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| READY, SET, GO! | Name _____ | Period _____ | Date _____ |
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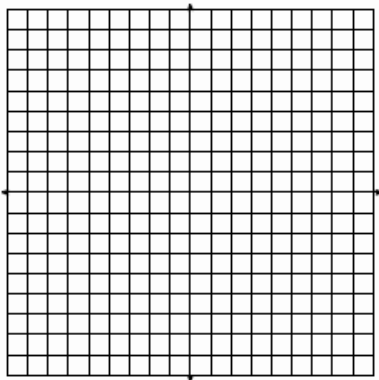
READY

Start 8.4

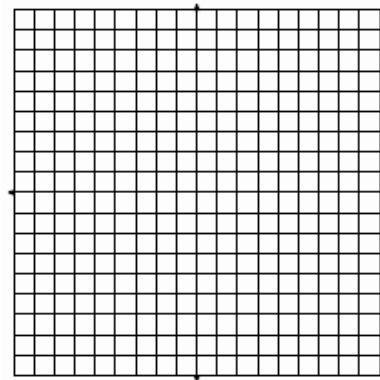
Topic: Graphing Quadratics

Graph each set of functions on the same coordinate axes. Describe in what way the graphs are the same and in what way they are different.

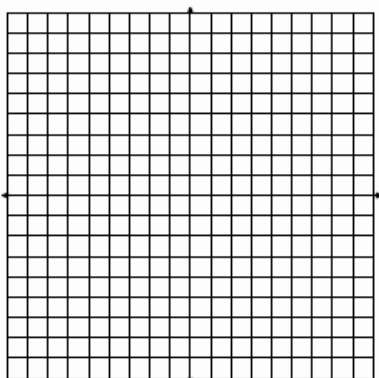
1. $y = x^2, y = 2x^2, y = 4x^2$



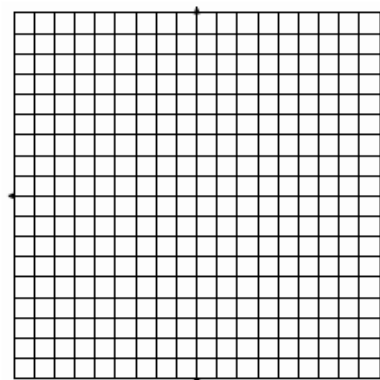
2. $y = \frac{1}{4}x^2, y = -x^2, y = -4x^2$



3. $y = \frac{1}{4}x^2, y = x^2 - 2, y = \frac{1}{4}x^2 - 2, y = 4x^2 - 2$



4. $y = x^2, y = -x^2, y = x^2 + 2, y = -x^2 + 2$



SET

Topic: Sketching a parabola using the conic definition.

Use the conic definition of a parabola to sketch a parabola defined by the given focus F and the equation of the directrix.

Begin by graphing the focus, the directrix, and point P_1 . Use the distance formula to find FP_1 and find the vertical distance between P_1 and the directrix by identifying point H on the directrix and counting the distance. Locate the point P_2 , (the point on the parabola that is a reflection of P_1 across the axis of symmetry.) Locate the vertex V . Since the vertex is a point on the parabola, it must lie equidistant between the focus and the directrix. Sketch the parabola. Hint: the parabola always "hugs" the focus.

