

Chapter 10 & 11 Final Exam Questions

Note Title

5/28/2016

Section 10.1 page 610

$$13) \quad x = (y-2)^2 + 3$$

$$x - 3 = (y-2)^2$$

$$x - h = a(y - k)^2 \quad \text{parabola}$$

(h, k) vertex, $a > 0$ right,
 $a < 0$ left, $|a| > 1$ thin,

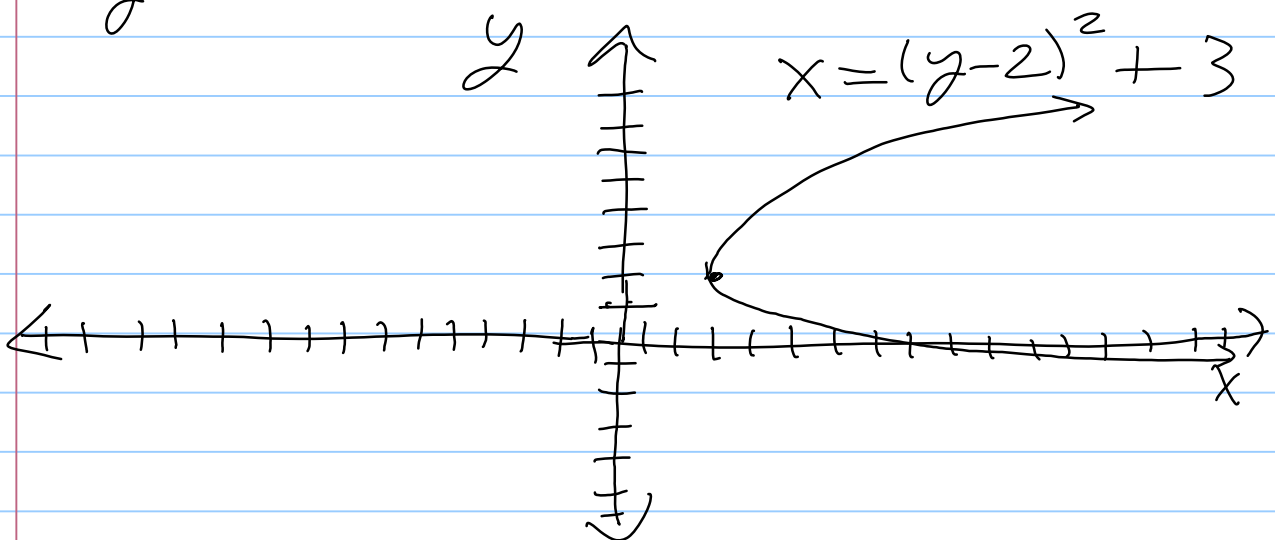
$0 < |a| < 1$ fat

$$\Rightarrow V(3, 2)$$

$$a = 1 > 0 \quad \text{right}$$

$|a| = 1$ same shape as

$$y = x^2$$



