HONORS PRECALCULUS
2ND SEMESTER REVIEW

Chapter 9 (Sections 1-3) - Conics

- **Parabolas**
- **Ellipses**
- **Hyperbolas**

Chapter 4 (Sections 1-7) Trigonometric Functions

- **Radian & Degree Measure**
- **Unit Circle**
- **Right Triangle Trig**
- **Trig Functions of any Angle**
- **Graphs of Sine, Cosine & Tangent**
- **Inverse Trig Functions**

Chapter 5 – (Sections 1-5) Analytic Trigonometry

- **Identities**
- **Verifying Identities**
- **Solving Trig Equations**
- **Sum & Difference Formulas**
- **Multiple Angle, Product-to-Sum Formulas, Half-Angle Formulas**

Calculus

- **Limits**
- **Difference Quotient**
- **Average Rate of Change**
- **Instantaneous Rate of Change**
- **Definition of Derivative (long method)**
- **Short cut method for Derivatives**
- **Product-Rule**
- **Quotient Rule**
- **Chain Rule**
- **Tangent Lines**
- **Optimization Problems**

6.5 – Trig Form of a Complex Number
9.6 – Polar Coordinate
9.5 - Parametric Equations

Honors Precal
Conics – Review

General Equation

$$Ax^2+Cy^2+Dx+Ey+F=0$$

1. **Circle** $A=C$; $A\neq 0$
2. **Parabola** $AC=0$; $A=0$ or $C=0$ (not both)
3. **Ellipse** $AC>0$; $A, C \rightarrow$ SAME SIGNS
4. **Hyperbola** $AC<0$; $A, C \rightarrow$ Different signs

Circle

Equation : $(x-h)^2+(y-k)^2=r^2$

$C(h,k)$

$r \rightarrow$ radius

Ellipse

Equation :

Horizontal Major Axis

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

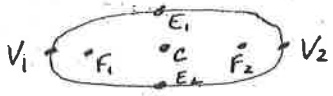
Vertical Major Axis

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

$a^2>b^2$

$c^2=a^2-b^2$

$V_1, V_2 \rightarrow a$ $\quad F_1, F_2 \rightarrow c$ $\quad E_1, E_2 \rightarrow b$



$C(h,k)$

$e=c/a$ $\quad e<1$

Parabola

Equation :

Horizontal Axis

$$x=\frac{1}{4m}(y-k)^2+h$$

Vertical Axis

$$y=\frac{1}{4m}(x-h)^2+k$$

need
- h
- k
- m

$V(h,k)$

$m \rightarrow$ DIRECTED DISTANCE FROM VERTEX TO FOCUS

Directrix → EQUATION → $-m$ units from Vertex

Hyperbola

Equation :

Horizontal Transverse Axis $(x>0)$

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

Vertical Transverse Axis

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

$c^2=a^2+b^2$

a^2 not nec. larger than b^2.

need
- h
- k
- a
- b
- c

$V_1, V_2 \rightarrow a$ $\quad F_1, F_2 \rightarrow c$ $\quad E_1, E_2 \rightarrow b$

$C(h,k)$

Limits

1. $\lim_{x\to 2}\sqrt{x+2}$

2. $\lim_{x\to 5} 9$

3. $\lim_{x\to 3} x$

4. $\lim_{x\to 4} x^3$

5. $\lim_{x\to 5}\dfrac{x^2-25}{x-5}$

6. $\lim_{x\to\infty}\dfrac{2x^2-3}{x^3-1}$

Use definitive of derivative to find the following derivatives $\lim_{h\to 0}\dfrac{f(x+h)-f(x)}{h}$

7. $f(x)=3x+2$

8. $f(x)=x^2-3x+1$

Derivatives : Short Cut

Find the derivatives of the following functions using short cut methods for differentiation.

Find $f'(x)$.

1. $f(x)=4x^2-5x+7$

2. $y=\dfrac{5}{2x^3}$

3. $f(x)=\dfrac{1}{x^4}$

4. $y=5-\sqrt{x}-x^2$

5. $f(x)=\dfrac{x^3-4x}{\sqrt{x}}$

6. $y=x(3x^2-5x)$

7. $f(x)=(-2x^2-3x)(x-5)$

8. $f(x)=\dfrac{x+1}{3x-5}$

9. $y=\sqrt[3]{x}(\sqrt{x}+3)$

10. $f(x)=(4x^2-3x+2)^5$

11. Find the equation of the tangent line to the graph of $f(x)=\dfrac{x}{x-1}$ at the point $(2,2)$

12. $f(x)=\left(4x^3-5\right)^5$

13. $f(x)=\sqrt{-5x^2-3}$

14. $f(x)=\sin^5 x$

15. $y=\tan x \sin x$

16. $y=\sqrt{\sec x-\cos x}$

Derivatives : Short Cut

Find the derivatives of the following functions using short cut methods for differentiation.

