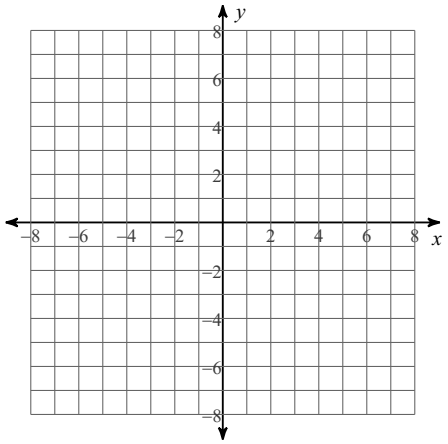
30) $y = (x+1)^2(x-2)(x-1)^2$



31) $y = x^3 - 3x^2 - x + 3$

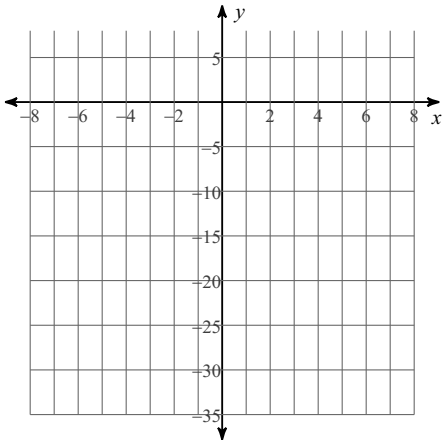


32) $y = -2x^4 - 8x^3 - 8x^2$

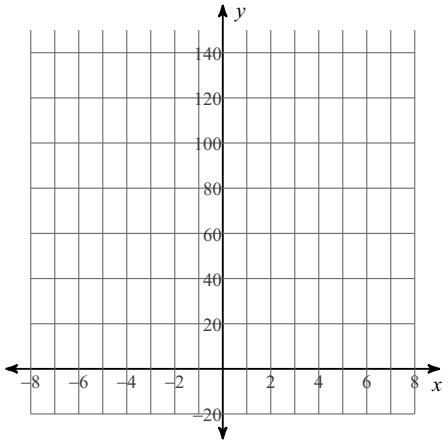


33) $y = x^3 + 3x^2 - 10x - 24$

Hint: One of the roots is -4



34) $y = -x^3 - 5x^2 + 25x + 125$



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Answers to Polynomial Review - Show all work on a separate sheet!

1) Quadratic Trinomial
Falls to the left. Falls to the right

2) Fourth Degree (Quartic) Binomial
Rises to the left. Rises to the right

3) Fifth Degree Polynomial
Falls to the left. Rises to the right

4) Fourth Degree Polynomial
Falls to the left. Falls to the right

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

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

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

8) $f(x) = (x+2)(x-2)(x+3)(x-3)$

9) $f(x) = (x+5)(x^2-5x+25)$

10) $f(x) = 3(x-4)(x^2+4x+16)$

11) Factors to: $f(x) = x(3x+2)(x+2)$
Zeros: $\left\{0, -\frac{2}{3}, -2\right\}$

12) Factors to: $f(x) = x(2x+3)(x-2)$
Zeros: $\left\{0, -\frac{3}{2}, 2\right\}$

13) Factors to: $f(x) = (3x+4)(x^2+5)$
Zeros: $\left\{-\frac{4}{3}, i\sqrt{5}, -i\sqrt{5}\right\}$

14) Factors to: $f(x) = (2x+1)(x^2+5)$
Zeros: $\left\{-\frac{1}{2}, i\sqrt{5}, -i\sqrt{5}\right\}$

15) Factors to: $f(x) = (x-5)(5x^2+4)$
Zeros: $\left\{5, \frac{2i\sqrt{5}}{5}, -\frac{2i\sqrt{5}}{5}\right\}$

16) Factors to: $f(x) = (x-5)(4x^2-3)$
Zeros: $\left\{5, \frac{\sqrt{3}}{2}, -\frac{\sqrt{3}}{2}\right\}$

17) Factors to: $f(x) = (x+3)(x^2-3x+9)$
Zeros: $\left\{-3, \frac{3+3i\sqrt{3}}{2}, \frac{3-3i\sqrt{3}}{2}\right\}$

18) Factors to: $f(x) = (x-5)(x^2+5x+25)$
Zeros: $\left\{5, \frac{-5+5i\sqrt{3}}{2}, \frac{-5-5i\sqrt{3}}{2}\right\}$

19) $4m^2+4m+10$

20) $2n^2-6n+9$

21) $n^3-9n^2-5n+2+\frac{2}{2n-1}$

22) $x^3+3x^2+10x-3$

23) $\{0, 4 \text{ mult. } 2, 2\}$

24) $\{0, 1+i, 1-i, -3\}$

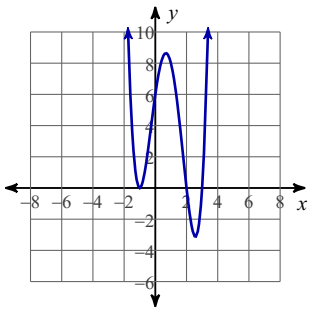
25) $\{0, 1+2i, 1-2i, 2\}$

26) $\{-2, 1, -1, 2\}$

27) $\{0, 3+\sqrt{13}, 3-\sqrt{13}, -5\}$

28) $\{0, 1+\sqrt{21}, 1-\sqrt{21}, -2\}$

29)



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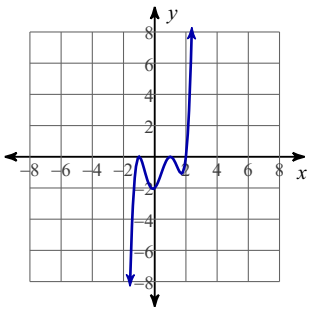

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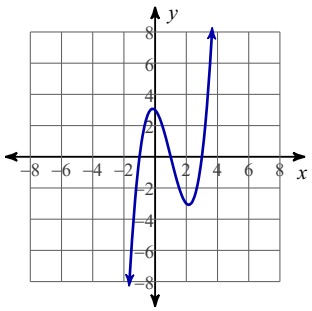

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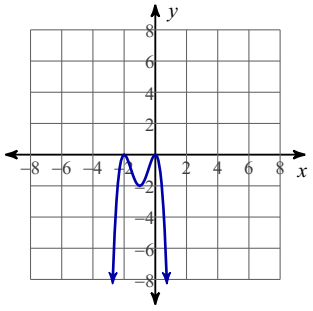

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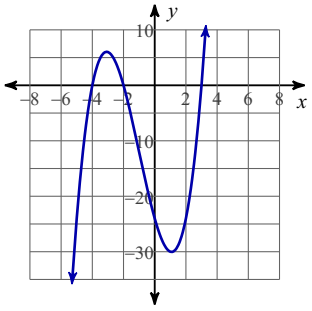

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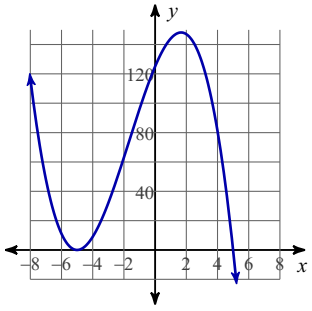

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