

Homework Assignments

p 513 1-77 odd

p 526 1-63 odd

p 536 7-45 odd

p 548 11-107 odd

p 558 9-87 odd

p 570 9-53 odd 67-77 odd

p 580 7-15 odd

p 589 3-17 odd

Review p 594 1-49 odd, 63-77 odd

EXAM I Review

p. 611 7-65 odd

p 618 9-65 odd

p 625 1-85 odd

p 634 9-87 odd

p 643 7-27 odd, 47-51 odd, 69-79 odd

p 653 7-43 odd

p 661 1-23 odd, 29-33 odd, 37, 45

Review p 664 1-31 odd, 37-59 odd, 73-79 odd, 81-119 odd

EXAM II Review

p 673 9-25 odd

p 682 9-35 odd

p 689 9-31 odd

p 720 5-81 odd

p 736 1-39 odd 55, 57

p 116 1-77 odd

p 744 11-59 odd

Review 707 1-23 odd, 766 1-49 odd

Exam III Review

p 755 7-53 odd

p 779 13-63 odd

p 790 13-63 odd

p 802 13-59 odd

Review p 766 51-67 odd

p 831 1-35 odd

Exam IV Review

Review Exam I

- a) Find the radian measure of $60^\circ, 120^\circ, 180^\circ, 240^\circ, 300^\circ, 360^\circ$
b) Find the degree measure of $\frac{\pi}{6}, \frac{\pi}{3}, \frac{\pi}{2}, \frac{2\pi}{3}, \frac{5\pi}{6}, \pi$
2. Name the quadrant that the terminal side of the angle lies (in standard position): a) 6.3 b) $\frac{8\pi}{3}$ c) $-\frac{7\pi}{6}$ d) 1830°
3. Find the exact values of the other 5 trigonometric functions of θ if $\cos\theta = \frac{2\sqrt{2}}{3}$ and θ is acute.
4. Find the exact value without a calculator
a) $2\sin 45^\circ + 4\cos 30^\circ$
b) $4 + \tan^2 \frac{\pi}{3}$
5. Find the exact values of the other 5 trigonometric functions of θ if $\sin\theta = -\frac{2}{3}$, $180^\circ < \theta < 270^\circ$
6. Find exact values without a calculator
a) $\sin 180^\circ$ b) $\cos(-\frac{\pi}{6})$ c) $\cos \frac{11\pi}{6}$ d) $\tan \frac{7\pi}{6}$
e) $\sec \frac{2\pi}{3}$ f) $\cos(-\frac{5\pi}{4})$ g) $\csc(-\frac{3\pi}{2})$
7. Solve $\cos x = 1$, $-2\pi \leq x \leq 2\pi$.
8. For what values x , $-2\pi \leq x < 2\pi$ does $y = \tan x$ have a vertical asymptote?
9. Graph $y = \cot x$, $-2\pi \leq x \leq 2\pi$
10. Find amplitude, period and phase shift and graph $y = 2\cos(2\pi x + \pi)$ for $-2 \leq x \leq 2$

Solution Review Exam I

1 a) $\frac{\pi}{3}, \frac{2\pi}{3}, \pi, \frac{4\pi}{3}, \frac{5\pi}{3}, 2\pi$

b) $30^\circ, 60^\circ, 90^\circ, 120^\circ, 150^\circ, 180^\circ$

2 a) I, b) II, c) II, d) I

3. $\sin \theta = \frac{1}{3}$ $\tan \theta = \frac{\sqrt{2}}{4}$ $\csc \theta = 3$ $\sec \theta = \frac{3\sqrt{2}}{4}$ $\cot \theta = 2\sqrt{2}$

