*Review 7.1-7.2(****Key****)*

1. Given graph:



 a. Number of turning points:

 b. Zeros:

 c. Even or odd degree function: **Odd degree function; one end of the graph points up and the**

 **other end points down.**

 d. Leading coefficient positive or negative: **Positive; right-hand end of the graph points up.**

 e. Equation of the function in factored form:

2. Given

 a. Find the degree (without multiplying through).

 **The given polynomial is equivalent to:**

 **The degree is the sum of the degrees of the factors.**

 **Add exponents: Degree is 6**

 b. Find the zeros and state the multiplicity for each.

 ***Multiplicity* implies "how many times the zero occurs"**

 **0**

 **Multiplicity 1**

 **Multiplicity 2 (notice exponent "2")**

 **Multiplicity 3 (notice exponent "3")**

 ***Review*:**

 **If zero has even multiplicity (example, 2, 4, 6, etc.), graph touches the *x*-axis but turns around**

 **If zero has odd multiplicity (example, 1, 3, 5, etc.), graph crosses the *x*-axis.**

3. Determine if is a factor of *f* .

  **is a factor of if and only if .**

  **is equivalent to , therefore, .**

 **If is a factor of the given polynomial function, then .**

 **Thus, is a factor of .**

 **Notice that, if we construct the graph of the given function we can see that the graph**

 **has a zero (*x*-intercept) at .**

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4. Use your calculator to find all the real zeros of the function3.

 Approximate your answers to 4 decimal places.



[-6, 6, 1] by [-10,10,1] Windows may vary

 **Zeros are:** -

5. Find a polynomial that could be represented by the given graph.



 **We notice the following characteristics:**

**✓ Both ends of the graph are pointing up, which means that this is an even-degree polynomial**

 **with a positive leading coefficient.**

**✓ The graph touches the *x*-axis and turns around at ; this is a zero of even multiplicity. The**

 **zeros with odd multiplicity are 1 and 1 because the graph crosses the *x*-axis at these values.**

 **So, the real zeros are given at and .**

✓**The *y*-intercept is , therefore  *=* .**

 **Solving for , we have:**

 **Therefore:  *=***

6. Given

 a. Determine the domain. Write your answer using interval notation.

 **Division by zero is undefined, therefore, . This means .**

 **The domain is given by:**

 b. Find the vertical asymptote(s), if any.

 **Solving , we have . A vertical asymptote occurs at .**

 c. Find the horizontal asymptote, if it exists.

 **Degree of numerator = degree of denominator. The horizontal asymptote equals the ratio**

 **of the leading coefficients: . A horizontal asymptote occurs at**

7. Given

 a. Find the vertical asymptote(s), if any.

 **Solving , we have**

 **Vertical asymptotes occur at and .**

 b. Find the horizontal asymptote, if it exists.

 **Degree of numerator less than degree of denominator. The line is the horizontal**

 **asymptote.**

 c. Find the *x*-intercept.

 **We only need to set the numerator and solve for *x*: . Therefore, .**

 **The graph of the function will have an *x*-intercept at**

 **Optional: Confirm with graph.**

8. Abdul has a business designing and selling sports memorabilia. The average cost per unit (in dollars)

 for producing *x* number of items is given by the function  *=* .

 a. Find and interpret (150). Round to the nearest dollar and answer in a complete sentence.

**(150) = 4.9167 .**

 **The average cost per unit for producing 150 items is approximately $5.**

 b. If the average cost per unit is $3.05, how many items can Abdul produce? Round your answer to

 the nearest whole number.

 **Solving = 3.05, we have**

 **items**

 c. What is the domain in terms of this problem? Answer in a complete sentence.

 **The domain of this function is . Since represents the number of items produced,**

 **negative values would not make sense; in addition, there can be no average cost per unit if**

 **Abdul were to produce 0 items.**