$$15) \quad y = -3(x-1)^2 + 5$$

-5

-5

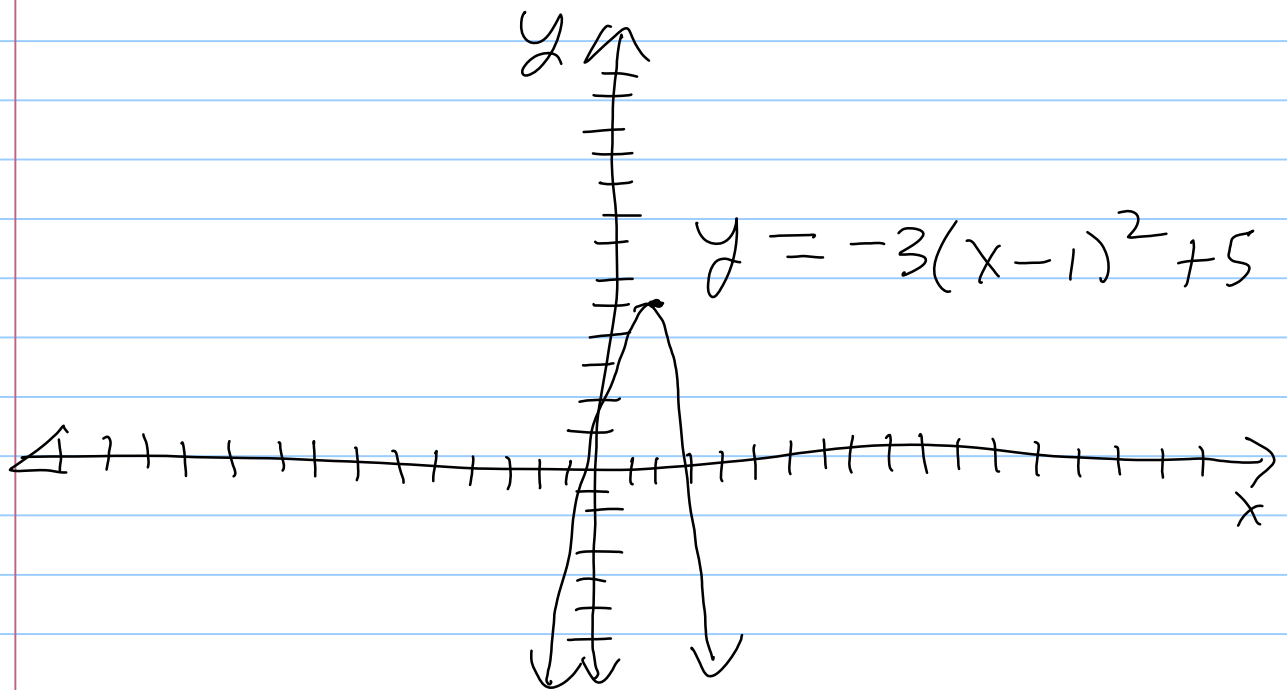
$$y - 5 = -3(x-1)^2$$

$$y - k = a(x-h)^2 \quad \text{parabola}$$

$$V(1, 5)$$

$$a = -3 < 0 \quad \text{down}$$

$$|a| = 3 > 1 \quad \text{thin}$$



$$27) \quad (x-5)^2 + (y+2)^2 = 1$$

$$(x-h)^2 + (y-k)^2 = r^2 \quad \text{circle}$$

$$C(h, k), \quad \text{radius } r$$

$$C(5, -2), \quad r = 1$$

