Algebra 2 w/ Trig

2.5 Long and Synthetic Division of Polynomials

**1.** **Use the quadratic formula to solve** 2*x*2 *–*3*x –* 1 = 0**.**

**2.** **Use synthetic substitution to evaluate** *f*(*x*)=*x*3+*x*2*–*3*x**–*10 **when** *x* = 2**.**

 **Round the nearest hundredth.**

**3. A company’s income is modeled by the function** *P*=22*x*2*–* 571*x***. What is the value of** *P***when** *x* = 200?

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Example 1: Use Polynomial Long Division Example 2: Use Polynomial Long Division with a Linear Divisor

**Divide**  *f* (*x*) = 3*x*4 – 5*x*3 + 4*x* – 6 **by** *x*2 – 3*x* + 5**. Divide *f* (*x*) = *x*3 + 5*x*2 – 7*x* + 2 by *x* – 2.**

YOU TRY:

**Divide using polynomial long division.**

**1.** (2*x*4 + *x*3 + *x* – 1)  (*x*2 + 2*x* – 1) **2.** (*x*3 – *x*2 + 4*x* – 10) ÷ (*x* + 2)

Example 3: Use Synthetic Division Example 4: Factor a Polynomial

**Divide** *f*(*x*)= 2*x*3 + *x*2 – 8*x* + 5 **by** *x* + 3**.**

**Factor** *f* (*x*) = 3*x*3 – 4*x*2 – 28*x* – 16 **completely given that** *x* + 2 **is a factor.**

YOU TRY:

Divide using Synthetic Division

**3.** (*x*3 + 4*x*2 – *x* – 1) ÷ (*x* + 3) **4.** (4*x*3 + *x*2 – 3*x* + 7) ÷ (*x* – 1)

**Factor the polynomial completely given that** *x –* 4 **is a factor.**

**5.** *f* (*x*) = *x*3 – 6*x*2 + 5*x* + 12 **6.** *f* (*x*) = *x*3 – *x*2 – 22*x* + 40

Example 5: Multiple Choice!!



Example 6: Use a Polynomial Model

**The profit** *P***(in millions of** dollars**) for a shoe manufacturer can be modeled by** *P* = – 21*x*3 + 46*x***where** *x***is the number of shoes produced (in millions). The company** **now produces** 1 **million shoes and makes a profit of** $25,000,000**, but would like to cut back production. What lesser number of shoes could the company produce and still make the same profit?**

YOU TRY:

**Find the other zeros of** *f***given that** *f* (– 2) = 0**.**

**7.** *f* (*x*) = *x*3 + 2*x*2 – 9*x* – 18 **8.** *f* (*x*) = *x*3 + 8*x*2 + 5*x* – 14

**9. What if? In Example** 6**, how does the answer change if the profit for the shoe manufacturer is modeled by**

*P* =– 15*x*3 + 40*x***?**

Hw: Section 2.5 p. 124 #1-35 every other odd

KEEP GOING:

**1. Divide** 6*x*4 – *x*3 – *x*2 + 11*x* – 18 **by** 2*x*2 + *x* – 3. **3. Find the zeros if one zero of** *f(x)* = *x*3 – *x*2 – 17*x* – 15 **is** *x =* – 1.

**2. Use synthetic division to divide** *f(x)* = *x*3 – 3*x*2 – 5*x* – 25

**4. One of the costs to print a novel can be modeled**

 **by** *C* = *x*3 – 10*x*2 + 28*x,* **where *x* is the number of**

 **novels printed in thousands. The company now**

 **prints** 5000 **novels at a cost of** $15,000. **What**

 **other numbers of novels would cost about the**

 **same amount?**

 **by** *x* – 5.