

# MPM2D – Unit 3 – Review Worksheet

## Part 1 – Graphing Quadratic Relations from Factored Form

1. For each of the quadratic relations listed below:
  - a. Factor the equation.
  - b. State the coordinates of the x-intercepts.
  - c. Determine the axis of symmetry.
  - d. Determine the maximum or minimum value.
  - e. State the vertex.
  - f. Graph the parabola.
  - i.  $y = x^2 + 4x + 3$
  - ii.  $y = x^2 + x - 2$
  - iii.  $y = x^2 - 2x - 8$
  - iv.  $y = -3x^2 + 9x$
  - v.  $y = \frac{1}{2}x^2 + x - 4$
  - vi.  $y = -x^2 + 2x + 3$
  - vii.  $y = x^2 - 6x$
  - viii.  $y = -2x^2 + 6x$
  - ix.  $y = -3x^2 - 12x$
  - x.  $y = -2x^2 + 12x - 16$
2. Write the equation for a quadratic relation that has zeros at 2 and 3 and the same step pattern as the base graph. Express your answer in factored form and then in standard form.
3. Write the equation for a quadratic relation that has zeros at 2 and 3 and is vertically reflected and stretched by a factor of 4. Express your answer in factored form and then in standard form.
4. Write the equation for a quadratic relation that has zeros of 5 and -6 and a vertical compression by a factor of  $\frac{1}{2}$ . Express your answer in factored form and then in standard form.
5. Write the equation for a quadratic relation that has zeros at 7 and -1 and is vertically stretched by a factor of 2. Express your answer in factored form and then in standard form and then in vertex form.
6. Page 320 #4

## Part 2 – Solving Revenue Problems

1. A sportswear store sells baseball caps with the local baseball team's logo on them. Last year, the store sold 600 caps at \$15 each. The store manager is planning to increase the price. A consumer survey shows that for every \$1 increase in price, there will be a drop of 30 sales a year.
  - a. What should the selling price be to maximize the annual revenue?
  - b. What is the maximum annual revenue from the caps?
2. An amusement park charges \$8 admission and averages 2000 visitors per day. A survey shows that for each \$1 increase in admission price, 100 fewer people will visit the park.
  - a. What admission price gives the maximum revenue?
  - b. How many visitors will attend the park to achieve maximum revenue?
3. If a farmer harvests his crop today, he will have 800 baskets worth \$2 per basket. Every week he waits the crop increases by 200 baskets, but the price decreases by 10¢ per basket.
  - a. When should he harvest his crop for maximum revenue?
  - b. What price per basket will he be able to charge for his crop?
  - c. What is the maximum revenue the farmer can earn?
4. Calculators are sold to students for \$20 each and three hundred students are willing to buy them at this price. For every five dollar increase in price, there are thirty fewer students willing to buy a calculator from the school.
  - a. What selling price will produce the maximum revenue?
  - b. What is the maximum revenue the school will earn?
5. A sporting goods store sells basketball shorts for \$8. At this price their weekly sales are approximately 100 items. Research says that for every \$2 increase in price, the manager can expect the store to sell five fewer pairs of shorts.
  - a. Determine the maximum revenue the manager can expect based on these estimates.
  - b. What selling price will give the maximum revenue?
  - c. How many shorts will be sold to achieve maximum revenue?
6. 600 people will attend a show when the admission price is \$4.50. For each 25¢ increase in price, the attendance will decrease by 20 people. What admission price will give the maximum revenue?

7. The Summer Theatre charges \$10 per ticket and it has had a full house of 500 nightly. The manager estimates that the ticket sales would decrease by 50 for each \$2 increase in ticket cost.
  - a. What is the most profitable price to charge for each ticket?
  - b. At this new price what is the maximum revenue the Summer Theater can expect to generate?
8. The current price of an amateur theatre ticket is \$20 and the venue typically sells 500 tickets a night. A survey found that for each \$1 increase in ticket price, 10 fewer tickets are sold.
  - a. How many price increases will maximize the revenue?
  - b. What ticket price will achieve the maximum revenue?
  - c. What is the maximum revenue earned?
9. TPS team photos sell for \$10 each. The coaches have found that they sell an average of 30 photographs per team. The coaches do a survey and find out that for each reduction in price of 50¢, an additional two photographs will be sold. At what price will the revenue be a maximum for the photographers?
10. Textbook page 321 #21

### **Part 3 – Factoring**

Please complete the following questions from the textbook:

Page 256-257 #9, 11, 14, 15, 16, 17, and 19

Page 258-159 #5abc, 7, 8(no a)

Page 320 #11, 12,

### **Part 4 – Problem Solving**

Please complete the following questions from the textbook:

Page 256-257 #12 and 18

Page 258-259 #12 and 13

### **Part 5 – One last question**

Graph  $y = 0.2x^2 - 2.4x - 12.8$  by determining where y is:

a) equal to zero

b) a minimum value