$$\frac{(x-h)^2}{a^2} + \frac{(y-k)^2}{b^2} = 1$$

$$C(h, k)$$

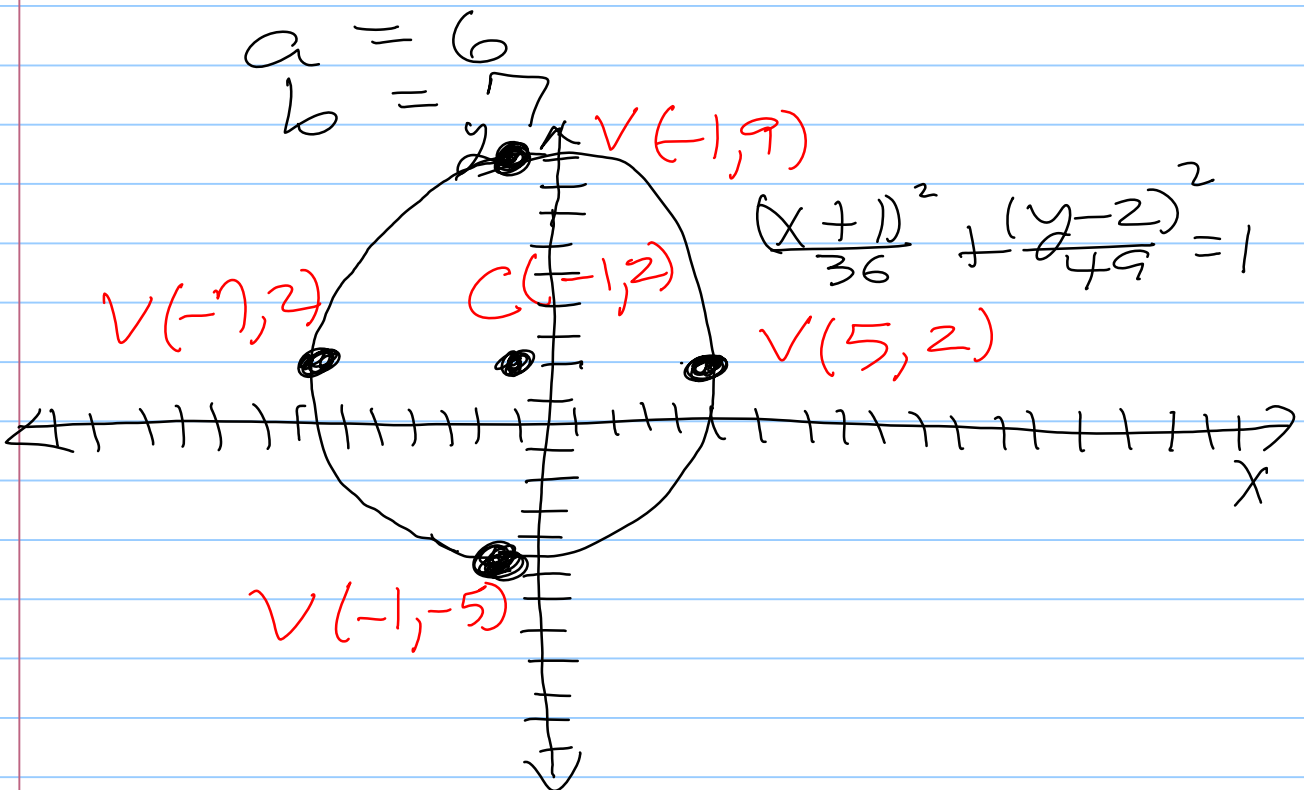
$$V(h \pm a, k)$$

$$V(h, k \pm b)$$

$$\Rightarrow C(-1, 2)$$

$$a = 6$$

$$b = 7$$



$$25) \quad \frac{16y^2}{16} - \frac{x^2}{16} = \frac{16}{16}$$

$$\frac{y^2}{1} - \frac{x^2}{16} = 1$$

hyperbola with $C(0, 0)$

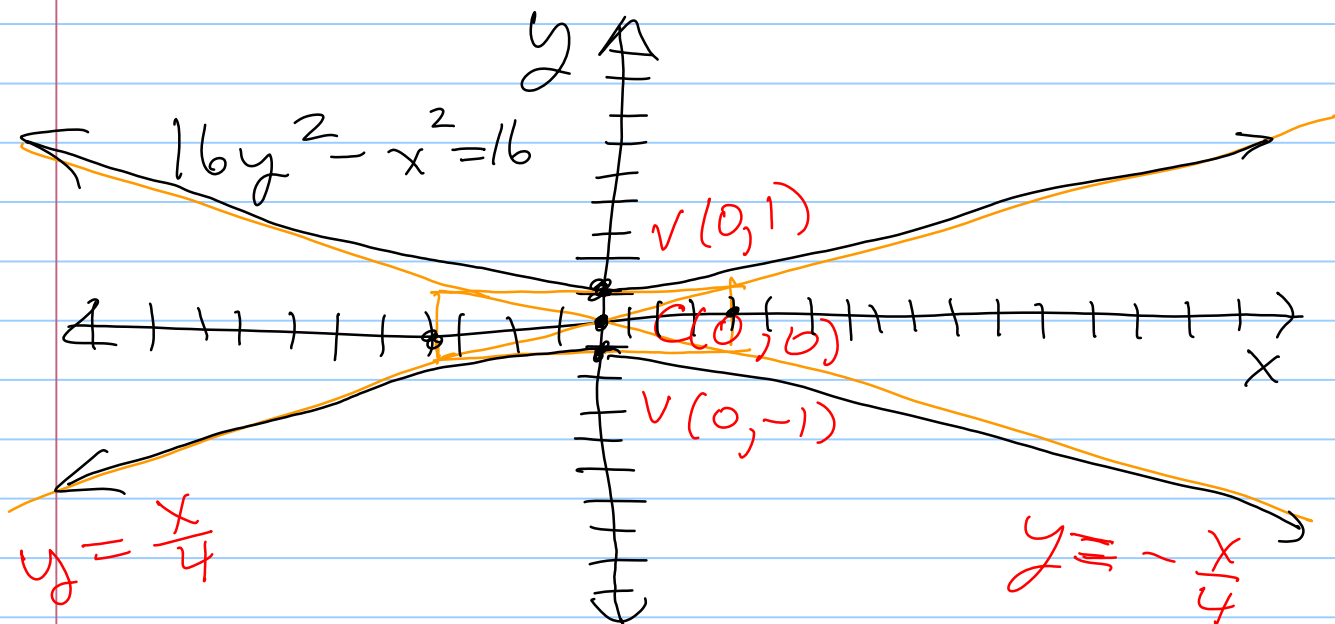
$$\frac{y^2}{b^2} - \frac{x^2}{a^2} = 1$$