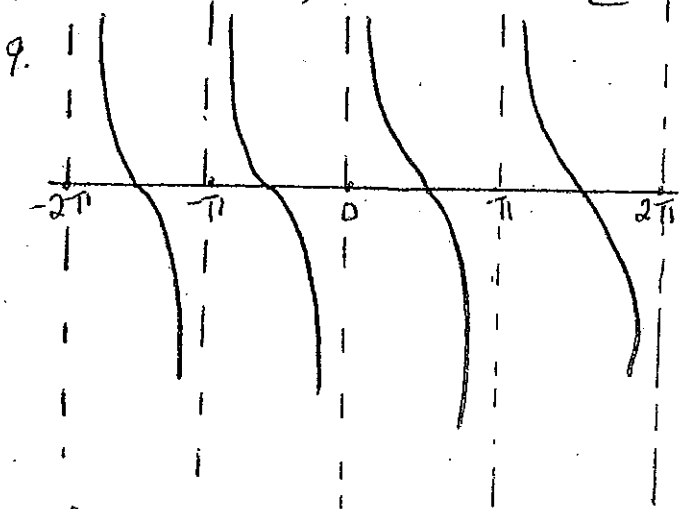
4 a) $\sqrt{2} + 2\sqrt{3}$ b) 7

5. $\cos \theta = -\frac{\sqrt{5}}{3}$ $\tan \theta = \frac{2\sqrt{5}}{3}$ $\csc \theta = -\frac{3}{2}$ $\sec \theta = -\frac{3\sqrt{5}}{5}$
 $\cot \theta = \frac{\sqrt{5}}{2}$

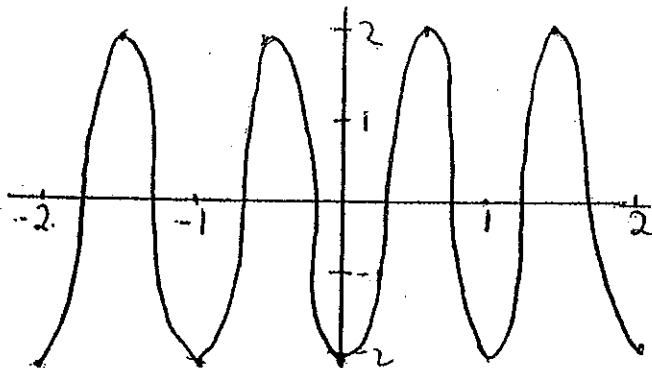
6. a) 0 b) $\frac{\sqrt{3}}{2}$ c) $\frac{\sqrt{3}}{2}$ d) $\frac{\sqrt{3}}{3}$ e) -2 f) $-\frac{\sqrt{2}}{2}$ g) 1

7. $X = -2\pi, 0, 2\pi$

8. $X = -\frac{3\pi}{2}, -\frac{\pi}{2}, \frac{\pi}{2}, \frac{3\pi}{2}$



10. Amplitude = 2 Period = 1 Phase Shift = $-\frac{1}{2}$



Review Exam II

1. Find the exact values of

a) $\tan^{-1}(-\sqrt{3})$ b) $\sin^{-1}(-\frac{1}{2})$ c) $\cos^{-1}(-\frac{1}{2})$

d) $\cot(\cos^{-1}(-\frac{\sqrt{3}}{2}))$

2. Prove $\frac{\tan \theta - \cot \theta}{\tan \theta + \cot \theta} + 2\cos^2 \theta = 1$

3. Find the exact value of $\cos[\tan^{-1}\frac{\sqrt{5}}{12} - \sin^{-1}(-\frac{3}{5})]$

4. Without a calculator, find $\sin \frac{7\pi}{2}$

5. Find the exact value of

a) $\sin(\alpha + \beta)$ b) $\cos(\alpha + \beta)$ c) $\sin(\alpha - \beta)$

d) $\tan(\alpha - \beta)$ for $\cos \alpha = \frac{\sqrt{5}}{5}$, $0 < \alpha < \frac{\pi}{2}$; $\sin \beta = -\frac{4}{5}$
 $-\frac{\pi}{2} < \beta < 0$

6. Find the exact values, without a calculator of $\sin 2x$, $\cos 2x$, $\tan 2x$ if $\sin x = \frac{3}{5}$, $0 < x < \frac{\pi}{2}$

7. Find the exact values of $\sin \frac{x}{2}$, $\cos \frac{x}{2}$, $\tan \frac{x}{2}$,
if $\sin x = -\frac{4}{5}$, $\pi < x < \frac{3\pi}{2}$

