**UNIT 3 STUDY GUIDE**

**Parent Functions**: Fill in the table, identify the domain and range, and draw each graph.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Absolute Value: f(x) = |x|

|  |  |
| --- | --- |
| X | Y |
| -2 |  |
| -1 |  |
| 0 |  |
| 1 |  |
| 2 |  |

Domain: \_\_\_\_\_\_\_\_\_\_\_\_\_ Range: \_\_\_\_\_\_\_\_\_\_\_\_\_ Even or Odd: \_\_\_\_\_\_\_\_\_\_\_\_\_ | Square Root: f(x) = $\sqrt{x}$

|  |  |
| --- | --- |
| X | Y |
|  | 0 |
|  | 1 |
|  | 2 |
|  | 3 |
|  | 4 |

Domain: \_\_\_\_\_\_\_\_\_\_\_\_\_ Range: \_\_\_\_\_\_\_\_\_\_\_\_\_ Even or Odd: \_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Quadratic: f(x) = x2

|  |  |
| --- | --- |
| X | Y |
| -2 |  |
| -1 |  |
| 0 |  |
| 1 |  |
| 2 |  |

Domain: \_\_\_\_\_\_\_\_\_\_\_\_\_ Range: \_\_\_\_\_\_\_\_\_\_\_\_\_ Even or Odd: \_\_\_\_\_\_\_\_\_\_\_\_\_ | Cubic: f(x) = x3

|  |  |
| --- | --- |
| X | Y |
| -2 |  |
| -1 |  |
| 0 |  |
| 1 |  |
| 2 |  |

Domain: \_\_\_\_\_\_\_\_\_\_\_\_\_ Range: \_\_\_\_\_\_\_\_\_\_\_\_\_ Even or Odd: \_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Cubed Root: f(x) = $\sqrt[3]{x}$

|  |  |
| --- | --- |
| X | Y |
| -8 |  |
| -1 |  |
| 0 |  |
| 1 |  |
| 8 |  |

Domain: \_\_\_\_\_\_\_\_\_\_\_\_\_ Range: \_\_\_\_\_\_\_\_\_\_\_\_\_ Even or Odd: \_\_\_\_\_\_\_\_\_\_\_\_\_ |  |

**Transformations**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 1. y = $\sqrt[3]{x+4}-1$

 | 1. y = –|x–1|+2

 | 1. y = x3 – 3

 | 1. y = (x + 2)2 + 2

 | 1. y = –$\sqrt{x+2}+2$

 |
| Below, describe the transformations above using complete sentences. |  |
|  |  |  |  |  |

**Function Operations**

1. If f(x) = 4x2 + 1, and g(x) = 5x3, find (f•g)(x).
2. If f(x) = 9x + 4 and g(x) = -17x – 2, find (f+g)(x).
3. If f(x) = 5x – 3 and g(x) = 2x3 – 3x, find (f•g )(4).
4. If (h – g)(x) = 33x2 – 4x – 2 and g(x) = x + 1, find h(x).

**Piecewise Functions**

|  |
| --- |
| 1. 4, if x < 2 f(x) = x2, if 2 ≤ x ≤ 6  3x – 18, if x > 6http://origin.myfonts.net/116/fs/u/6f/6ed9ba52d29538fc9728439e813ef6.gifContinuous or Discontinuous?1. f(-3) b) f(4) c) f(11)
 |
| 2.  2x + 5, if x < -3 f(x) = x, if -3 ≤ x < 2  -6, if x ≥ 2Continuous or Discontinuous?http://origin.myfonts.net/116/fs/u/6f/6ed9ba52d29538fc9728439e813ef6.gif1. f(-2) b) f(0) c) f(8)
 |
| 3. When a diabetic takes long-acting insulin, the insulin reaches its peak effect on the blood sugar level in about three hours. This effect remains fairly constant for 5 hours, then declines, and is very low until the next injection. In a typical patient, the level of insulin might be modeled by the following function.$ f \left(t\right)= \left\{\begin{array}{c}30t+100 if 0 \leq t \leq 3\\210 if 3<t \leq 8\\-70t+870 if 8<t \leq 12\\50 if 12<t \leq 24\end{array}\right.$Here, represents the blood sugar level at time *t* hours after the time of the injection. If a patient takes insulin at 6 am, find the blood sugar level at each of the following times. a. 8 am b. 12 pm c. 4 pm d. 6 pm  |