$$V(0, \pm b), \quad y = \pm \frac{b}{a}x$$

$$\Rightarrow C(0,0)$$

$$a = 4$$

$$b = 1$$



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$$15) a_n = (-1)^n n^2$$

$$a_1 = (-1)^1 (1)^2 = -1 \cdot 1 = -1$$

$$a_2 = (-1)^2 (2)^2 = 1 \cdot 4 = 4$$

$$a_3 = (-1)^3 (3)^2 = -1 \cdot 9 = -9$$

$$a_4 = (-1)^4 (4)^2 = 1 \cdot 16 = 16$$

$$a_5 = (-1)^5 (5)^2 = -1 \cdot 25 = -25$$

$$\boxed{-1, 4, -9, 16, -25, \dots}$$

$$31) a_n = \frac{(-1)^n}{n+6}$$

$$a_{19} = \frac{(-1)^{19}}{19+6} = \boxed{-\frac{1}{25}}$$

Section 11.2 Page 646

19) 2, -10, 50, ... geometric $a_5 = ?$
2, -10, 50, -250, 1250, ...

$$\boxed{a_5 = 1250}$$

23) $a_2 = -1$ arithmetic sequence

$$a_4 = 5 \Rightarrow a_9 = ?$$

$$a_n = a_1 + (n-1)d$$

$$n=2 \Rightarrow a_2 = a_1 + (2-1)d$$

$$\Rightarrow R: -1 = a_1 + d$$

$$n=4 \Rightarrow a_4 = a_1 + (4-1)d$$

$$\Rightarrow S: 5 = a_1 + 3d$$

$$-R: 1 = -a_1 - d$$

$$\frac{6}{2} = \frac{2d}{2}$$

$$d = 3$$

$$R \Rightarrow -1 = a_1 + 3$$

$$\frac{-3}{-3} = \frac{-3}{-3}$$
$$-4 = a_1$$

$$\Rightarrow a_9 = -4 + (9-1)(3)$$

$$a_9 = -4 + 8(3) = -4 + 24 = \boxed{20}$$

Section 11.3 page 651

$$13) \sum_{i=3}^5 i(i+3) = 3(3+3) + 4(4+3) \\ + 5(5+3) = 3(6) + 4(7) + 5(8)$$

$$= 18 + 28 + 40 = \boxed{86}$$

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$$5) 3 + 6 + 9 + \dots$$

arithmetic series

$$S_n = \frac{n}{2} [2a_1 + (n-1)d]$$

$$S_6 = \frac{6}{2} [2(3) + (6-1)3]$$

$$S_6 = 3 [6 + 5(3)] = 3(6+15)$$

$$S_6 = 3(21) = \boxed{63}$$

$$7) 2 + \frac{2}{5} + \frac{2}{25} + \dots$$

geometric series

$$S_n = a_1 \left(\frac{1-r^n}{1-r} \right) \quad (r \neq 1)$$

$$S_4 = ?$$

$$S_4 = 2 \left(\frac{1 - \left(\frac{1}{5}\right)^4}{1 - \frac{1}{5}} \right)$$

$$S_4 = 2 \frac{\left(1 - \frac{1}{625}\right) 625}{\left(1 - \frac{1}{5}\right) 625}$$

$$S_4 = 2 \left(\frac{625 - 1}{625 - 125} \right)$$

$$S_4 = \cancel{2} \frac{\cancel{(625)}^{312}}{\cancel{500}^{125}} = \boxed{\frac{312}{125}}$$

21) $\frac{2}{3} - \frac{1}{3} + \frac{1}{6} - \dots$

infinite geometric series

$$S_{\infty} = \begin{cases} \frac{a_1}{1-r} & \text{if } |r| < 1 \\ \text{divergent} & \text{if } |r| \geq 1 \end{cases}$$

$$a_1 = \frac{2}{3}$$

$$r = -\frac{1}{2}$$

$$|r| = \frac{1}{2} < 1$$

$$S_{\infty} = \frac{a_1}{1-r} = \frac{\left(\frac{2}{3}\right) 6}{\left(1 + \frac{1}{2}\right) 6} = \frac{4}{6+3}$$

$$S_{\infty} = \boxed{\frac{4}{9}}$$