8. Use a half angle formula to find the exact value of $\tan \frac{7\pi}{2}$

9. Solve the following equations ($0 \leq \theta < 2\pi$)

a) $\sin \theta = -\frac{1}{2}$

b) $\sin 2\theta = \sin \theta$

c) $\cot 2\theta = -\sqrt{3}$

d) $2\sin^2 \theta = 3\sin \theta - 1$

Solution Review Exam II

1. a) $-\frac{\pi}{3}$ b) $-\frac{\pi}{6}$ c) 2π d) $-\sqrt{3}$

$$2. \frac{\tan \theta - \cot \theta}{\tan \theta + \cot \theta} + 2 \cos^2 \theta = \frac{\frac{\sin \theta}{\cos \theta} - \frac{\cos \theta}{\sin \theta}}{\frac{\sin \theta}{\cos \theta} + \frac{\cos \theta}{\sin \theta}} + 2 \cos^2 \theta$$

$$= \frac{\frac{\sin^2 \theta - \cos^2 \theta}{\sin \theta \cos \theta}}{\frac{\sin^2 \theta + \cos^2 \theta}{\sin \theta \cos \theta}} + 2 \cos^2 \theta = \frac{\sin^2 \theta - \cos^2 \theta}{\sin^2 \theta + \cos^2 \theta} + 2 \cos^2 \theta = \sin^2 \theta + \cos^2 \theta = 1$$

3. $\theta_1 = \tan^{-1}\left(\frac{5}{12}\right)$ $\theta_2 = \sin^{-1}\left(-\frac{3}{5}\right)$

$$\cos(\theta_1 - \theta_2) = \cos \theta_1 \cos \theta_2 + \sin \theta_1 \sin \theta_2 = \frac{12}{13} \left(\frac{4}{5}\right) + \frac{5}{13} \left(-\frac{3}{5}\right) = \frac{33}{65}$$

4. $\sin \frac{\pi}{12} = \sin \left(\frac{4\pi}{12} - \frac{3\pi}{12}\right) = \sin \left(\frac{\pi}{3} - \frac{\pi}{4}\right) = \sin \frac{\pi}{3} \cos \frac{\pi}{4} - \cos \frac{\pi}{3} \sin \frac{\pi}{4}$

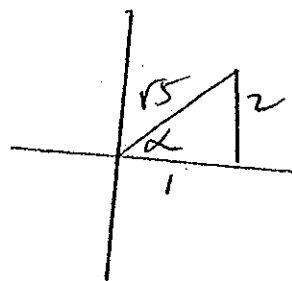
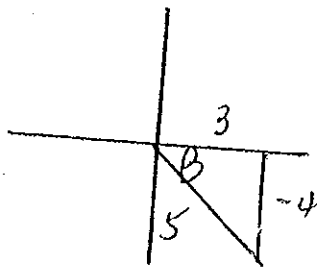
$$= \frac{\sqrt{6} - \sqrt{2}}{4}$$

5. a) $\sin(\alpha + \beta) = \frac{2\sqrt{5}}{25}$

b) $\cos(\alpha + \beta) = \frac{11\sqrt{5}}{25}$

c) $\sin(\alpha - \beta) = \frac{2\sqrt{5}}{5}$

d) $\tan(\alpha - \beta) = -2$



6. $\sin 2x = \frac{24}{25}$; $\cos 2x = \frac{7}{25}$; $\tan 2x = \frac{24}{7}$

7. $\sin \frac{x}{2} = +\sqrt{\frac{1 - (-3/5)}{2}} = +\sqrt{\frac{5+3}{10}} = \frac{4\sqrt{5}}{10} = \frac{2\sqrt{5}}{5}$

$\cos \frac{x}{2} = -\sqrt{\frac{1 + (-3/5)}{2}} = -\sqrt{\frac{2}{10}} = -\frac{\sqrt{5}}{5}$

$\tan \frac{x}{2} = -\sqrt{\frac{1 - (-3/5)}{1 + (-3/5)}} = -\sqrt{\frac{8}{2}} = -2$

