IM1 Problem Set 53

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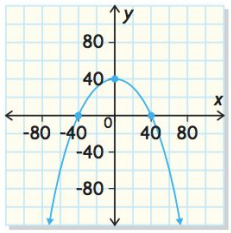
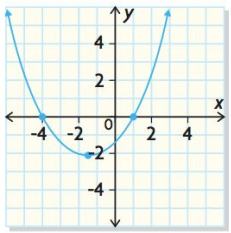
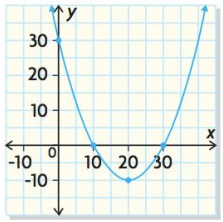
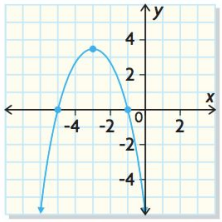
53.1	Use your calculator and a standard view window to graph and analyze the following functions: (Your analysis will include x- and y-intercepts and vertex and axis of symmetry. a. $y = 2(x + 4)(x - 2)$ b. $y = \frac{1}{2}(x - 3)(x + 5)$ c. $f(x) = -3(x - 1)(x + 3)$
53.2	Factoring Quadratics: Changing from standard form to factored form a. Find 2 numbers that will add to a sum of 1 and multiply to a product of -6. b. Graph $y = x^2 + x - 6$ and then graph $y = (x + 3)(x - 2)$. What do you notice? c. How are these two questions related? d. Find 2 numbers that will add to a sum of 2 and multiply to a product of -8. e. Graph $y = x^2 + 2x - 8$ and then graph $y = (x + 4)(x - 2)$. What do you notice? f. Find 2 numbers that will add to a sum of 10 and multiply to a product of 21. g. Graph $y = x^2 + 10x + 21$ and then graph $y = (x + 7)(x + 3)$. What do you notice
53.3	The function $B(x) = -x^2 + 12x + 155$ models the number of books, $B(x)$, sold in a bookstore x days after an award winning author appeared at an autograph-signing reception. a. Explain what $B(14) = 127$ means in the context of the problem. b. How many books were sold on the day that the author appeared at the autograph signing reception? c. What was the first day that at least 180 copies of the book were sold? d. State a reasonable domain and range for this model.
53.4	Expand and simplify the following polynomial expressions: a. (i) $(3x + 2)(2x - 1)$ (ii) $(4x + 2)(3x - 5)$ b. (i) $(x + 5)^2$ (ii) $(x - 4)^2$

53.5	For each graph, state the x-intercept and then use the x-intercepts to determine the equation of the parabola in the form of $y = a(x + \boldsymbol{R})(x - \boldsymbol{S})$ a)  c)  b)  d) 
53.6	A projectile is fired from a cliff 200 feet above the water at an inclination of 45° to the horizontal, with a muzzle velocity of 50 feet per second. The height, h, of the projectile above the water is given by $h(x) = -\frac{32}{50^2}x^2 + x + 200$ where x is the horizontal distance of the projectile from the face of the cliff. a. State the window settings you used to see the parabola. b. At what horizontal distance from the cliff is the height of the projectile a maximum? c. Find the maximum height of the projectile. d. At what horizontal distance from the cliff will the projectile strike the water? e. When the height of the projectile is 100 feet above the water, how far is it from the cliff? f. State a domain and range for the model, given the context of the problem.
53.7	Working with "Special Quadratics." for all of the quadratic equations presented, graph them on the calculator and then using the graph, write the equation of each quadratic in factored form. Finally, explain any observations that you make in terms of why these quadratics are "special". a. (i) $x^2 - 64$ (ii) $x^2 - 25$ (iii) $x^2 - 36$ (iv) $2x^2 - 98$ b. (i) $x^2 + 10x + 25$ (ii) $x^2 - 4x + 4$ (iii) $x^2 + 8x + 16$ (iv) $x^2 - 12x + 36$
53.8	Fun times today and thanks for your participation and efforts in this situation. As requested, I am putting the video of the recorded lesson into our shared google folder ==> (address link below) https://drive.google.com/drive/folders/12SwzmIuNrofSFnJxpHtQ67tCcCTp7LSN