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<b>10/16</b>	<b>1.12 4th Degree Factoring</b>	<b>64-65</b>

**Set up p. 64 for HW and p. 65 for notes**

<p><b>Save the dates!</b></p> <ul style="list-style-type: none"> <li>• Hackathon: <b>Oct 18</b> from 3:30-7PM - <b>FREE PIZZA</b></li> <li>• Hauncert - <b>Oct 24</b> at 7PM</li> <li>• ChicTech: <b>Nov 2-3</b> at U of I</li> <li>• NCWIT AiC Award - app <b>due 11/5</b></li> <li>• Code Day: <b>Nov 9-10</b> from noon to noon at IWU</li> </ul> <p style="text-align: right;"><b>64</b></p>	<p style="text-align: center;"><b>1.12 4th Degree Factoring</b></p> <div style="border: 1px solid black; padding: 5px; text-align: center;"> <p>work on 1.11 HW</p> <p>page</p> <p><b>NOW</b></p> </div> <p style="text-align: center;"><b>NO SUMMARY TODAY</b></p> <p style="text-align: right;"><b>65</b></p>
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Auction items

Mechanical pencil with full container of lead	170
Reese's mini peanut butter cups (10-ish)	460
Laffy Taffy four flavors 12 count	720
Gummy Krabby Patties 8-ish count	300
Warm Apple Pie scented candle	420
Cliff bar cool mint chocolate	50
Unsolved rubick's cube	saved for Nov
Sour patch kids watermelon (one bag) ←	1000
Post-its (blue)	saved for
One Quarter	November

## 1.11 HW

Write the revenue functions from today's lesson in standard form, then write it in vertex form.

$$R(x) = x(2000 - 40x)$$

$$R(x) = x(4200 - 60x)$$

Standard form:

\*use the distributive property

$$R(x) = \frac{-40x^2}{-40} + \frac{2000x}{-40}$$

Standard form:

\*use the distributive property

$$R(x) = -60x^2 + 4200x$$

Vertex form:

\*use completing the square

$$\left(\frac{-50}{2}\right)^2 = (-25)^2 = 625$$

$$\frac{R(x)}{-40} = (x^2 - 50x + 625) - 625$$

$$\frac{R(x)}{-40} = (x - 25)^2 - 625$$

$$R(x) = -40(x - 25)^2 + 25,000$$

Vertex form:

\*use completing the square

$$\frac{R(x)}{-60} = (x^2 - 70x + 1225) - 1225$$

$$\left(\frac{-70}{2}\right)^2 = (-35)^2 = 1225$$

$$\frac{R(x)}{-60} = (x - 35)^2 - 1225$$

$$R(x) = -60(x - 35)^2 + 73,500$$

## Applications continued

Find the length and width of a rectangle when its area is 55 square centimeters and its length is 6 cm shorter than its width.

Find the maximum height of a ball kicked into the air if the height of the ball over time is represented with the function  $h(t) = -16t^2 + 32t$ .

**We have been factoring quadratic expressions. Now, let's extend our factoring skills to factor higher degree polynomials that model quadratic form.**

**...this is a preview of the upcoming unit on polynomials**

**difference  
of two  
squares**

$$a^2 - b^2 \quad (x+5)^2 = x^2 + 10x + 25$$

$$x^2 - 25 \quad (x+5)(x-5)$$

$$x^2 - 1 \quad (x+1)(x-1)$$

$$9x^2 - 4 \quad (3x-2)(3x+2)$$

**sum of two  
squares**

$$a^2 + b^2 \quad \text{only possible w/ complex numbers}$$

**perfect  
square  
trinomial**

$$a^2 + 2ab + b^2$$

$$x^2 + 10x + 25 = (x+5)^2$$

**Quadratic  
Expression**

*Factor into  
two binomials.*

**Factor**  $x^2 - 8x + 16$

$$(x-4)(x-4)$$

$$\text{or } (x-4)^2$$

**4<sup>th</sup> Degree  
Polynomial in  
Quadratic Form**  
*notice the similar  
structure?*

**Factor**  $x^4 - 8x^2 + 16$

$$(x^2 - 4)(x^2 - 4)$$

$$(x-2)(x+2)(x-2)(x+2)$$

$$\text{rewrite } (x-2)^2(x+2)^2$$

**Factor.**

$$4x^4 - 17x^2 + 4$$

$$4 \cdot 4 = 16 \quad 4x^4 - 16x^2 - 1x^2 + 4$$

$$\begin{array}{l} \textcircled{1 \cdot 16} \\ 2 \cdot 8 \\ 4 \cdot 4 \end{array} \quad 4x^2(x^2 - 4) - 1(x^2 - 4)$$

Pretend  $4x^2 - 17x + 4 = (x^2 - 4)(4x^2 - 1)$

$$(x-2)(x+2)(2x-1)(2x+1)$$

$\downarrow \qquad \downarrow \qquad 2x-1=0 \quad 2x+1=0$

**Solve.**

$$4x^4 - 17x^2 + 4 = 0 \quad x = 2, -2, \frac{1}{2}, -\frac{1}{2}$$

**Factor.**

1.  $x^4 - 2x^2 + 1$

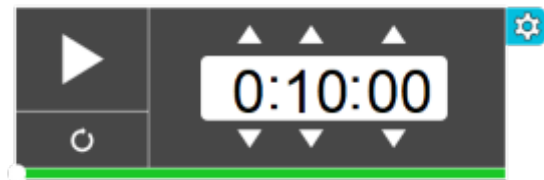
2.  $x^4 - 16$

3.  $x^4 + 6x^2 + 5$

4.  $x^4 - 7x^2 + 12$

5.  $2x^4 + 7x^2 + 5$

6.  $x^4 - 81$



$$(x^2 - 3)(x^2 - 4)$$

$$(x^2 - 3)(x + 2)(x - 2)$$

## Answers

$$1. x^4 - 2x^2 + 1 = (x^2 - 1)(x^2 - 1) \text{ or } (x+1)^2(x-1)^2$$

$$= (x+1)(x-1)(x+1)(x-1)$$

$$2. x^4 - 16 = (x^2 - 4)(x^2 + 4) = (x-2)(x+2)(x^2 + 4)$$

$$3. x^4 + 6x^2 + 5 = (x^2 + 5)(x^2 + 1)$$

$$4. x^4 - 7x^2 + 12 = (x^2 - 4)(x^2 - 3) = (x-2)(x+2)(x^2 - 3)$$

$$5. 2x^4 + 7x^2 + 5 = (2x^2 + 5)(x^2 + 1)$$

$$6. x^4 - 81 = (x^2 - 9)(x^2 + 9) = (x+3)(x-3)(x^2 + 9)$$

### 1.12 HW

Solve the equation.

7.  $x^4 - 5x^2 + 4 = 0$

8.  $x^4 - 16 = 0$

9.  $6x^4 + 7x^2 - 3 = 0$

10.  $x^4 - 6x^2 + 9 = 0$

11.  $2x^4 + 9x^2 = 5$

12.  $x^4 - 13x^2 = -36$