NOTE:

$$\frac{\pi}{2} < \frac{x}{2} < \pi$$

(Quad II)

$$8. \tan \frac{7\pi}{12} = -\sqrt{\frac{1-\cos \frac{7\pi}{6}}{1+\cos \frac{7\pi}{6}}} = -\sqrt{\frac{1-(-\frac{\sqrt{3}}{2})}{1+(\frac{\sqrt{3}}{2})}} = -\sqrt{\frac{2+\sqrt{3}}{2+\sqrt{3}}}$$

$$9. \text{ a) } \theta = \frac{7\pi}{6}, \frac{11\pi}{6} \quad \text{ b) } \theta = 0, \frac{7\pi}{3}, \pi, \frac{5\pi}{3}$$

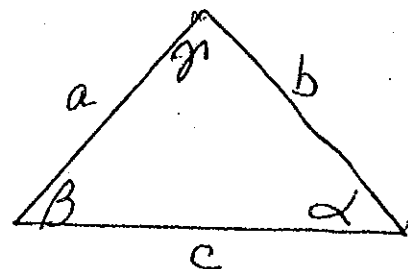
$$\text{ c) } 2\theta = \frac{5\pi}{6}, \frac{11\pi}{6}, \frac{17\pi}{6}, \frac{23\pi}{6} \quad \text{ so } \theta = \frac{5\pi}{12}, \frac{11\pi}{12}, \frac{17\pi}{12}, \frac{23\pi}{12}$$

$$\text{ d) } \theta = \frac{7\pi}{6}, \frac{5\pi}{6}, \frac{\pi}{2}$$

Review Exam III

1. Solve the triangle where

- a) $\alpha = 41^\circ$, $\beta = 77^\circ$, $c = 100$
 b) $\alpha = 38^\circ$, $a = 1.95$, $b = 2.43$, β obtuse
 c) $\beta = 57^\circ$, $a = 6.0$, $b = 5.0$
 d) $a = 6.00$ $b = 5.00$ $c = 5.50$



2. What are the rectangular coordinates of a point with the following polar coordinates (leave radicals in answers)

- a) $(5, \frac{5\pi}{6})$ b) $(3, \frac{\pi}{2})$ c) $(4, \frac{5\pi}{6})$

3. What are the polar coordinates of a point with rectangular coordinates

- a) $(3\sqrt{2}, -3\sqrt{2})$ b) $(-\sqrt{3}, 1)$ (leave answers with radicals and π)

4. Give 3 other pairs of polar coordinates (r, θ) equivalent to $(2, \frac{\pi}{4})$ where $-2\pi \leq \theta \leq 2\pi$.

5. Change the following polar equations to rectangular form:

- a) $r = \sin\theta - \cos\theta$ b) $r^2 = 2\sin\theta$

6. Change the following rectangular equations to polar form:

- a) $2x + 5y = 8$ b) $x^2 + y^2 - 2x = 16$

7. Sketch the following polar graphs (Include 3 polar points on each graph.)

- a) $r = 10 \cos\theta$ c) $r = 5$

- b) $r = 2 + 2\sin\theta$ d) $\theta = \frac{\pi}{6}$

8. Write each expression in the standard form $a+bi$

- a) $\frac{13}{5-12i}$ b) i^{14} c) $2i^4(1+i^2)$

9. Solve $10x^2 + 6x + 1 = 0$ in the complex number system.
10. Write in rectangular form: $2(\cos \frac{5\pi}{6} + i \sin \frac{5\pi}{6})$
11. For $z = \cos 120^\circ + i \sin 120^\circ$ $w = \cos 100^\circ + i \sin 100^\circ$
 a) Find $z \cdot w$ b) Find $\frac{z}{w}$ (leave in polar form)
12. Write in standard form $a + bi$: $[\frac{1}{2}(\cos 72^\circ + i \sin 72^\circ)]^5$
13. Change to polar form, perform operation, then change back to standard form $a + bi$: $(\sqrt{3} - i)^6$
14. Find all complex cube roots and leave in polar form for $-8 - 8i$