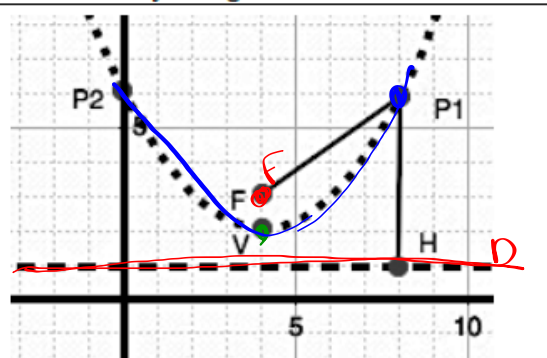
Example: $F(4,3), P_1(8,6), y=1$

$$FP_1 = \sqrt{(4-8)^2 + (3-6)^2} = \sqrt{16+9} = \sqrt{25} = 5$$

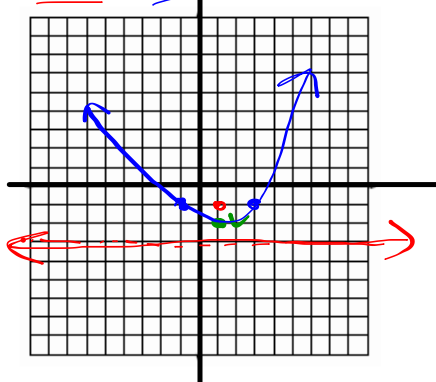
$$P_1H = 5$$

P_2 is located at $(0, 6)$

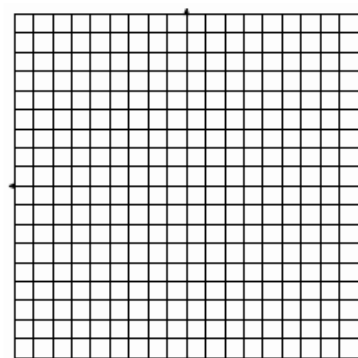
V is located at $(4, 2)$



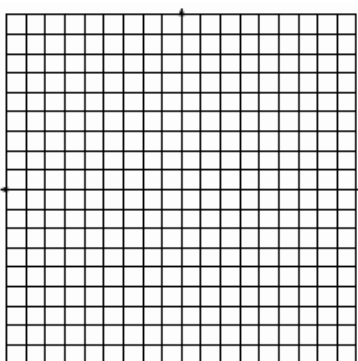
5. $F(1,-1), P_1(3,-1), y=-3$



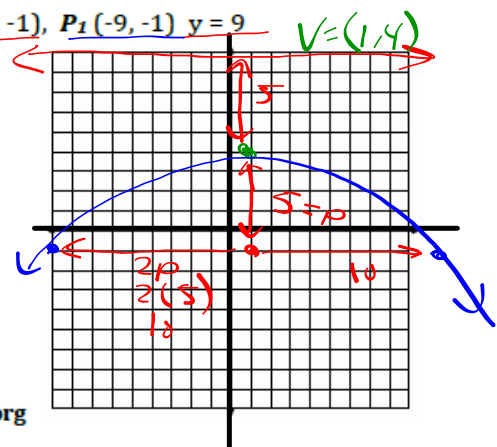
6. $F(-5,3), P_1(-1,3), y=7$



7. $F(2,1), P_1(-2,1), y=-3$

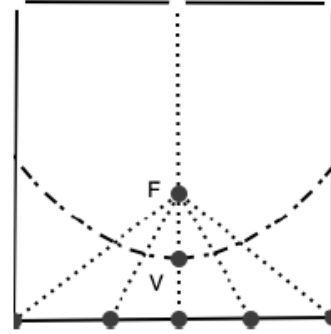


8. $F(1,-1), P_1(-9,-1), y=9$



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9. Find a square piece of paper (a post-it note will work). Fold the square in half vertically and put a dot anywhere on the fold. Let the edge of the paper be the directrix and the dot be the focus. Fold the edge of the paper (the directrix) up to the dot repeatedly from different points along the edge. The fold lines between the focus and the edge should make a parabola.



Experiment with a new paper and move the focus.
Use your experiments to answer the following questions.

10. How would the parabola change if the focus were moved up, away from the directrix?
11. How would the parabola change if the focus were moved down, toward the directrix?
12. How would the parabola change if the focus were moved down, below the directrix?

GO

Topic: Finding the center and radius of a circle.

Write each equation so that it shows the center (h, k) and radius r of the circle. This called the standard form of a circle. $(x - h)^2 + (y - k)^2 = r^2$

13. $x^2 + (y^2 + 4y) - 12 = 0$ $\div 12$
 $x^2 + (y^2 + 4y + 4) = 12 + 4$
 $x^2 + (y + 2)^2 = 4^2$
14. $x^2 + y^2 - 6x - 3 = 0$
 $(x^2 - 6x + 9) + y^2 = 3 + 9$
 $(x - 3)^2 + y^2 = (\sqrt{12})^2 = (2\sqrt{3})^2$
15. $x^2 + y^2 + 8x + 4y - 5 = 0$
 $(x^2 + 8x + 16) + (y^2 + 4y + 4) = 5 + 16 + 4$
 $(x + 4)^2 + (y + 2)^2 = 5^2$
16. $x^2 + y^2 - 6x - 10y - 2 = 0$
17. $x^2 + y^2 - 6y - 7 = 0$
18. $x^2 + y^2 - 4x + 8y + 6 = 0$

19. $x^2 + y^2 - 4x + 6y - 72 = 0$
20. $x^2 + y^2 + 12x + 6y - 59 = 0$

21. $x^2 + y^2 - 2x + 10y + 21 = 0$ $+1+25$
 $(x - 1)^2 + (y + 5)^2 = \sqrt{5}$
22. $(4x^2 + 4y^2 + 4x - 4y - 1 = 0) \div 4$
 $(x^2 + x -) + (y^2 - y -) = \frac{1}{4} + _ + _$