Chapters 9 & 11

Additional Review Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Indicate whether each of these functions models exponential growth, decay, or neither.

|  |  |
| --- | --- |
| a. | b. |
| c. | d. |

2. For the following rates of growth and decay, find the multiplier (b) that should be used in the equation.

a) 20% decay \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ b) 1% decay \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ c) 1.5% growth \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. If the inflation rate is 2% per year, how much will a house that is now worth $250,000 be worth in five years?

4. If a car depreciates at a rate of 12% per year, how much will a car that is currently worth $23,000 be worth in three years?

5. Actinium-226 has a half-life of 29 hours. If 100 mg of actinium-226 disintegrates over a period of 58 hours, how many mg of actinium-226 will remain?

6. Selenium-83 has a half-life of 25 minutes. How much Selenium-83 would be left after an hour if you start with a 100 mg sample?

7. Consider the function: 

a. Does this model exponential growth, exponential decay, or neither? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

b. What is the domain of this function? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

c. What is the range of this function? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

d. What is the y-intercept of this function? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

e. In which quadrant does the curve approach the horizontal axis? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

8. Given the polynomial , identify the following:

|  |  |
| --- | --- |
| a) Write in standard form: | b) Degree: |
| c) Leading coefficient: | d) Constant term: |
| e) *P(1)* = | f) Classify this polynomial by the number of terms it has. (What type of polynomial is it?) |

9. Expand (multiply) and simplify:

|  |  |
| --- | --- |
| a) | b) |

10. a) Find all of the zeros (roots) of each polynomial equation or function,

b) Indicate the multiplicity of each root

c) Tell whether each zero is real (rational or irrational) or complex.

|  |  |  |  |
| --- | --- | --- | --- |
| Polynomial equation | Zeros (roots) | Multiplicity | Type of number |
| a. |  |  |  |
| b. |  |  |  |
| c. |  |  |  |
| d. |  |  |  |

11. Decide whether or not each of the following is a trinomial square. If it is, factor it.

|  |  |
| --- | --- |
| a. | b. |
| c. | d. |

12. Decide whether or not each of the following is a difference of squares. If it is, factor it.

|  |  |
| --- | --- |
| a. | b. |

13. Factor the following completely using any method we discussed in class. *{1. GCF, 2. Special Cases, 3. Guess and Check, 4. Quadratic Formula}* [Make sure all equations are set equal to 0 first, if necessary.]

|  |  |
| --- | --- |
| a. | b. |
| c. | d. |
| e. | f. |
| g. | h. |
| i. | j. |
| k. | l. |
| m. | n. |
| o. | p. |

14. Solve these equations by factoring and then using the principle of zero products.

|  |  |
| --- | --- |
| a. | b. |
| c. | d. |
| e. | f. |

15. Find the x-intercepts for the graph of the equation. (The grids are intentionally not included.)

|  |  |
| --- | --- |
| a.  Macintosh HD:Users:lisahoneyman:Desktop:Screen shot 2014-01-29 at 8.40.48 PM.png | b.  Macintosh HD:Users:lisahoneyman:Desktop:Screen shot 2014-01-29 at 8.41.13 PM.png |

16. Identify whether or not each of these sequences of numbers comes from a polynomial function. If it does, indicate its degree.

a.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| *x* | 1 | 2 | 3 | 4 | 5 | 6 |
| *y* | 1 | 15 | 53 | 127 | 249 | 431 |

b.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| *x* | 1 | 2 | 3 | 4 | 5 | 6 |
| *y* | -8 | -6 | -2 | 6 | 22 | 54 |

ANSWERS:

1a. growth 1b. decay 1c. neither 1d. decay (note the negative exponent)

2a. 0.80 2b. 0.99 2c. 1.015

3.  4. 

5.  6. 

7. a. decay 7b. all Real numbers 7c. all positive Reals 7d. 2.5 7e. I

8a.  8b. degree = 5 8c. 7 8d. -12 8e. -4 8f. trinomial

9a.  9b. 

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Root | multiplicity | type |  | Root | multiplicity | type |
| 10a. | 0  5/2  -2/3 | 2  1  1 | rational  rational  rational | 10b. | 0  5  -1/4 | 1  3  2 | rational  rational  rational |
| 10c. | 2  -2  i  -i | 3  3  1  1 | rational  rational  complex  complex | 10d. | 2 | 7  1 | rational  irrational |

11a. no (the 25 would need to be positive) 11b. yes: (2x – 3)(2x – 3) = 

11c. yes:  11d. yes: 

12a. yes: (x + 10)(x – 10) 12b. no; It is a sum of squares, not a difference.

13a. x(x – 10) 13b.  13c.  13d. (x + 3)(x + 6)

13e. (a + 9)(a – 9) 13f. (y – 1)(y – 8) 13g. x(x – 8)(x + 5) 13h. 

13i. (3x + 1)(x + 1) 13j. (2x + 7)(x – 1) 13k. 5x(x + 1)(x – 1) 13l. (3x + 1)(x – 1)

13m. (x + 5)(3x – 2) 13n. (a + 5)(a – 4) 13o. (8x + y)(8x – y) 13p. (5x – 2)(x – 6)

14a. (x + 4)(x + 1) = 0;  14b. (x + 7)(x – 3) = 0; 

14c. x(x – 10) = 0;  14d. (4x + 1)(4x – 1) = 0; 

14e. (3x – 1)(x + 2) = 0;  14f. 2(x + 5)(x + 3) = 0; 

15a. (2x + 3)(x – 1) = 0;  15b. (x + 1)(x – 2) = 0; 

16a. This sequence comes from a polynomial function with degree 3; the common difference will be 12.

16b. This sequence does not come from a polynomial function. The pattern: 2 4 8 16 32 etc. repeats itself in successive rows. (That means the values came from an exponential function).