Solution Review Exam III

1 a) $\alpha = 62^\circ$, $a = 74$ $b = 110$

b) $\beta = 129.83^\circ$, $\gamma = 12.17^\circ$, $c = .668$

c) No solution

d) $\alpha = 69.5^\circ$, $\beta = 51.33^\circ$, $\gamma = 59.17^\circ$

2 a) $(-\frac{5\sqrt{3}}{2}, \frac{5}{2})$ b) $(0, 3)$ c) $(-2\sqrt{3}, 2)$

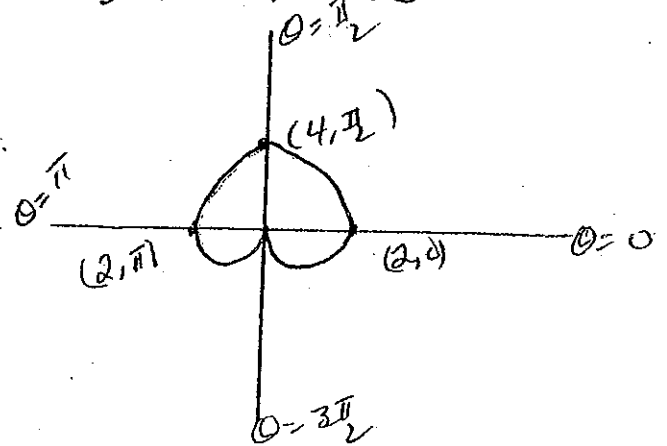
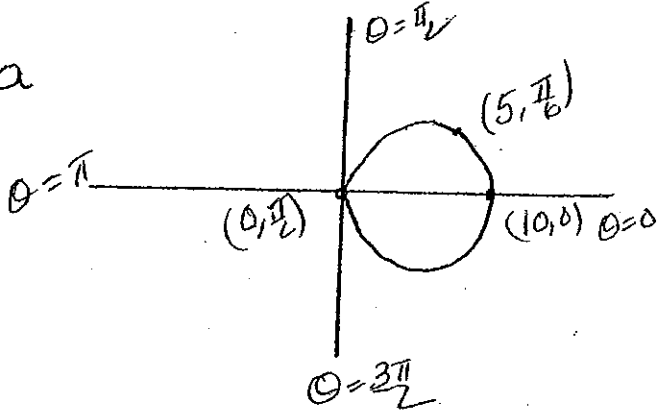
3 a) $(6, \frac{7\pi}{4})$ b) $(2, \frac{5\pi}{6})$

4 $(2, -\frac{7\pi}{4})$ $(-2, -\frac{3\pi}{4})$ $(-2, \frac{5\pi}{4})$

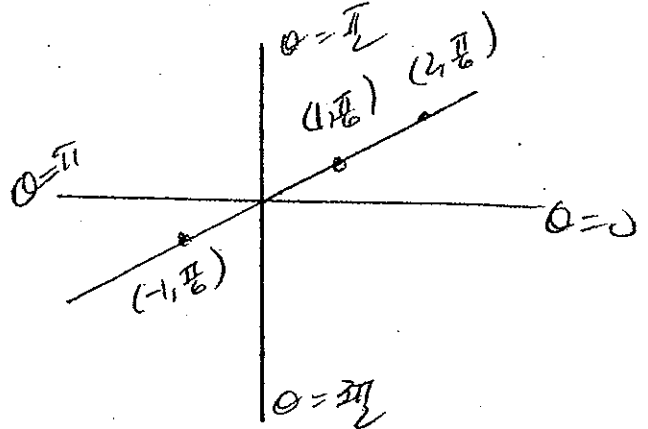
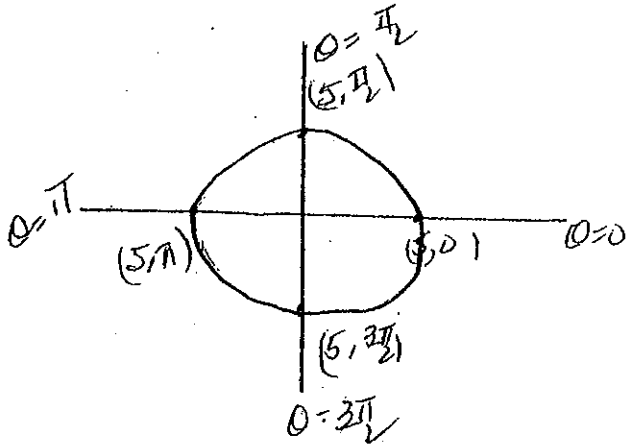
5 a) $x^2 + y^2 + x - y = 0$ b) $(x^2 + y^2)^{3/2} = 2y$

