Algebra 2 w/ Trig

2.6 Finding Rational Zeros

Warm-Up:

**Factor completely.**

**1.** *x*2*–* *x* *–* 12 **2.** 2*x*2*–* 5*x* *–* 3 **3. Use synthetic division to divide** 2*x*3*–* 3*x*2 *–* 18*x* *–* 8 by *x* *–* 4**.**

**4. The volume of a box is modeled by** *f* (*x*) = *x* (*x* *–* 1)(*x* *–* 2), **where** *x* **is the length in meters. What is the volume when the length is** 3 **meters.**

-------------------------------------------------------------NOTES-----------------------------------------------------------------------------Example 1: List Possible Rational Zeros

**List the possible rational zeros of** *f* **using the rational zero theorem.**

|  |  |  |
| --- | --- | --- |
| **EXAMPLE:** | **a.** *f* (*x*) = *x*3 + 2*x*2 – 11*x* + 12 | **b.** *f* (*x*) = 4*x*4 – *x*3 – 3*x*2 + 9*x*  – 10 |
| **Factors of the constant term:** |  |  |
| **Factors of the leading coefficient:** |  |  |
| **Possible rational zeros:** |  |  |
| **Simplified list of possible zeros:** |  |  |

YOU TRY:

|  |  |  |
| --- | --- | --- |
| **EXAMPLE:** | 1. *f* (*x*) = *x*3 + 9*x*2 + 23*x* + 15 | 2. *f* (*x*) =2*x*3 + 3*x*2 – 11*x* – 6 |
| **Factors of the constant term:** |  |  |
| **Factors of the leading coefficient:** |  |  |
| **Possible rational zeros:** |  |  |
| **Simplified list of possible zeros:** |  |  |

Example 2: Find Zeros when the Leading Coefficient is 1.

**Find all real zeros of** *f* (*x*) = *x*3 – 8*x*2 +11*x* + 20**.**

YOU TRY:

**Find all real zeros of the function.**

**3.** *f* (*x*) = *x*3 – 4*x*2 – 15*x* + 18 **4**. *f* (*x*) + *x*3 – 8*x*2 + 5*x+* 14

Example 3: Find Zeros when the Leading Coefficient is not 1.

**Find all real zeros of** *f* (*x*) =10*x*4 – 11*x*3 – 42*x*2 + 7*x* + 12**.**

YOU TRY:

**Find all real zeros of the function.**

**5.** *f* (*x*) = 48*x*3+ 4*x*2 – 20*x* + 3 **6.** *f* (*x*) = 2*x*4 + 5*x*3 – 18*x*2 – 19*x* + 42

****Example 4: Solve a Multi-Step Problem

**Some ice sculptures are made by filling a mold with water and then freezing it. You are** **making such an ice sculpture** **for a school dance. It is to be shaped like a pyramid with a height that is** 1 foot **greater than the length of each side of its square base. The volume of the ice sculpture is** 4 cubic feet**. What are the dimensions of the mold?**

Hw: Section 2.6 p. 132 #11-18, 24-35, 41-43

YOU TRY:

**7. WHAT IF? In Example** 4**, suppose the base of the ice sculpture has sides that are** 1 foot **longer than the height. The volume of the ice sculpture is** 6cubic feet**. What are the dimensions of the mold?**

KEEP GOING:

**1. List the possible rational zeros of**

**4. The volume** *V* **of a storage shed with a triangular**

**roof can be modeled by** *V* = *x*3 + *x*2(6 – *x*). **If**

 **the volume of the shed is** 80 cubic feet**, find** *x***.**

 *f(x)* = *x*3 + 8*x*2 – *x* + 4.

**For 2 and 3, find all real zeros of the functions**

**2.** *f(x)* = *x*3 – 3*x*2  – 6*x* + 8.

**3.** *f(x)* = 2*x*3 – 3*x*2  – 17*x* + 30.