Name: _____ Date: _____

Math 10 HOnours Chapter 2 Review #4 Quadratic Functions

1. Solve by factoring

a) $x^2 - x - 56 = 0$

b) $6x^2 + 7x - 20 = 0$

c) $9x^2 - 64 = 0$

d) $9x^2 - 42x + 49 = 0$

e) $25m^2 - 49 = 0$

f) $16y^2 + 72y + 81 = 0$

2. Complete the square and convert to $y = a(x - p)^2 + q$ form. Indicate the coordinates of the vertex

a) $y = 3x^2 - 12x + 7$

b) $y = 0.5x^2 - 5x - 3$

c) $y = 4x^2 - 12x + 9$

d) $y = -2x^2 - 14x - 1$

3. Solve by completing the square.

a) $5x^2 - 30x + 8 = 0$

b) $-\frac{1}{3}x^2 + 4x - 5 = 0$

c) $6x^2 + 30x + 5 = 0$

d) $-\frac{1}{2}x^2 - \frac{9}{2}x + 5 = 0$

4. Solve by using the quadratic formula.

a) $6x^2 + x - 48 = 0$

b) $5x^2 - 7x = 90$

c) $0.4x^2 + 0.2x = 1.7$

d) $\frac{7}{2}x^2 - \frac{1}{2} = x$

5. Use the discriminant to determine the nature of the root.

a) $x^2 - 8x - 12 = 0$

b) $2x^2 - 5x - 12 = 0$

6. For what values of k does each equation have two different real roots?

a) $x^2 + kx + 9 = 0$

b) $3x^2 + kx + 27 = 0$

7. For what values of m does each equation have two equal real roots?

a) $4x^2 + mx + 9 = 0$

b) $(2m-1)x^2 - 8x + 6 = 0$

8. For what values of n does each equation have no real roots?

a) $5x^2 + mx + 20 = 0$

b) $nx^2 - 5x + n = 0$

9. A ball is thrown into the air from the balcony of a condo and falls to the ground. The height h meters of the ball relative to the ground t seconds after being thrown is given by $h = -5t^2 + 18t + 20$. When will the ball reach 28 meters?

10. A rectangular lot is bordered on one side by a stream and on the other three sides by 200 meters of fencing. What are the dimensions of the lot if its area is 4350 m^2.

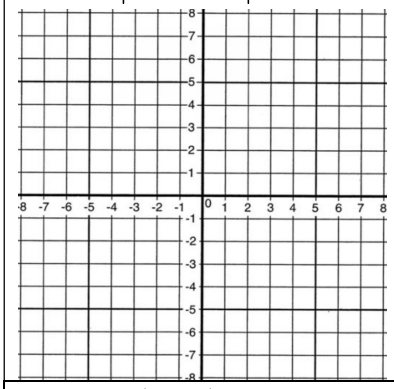
11. The second number is 4 more than 3 times the first number and their product are 480. Find the numbers.

12. A metal wire, 40 cm long, is cut in two and each piece bent to form a square. If the sum of their areas is 58 cm^2, how long is each piece of wire?

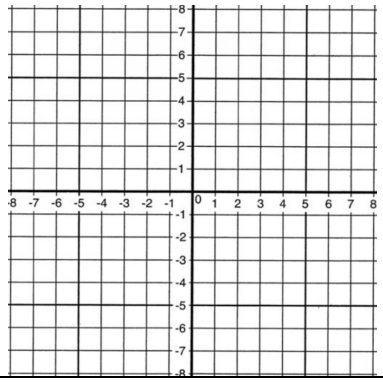
13. A family plans to fence in a rectangular patio area behind their house. They have 200 feet of fence to use. One side of the rectangle is the back of the house. What should be the dimensions of the rectangular region if they want to make the patio area enclosed as large as possible