6 a) $2r \cos \theta + 5r \sin \theta = 8$ b) $r^2 - 2r \cos \theta = 16$

7a



c)



8 a) $\frac{5}{13} + \frac{12}{13}i$ b) -1 c) 0

9. $\{-\frac{3}{10} + \frac{1}{10}i, -\frac{3}{10} - \frac{1}{10}i\}$

$$10. -\sqrt{3} + i$$

$$11. a) z_w = \cos 220^\circ + i \sin 220^\circ$$

$$b) \frac{z}{w} = \cos 20^\circ + i \sin 20^\circ$$

$$12. \frac{1}{\sqrt{2}}$$

$$13. -64$$

$$14. z_0 = 2\sqrt{2} (\cos 75^\circ + i \sin 75^\circ)$$

$$z_1 = 2\sqrt{2} (\cos 195^\circ + i \sin 195^\circ)$$

$$z_2 = 2\sqrt{2} (\cos 315^\circ + i \sin 315^\circ)$$

Review Exam IV

1. Write $V = \vec{PQ}$ in the form $a_i + b_j$ where $P = (-3, 2)$ $Q = (6, 5)$
2. Find $\|V\|$ where $V = -5i + 12j$
3. Find a unit vector having the same direction as $V = 2i - j$
4. What is the equation of a parabola with focus at $(\frac{3}{2}, 0)$ and directrix $x = -\frac{3}{2}$?
5. What is the equation of a parabola with focus at $(0, 2)$ and directrix $y = -2$?
6. Sketch the graph of $y^2 = -8x$. Label focus, directrix, vertex, points on latus rectum.
7. Sketch the graph of $4x^2 + 16y^2 = 16$. Label foci and intercepts.
8. Sketch the graph of $x^2 - 36y^2 = 36$. Label vertices, asymptotes, asymptote rectangle and foci.
9. Determine if graph is a parabola, ellipse or hyperbola.

For parabola: sketch, including vertex, focus, directrix, and points on latus rectum

For ellipse: sketch, including vertices, foci and center

For hyperbola: sketch, including vertices, foci, asymptote rectangle, equations of asymptotes and center

