

Name: _____

Date: _____

Pre Calculus 11 HW: Section 3.3 Completing the Square

1. Indicate what value should be added to the trinomial so that the equation could be a perfect trinomial:

a) $x^2 + (?) + 9$	b) $x^2 + 8x + (?)$
c) $(?) - 2x + 1$	d) $x^2 - (?) + 81$
e) $x^2 - 15x + (?)$	f) $x^2 + 17x + (?)$
g) $4x^2 + 4x + (?)$	h) $9x^2 - (?) + 1$

2. Given each equation in to general form: $y = a(x - p)^2 + q$ by completing the square. Show all your steps:

a) $y = x^2 + 4x - 20$	b) $y = x^2 - 8x - 20$
<i>Equation:</i>	<i>Equation:</i>
c) $y = -x^2 - 14x - 15$	d) $y = 4x^2 + 20x - 12$
<i>Equation:</i>	<i>Equation:</i>

$$e) y = 2x(x-5)$$

Equation:

$$f) y = 3x^2 + 6x + 10$$

Equation:

$$g) y = -2x^2 - 15x + 100$$

Equation:

$$h) y = -3x^2 + 18x + 50$$

Equation:

$$e) y = -7x^2 + 182x + 100$$

Equation:

$$f) y = \frac{1}{2}x^2 + 8x - 30$$

Equation:

3. Two numbers have a difference of 10. Their product is a minimum. Determine the numbers

4. The sum of two natural numbers is 12. Their product is a maximum. Determine the numbers

5. A rectangular area is enclosed by a fence and separated into 2 rectangular regions as shown. With 800m of fencing, what is the maximum area that could be enclosed. Find the dimensions of the enclosed area.



6. Suppose the rectangular fence is to be separated into 3 rectangular regions as shown. Again, with 800m of fencing, find the maximum area that could be enclosed. Find the dimensions of the enclosed area.



7. A company that charters a boat for tours around Vancouver Island can sell 200 tickets at \$50 each. For every \$10 increase in the ticket price, 5 fewer tickets will be sold. What selling price will provide the maximum revenue? What is the maximum revenue?

8. A Broadway musical sells 400 tickets each day at \$30 per ticket. For every increase of \$3.00, they lose 20 sales. What should their ticket price be to yield the maximum revenue?
9. A company sells its bikes at \$300 each and can sell 70 in a season. For every \$25 increase in the price, the number sold drops by 10. What price will yield the maximum revenue?
10. A farmer wants to make a rectangular corral by using his barn wall as one of the sides of the corral. If the farmer has only 60m of fence, what length for the rectangular corral would maximize the area?
11. Challenge: This one is super hard. The parabola $y = f(x) = x^2 + bx + c$ has vertex "P" and the parabola $y = g(x) = -x^2 + dx + e$ has vertex "Q", where "P" and "Q" are distinct points. The two parabolas also intersect at "P" and "Q". Prove that $2(e - c) = bd$.