14. Graph the following functions, state the piecewise function, and then state the domain and range:

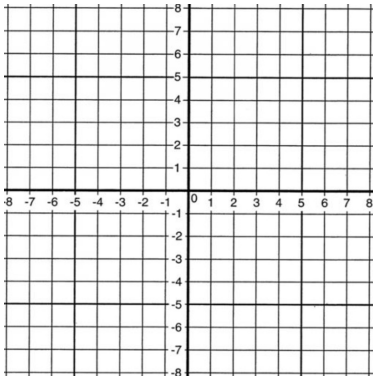
a) $y = |x^2 - x - 6|$



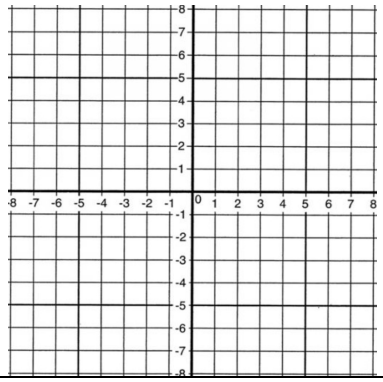
b) $y = |0.5x^2 - x - 1.5|$



c) $y = -|x + 3| + 5$



d) $y = -|(x - 4)^2 + 6|$



15. Solve for x.

a) $|x - 3| = x - 4$

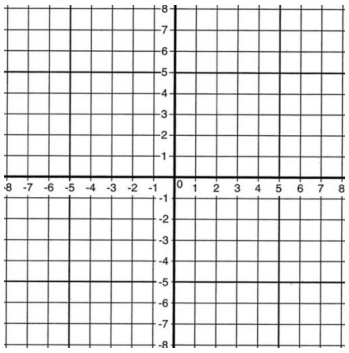
b) $|2x - 3| = x + 4$

c) $|x^2 + 9| = 6x$

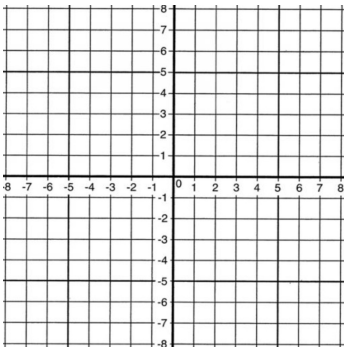
d) $|2x^2 - x - 6| = 2x + 1$

16. Graph the following reciprocal functions.

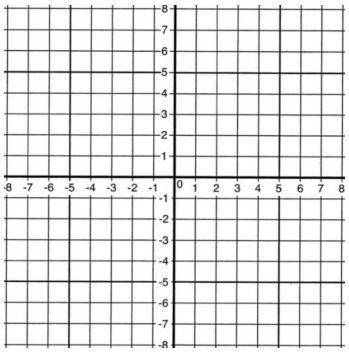
a) $y = \dfrac{1}{0.5x+2}$



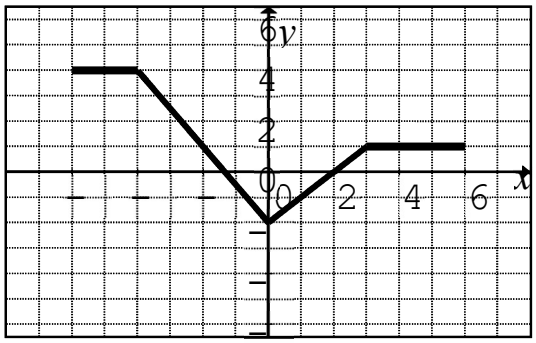
b) $y = \dfrac{-2}{(x-4)^2+8}$



c) $y = \dfrac{1}{(x-2)(x+3)}$



d) $y = \dfrac{1}{f(x)}$



17. A quadratic polynomial $f(x) = x^2 + px + q$ has two roots where one is twice the other:[Euclid]

a) If $f(x) = -15$, then what is the value of "q"?

b) If one of the roots is equal to 4, determine all the possible values of $p+q$

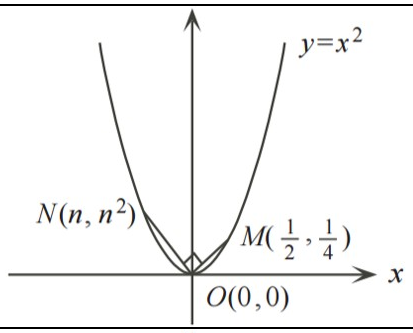
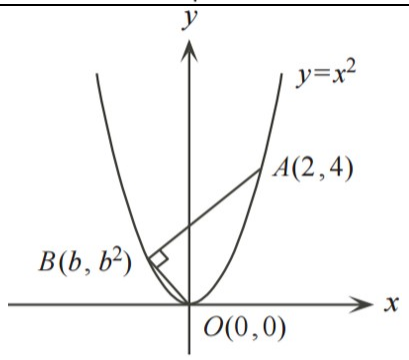
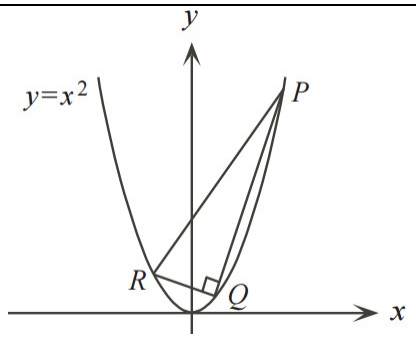
c) If $p+q=9$, then determine all the possible functions $f(x)$

18. Given the parabola $y = (x-3)^2 + 1$ [Euclid]

a) Find the coordinates of the vertex
b) If the parabola is shifted 3 units left and 3 units up, what is the equation of the new parabola?

c) Determine the points of intersection between the two parabolas

d) The parabola $y = ax^2 + 4$, $a < 0$ touches the parabola $y = (x-3)^2 + 1$ at only one point. Determine the value of "a"

19. Points $M\left(\frac{1}{2},\frac{1}{4}\right)$ and $N\left(n,n^2\right)$ lie on the parabola with equation $y=x^2$, as shown. Determine the value of "n" such that $\angle MON = 90°$	
20. Points $A(2,4)$ and $B\left(b,b^2\right)$ are the endpoints of a chord of the parabola with equation $y=x^2$. Determine the value of "b" so that $\angle ABO = 90°$	
21. Right-angled triangle PQR is inscribed in the parabola with equation $y=x^2$ as shown. Points "P", Q, and R have coordinates $\left(p,p^2\right)$, $\left(q,q^2\right)$, and $\left(r,r^2\right)$. If p, q, and r, are integers, show that $p+q+r=0$	

22. Challenge: The graphs of $y=3\left(x-h\right)^2+j$ and $y=2\left(x-h\right)^2+k$ have y-intercepts of 2013 and 2014, respectively, and each graph has two positive integer x-intercepts. Find "h" [aime]