**Sketching Graphs and Comparing Functions ⸱ Form A**

**Examples 1 and 2**

**Use the key features of each function to sketch its graph.**

 **1. *x*-intercept:** (0, 0) **2. *x*-intercept:** (5, 0)

 ***y*-intercept:** (0, 0) ***y*-intercept:** (0, 2)

 **Linearity:** linear **Linearity:** linear

 **Continuity:** continuous **Continuity:** continuous

**Positive:** for values *x* < 0 **Positive:** for values *x* < 5

**Negative:** for values of *x >* 0**Decreasing:** for all values of *x*

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 as *x* → −∞, *f*(*x*) → ∞.

 **3. *x*-intercept:** (–3, 0) and (2, 0) **4. *x*-intercept:** (–2, 0) and (2, 0)

 ***y*-intercept:** (0, –4) ***y*-intercept:** (0, –1)

 **Linearity:** nonlinear **Linearity:** nonlinear

 **Continuity:** continuous **Continuity:** continuous

 **Positive:** for values *x* < −3 and *x* > 2 **Symmetry:** symmetric about the line *x* = 0

 **Negative:** for values of –3 < *x* < 2 **Positive:** for values *x* < −2 and *x* > 2

**Increasing:** for all values of *x* > 0 **Negative:** for values of –2 < *x* < 2

**Decreasing:** for all values of *x* < 0 **Increasing:** for all values of *x* > 0

**Extrema:** minimum at (0, −4) **Decreasing:** for all values of *x* < 0

 **End Behavior:** As *x* → ∞, *f*(*x*) → ∞ and **Extrema:** minimum at (0, −1)

 as *x* → −∞, *f*(*x*) → ∞. **End Behavior:** As *x* → -∞, *f*(*x*) → ∞and as
*x* → ∞, *f*(*x*) → ∞.

**Example 3**

 **5. SCOOTERS** Greg rides his motorized scooter for 20 minutes. Greg starts riding at 0 mph. Greg’s maximum speed is 35 mph, which he reaches 5 minutes after he starts riding. Greg’s speed increases steadily for 5 minutes. At the 10-minute mark, Greg decreases his speed for
2.5 minutes, then he stays at 20 mph for 5 minutes. At the 17.5-minute mark, he again decreases his speed for 2.5 minutes until he stops. Use the key features to sketch a graph.

**Examples 4 and 5**

 **6.** Compare the key features of the functions represented with a graph and a verbal description.

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**7.** Compare the key features of the functions represented with a graph and a verbal description.

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 **8.** Compare the key features of the functions represented with a graph and a table.

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**MIXED EXERCISES**

 **9. WATER** Sia filled a pitcher with water.The pitcher started with 0 ounces of water. After 8 seconds the pitcher contains 64 ounces of water. The function that models the situation is linear.

 **a.** Use the key features to sketch a graph.

 **b.** What is the end behavior of the graph? Explain.

 **~~10. USE A SOURCE~~** ~~Research the value of a new car after it is purchased. Use the information you collect to describe key features of a graph that represents the value of a new car~~ *~~x~~* ~~years after it is purchased. Then use the key features to sketch a graph.~~

 **11. CONSTRUCT ARGUMENTS** Keisha babysits for her aunt for an hourly rate of $9. The graph shows Keisha’s earnings *y* as a function of hours spent babysitting *x*. Explain why the graph only exists for positive *x*- and *y*-values.

 **~~12. CREATE~~** ~~Choose a function and create a list key features to describe the function. Then sketch the function.~~

 **13. ANALYZE** Determine whether the statement is *always*, *sometimes*, or *never* true.

*A graph that has more than one x-intercept is represented by a nonlinear function.*

** 14. FIND THE ERROR** Linda and Rubio sketched a graph with the following key features. The *x*-intercept is 2. The *y*-intercept is
–9. The function is positive for *x* > 2. As *x* → –∞, *f*(*x*) → –∞ and as *x* → ∞, *f*(*x*) → ∞. Is either graph correct based on the key features? Explain your reasoning.