a) $4x^2 + 24x + 9y^2 - 36y + 36 = 0$

b) $9x^2 - 4y^2 + 72x + 24y + 144 = 0$

c) $y^2 + 3x + 12y + 42 = 0$

Solution Review Exam IV

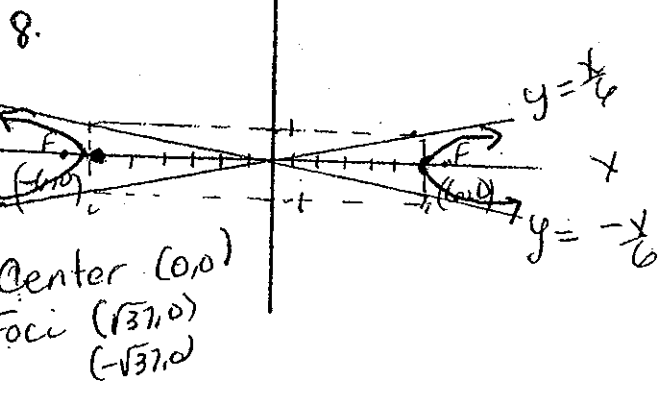
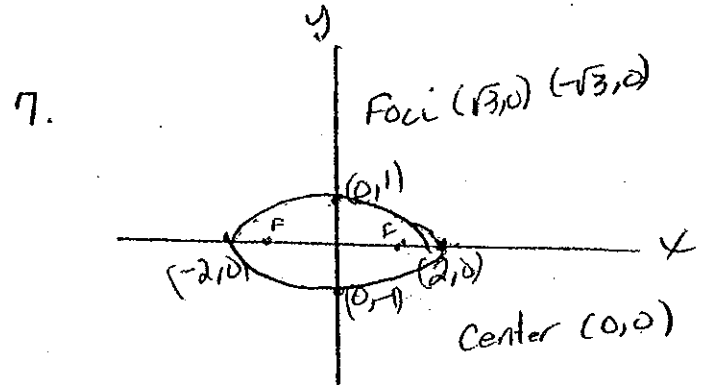
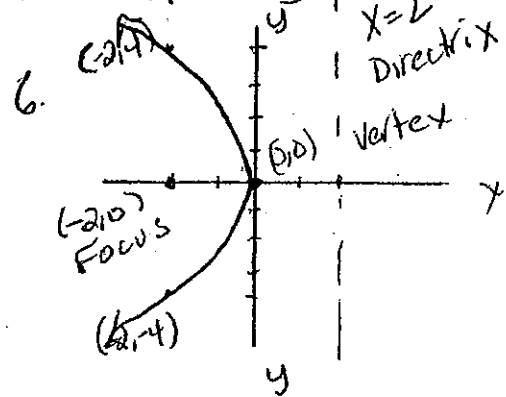
1. $V = 9i + 3j$

2. $\|V\| = 13$

3. $U = \frac{2\sqrt{5}}{5}i - \frac{\sqrt{5}}{5}j$

4. $y^2 = 6x$

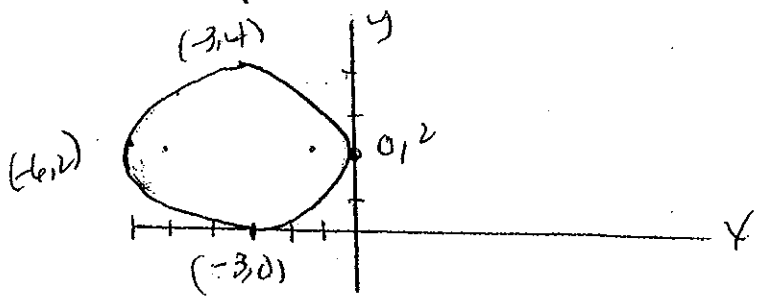
5. $x^2 = 8y$



9a. $\frac{(x+3)^2}{9} + \frac{(y-2)^2}{4} = 1$ Ellipse

Center $(-3, 2)$ $a=3$ $b=2$

Foci $(-3-\sqrt{5}, 2)$ $(-3+\sqrt{5}, 2)$



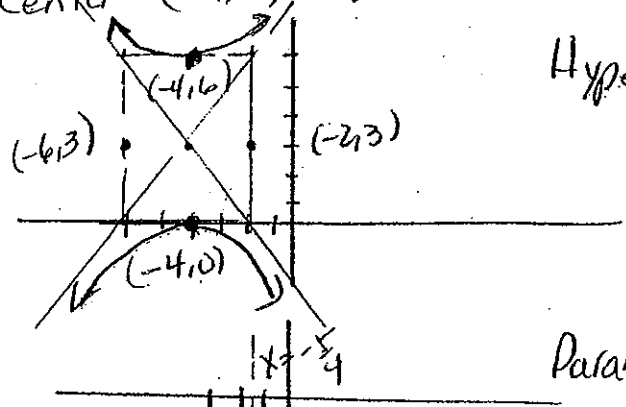
1b. $\frac{(y-3)^2}{9} - \frac{(x+4)^2}{4} = 1$

Foci $(-4, 3+\sqrt{13})$ $(-4, 3-\sqrt{13})$

Asymptotes $y-3 = \pm \frac{3}{2}(x+4)$

Center $(-4, 3)$ $a=3$ $b=2$

Hyperbola



c) $(y+6)^2 = -3(x+2)$

Vertex $(-2, -6)$ $a = -\frac{3}{4}$

Focus $(-4, 6)$

Directrix $x = -\frac{5}{4}$

