Honors Algebra II Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

LT 8-1: Characteristics of Polynomials Day 1 Period\_\_\_\_

**Using the characteristics that we discussed in class today, fill in the blanks.**

1) An \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ degree polynomial must have at least one real zero.

2) A polynomial function is written in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ if its terms are written in descending order of exponents from left to right.

3) The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the number in front of the term with the highest exponent in the polynomial.

4) A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is a polynomial with one term, a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ has two terms, and a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ has three terms.

5) It is possible for an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ degree polynomial to have no real zeros.

6) The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is used to determine the end behavior of the graph of a polynomial function.

**Write each polynomial in standard form and state the degree, type, leading coefficient, and the end behavior. The first example has been done for you.**

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|  | **Standard Form** | **Degree** | **Classify by Degree** | **Classify by Number of Terms** | **LC** | **End Behavior** |
| *Example:* $y=7-3x$ | $$y=-3x+7$$ | 1 | Linear | Binomial | $$-3$$ | As $x\rightarrow -\infty , y\rightarrow \infty $As $x\rightarrow \infty , y\rightarrow -\infty $ |
| 7) $f\left(x\right)=2x-x^{3}+8$ |  |  |  |  |  |  |
| 8) $y=3x^{2}+x^{3}-(x^{3}+x^{2})$ |  |  |  |  |  |  |
| 9) $y=\left(2x\right)^{3}+3x-1$ |  |  |  |  |  |  |
| 10) $f\left(x\right)=\left(x+2\right)^{2}+3$ |  |  |  |  |  |  |
| 11) $y=\left(2+x\right)\left(2-x\right)-4$ |  |  |  |  |  |  |
| 12) $f\left(x\right)=3\left(x+1\right)^{2}-3x^{2}$ |  |  |  |  |  |  |
| 13) $g\left(x\right)=2x-2(x-3)$ |  |  |  |  |  |  |

**Describe the end behavior of the graph of the polynomial function without graphing.**

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| 14) $y=4x-2+5x^{5}$As $x\rightarrow -\infty , y\rightarrow \\_\\_\\_\\_\\_\\_\\_\\_\\_$and as $x\rightarrow \infty , y\rightarrow \\_\\_\\_\\_\\_\\_\\_\\_\\_$ | 15) $y=-5x^{3}+2x$As $x\rightarrow -\infty , y\rightarrow \\_\\_\\_\\_\\_\\_\\_\\_\\_$and as $x\rightarrow \infty , y\rightarrow \\_\\_\\_\\_\\_\\_\\_\\_\\_$ | 16) $y=-2x-12x^{6}+5$As $x\rightarrow -\infty , y\rightarrow \\_\\_\\_\\_\\_\\_\\_\\_\\_$and as $x\rightarrow \infty , y\rightarrow \\_\\_\\_\\_\\_\\_\\_\\_\\_$ |
| 17) $y=6-2x+6x^{2}-12x^{9}$As $x\rightarrow -\infty , y\rightarrow \\_\\_\\_\\_\\_\\_\\_\\_\\_$and as $x\rightarrow \infty , y\rightarrow \\_\\_\\_\\_\\_\\_\\_\\_\\_$ | 18) $y=1-x^{6}-1+2x^{6}$As $x\rightarrow -\infty , y\rightarrow \\_\\_\\_\\_\\_\\_\\_\\_\\_$and as $x\rightarrow \infty , y\rightarrow \\_\\_\\_\\_\\_\\_\\_\\_\\_$ | 19) $y=x(x-2)(x+3)(-2x-5)$As $x\rightarrow -\infty , y\rightarrow \\_\\_\\_\\_\\_\\_\\_\\_\\_$and as $x\rightarrow \infty , y\rightarrow \\_\\_\\_\\_\\_\\_\\_\\_\\_$ |

**Match the polynomial function with its graph without using a graphing calculator.**



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| \_\_\_\_ 20) $y=x^{2}-4x$  | \_\_\_\_ 21) $y=2x^{3}-3x+1$ | \_\_\_\_ 22) $y=-\frac{1}{3}x^{3}+x^{2}-\frac{4}{3}$ |
| \_\_\_\_ 23) $y=\frac{1}{2}x+2$ | \_\_\_\_ 24) $y=-2x^{2}-5$ | \_\_\_\_ 25) $y=3x^{2}-\frac{1}{4}x^{4}$ |
| \_\_\_\_ 26) $y=3-2x$ | \_\_\_\_ 27) $y=2x^{3}+x^{4}$ | \_\_\_\_ 28) $y=\frac{1}{5}x^{5}-2x^{3}+\frac{9}{5}x$ |