Find $f'(x)$.

1. $f(x)=4x^2-5x+7$

$f'(x)=8x-5$

2. $y=\dfrac{5}{2x^3}$ $\quad y'=-\dfrac{15}{2x^4}$

3. $f(x)=\dfrac{1}{x^4}$ $\quad f'(x)=-\dfrac{4}{x^5}$

4. $y=5-\sqrt{x}-x^2$ $\quad y'=-\dfrac{1}{2\sqrt{x}}-2x$

5. $f(x)=\dfrac{x^3-4x}{\sqrt{x}}$ $\quad f'(x)=\dfrac{5x\sqrt{x}}{2}-\dfrac{2}{\sqrt{x}}$

6. $y=x(3x^2-5x)$ $\quad y'=9x^2-10x$

7. $f(x)=(-2x^2-3x)(x-5)$

$f'(x)=-6x^2+14x+15$

8. $f(x)=\dfrac{x+1}{3x-5}$ $\quad f'(x)=\dfrac{-8}{(3x-5)^2}$

9. $y=\sqrt[3]{x}(\sqrt{x}+3)$ $\quad y'=\dfrac{5}{6x^{\frac{1}{6}}}+\dfrac{1}{x^{\frac{2}{3}}}$

10. $f(x)=(4x^2-3x+2)^5$

$f'(x)=5(4x^2-3x+2)^4(8x-3)$

11. Find the equation of the tangent line to the graph of $f(x)=\dfrac{x}{x-1}$ at the point $(2,2)$ $\quad y=-x+4$

12. $f(x)=(4x^3-5)^5$ $\quad f'(x)=60x^2(4x^3-5)^4$

13. $f(x)=\sqrt{-5x^2-3}$ $\quad f'(x)=\dfrac{-5x}{\sqrt{-5x^2-3}}$

14. $f(x)=\sin^5 x$ $\quad 5\sin^4 x\cos x$

15. $y=\tan x\sin x$ $\quad y'=\tan x\cos x+\sin x\sec^2 x$

16. $y=\sqrt{\sec x-\cos x}$ $\quad y'=\dfrac{\sec x\tan x+\sin x}{2\sqrt{\sec x-\cos x}}$

Limits

1. $\lim_{x\to 2}\sqrt{x+2}$ 2

2. $\lim_{x\to 5} 9$ 9

3. $\lim_{x\to 3} x$ 3

4. $\lim_{x\to 4} x^3$ 64

5. $\lim_{x\to 5}\dfrac{x^2-25}{x-5}$ 10

6. $\lim_{x\to \infty}\dfrac{2x^2-3}{x^3-1}$ 0

Use definitive of derivative to find the following derivatives $\lim_{h\to 0}\dfrac{f(x+h)-f(x)}{h}$

7. $f(x)=3x+2$ $f'(x)=3$

8. $f(x)=x^2-3x+1$ $f'(x)=2x-3$

Honors Precalculus
Review for 2nd Semester Final (Juniors)

Chapter 4

1. Convert to radians : 240^0

a) $\frac{3\pi}{4}$ b) $\frac{43200}{\pi}$

c) $\frac{3\pi}{2}$ d) $\frac{4\pi}{3}$ e) None of these

2. Find the point (x, y) on the unit circle that corresponds to the real number $t = \pi$

a) $(0,-1)$ b) $(-1,0)$

c) $(0,0)$ d) $(1,1)$ e) None of these

3. Given θ as an acute angle of a right triangle and $\csc\theta = \frac{7}{3}$, find $\tan\theta$

a) $\frac{2\sqrt{10}}{7}$ b) $\frac{3\sqrt{10}}{20}$

c) $\frac{2\sqrt{10}}{3}$ d) $\frac{3}{7}$ e) None of these

4. Evaluate: $\cot 15^0$

a) 3.7321 b) 0.0012

c) 86.1859 d) 1.0353 e) None of these

5. Find an acute angle θ if $\cos\theta = 0.9872$

a) 80.8229^0 b) 0.9998^0

c) 9.1771^0 d) 1.0001^0 e) None of these

6. Evaluate: $\sec\left(\frac{\pi}{3}\right)$

a) $\frac{\sqrt{2}}{2}$ b) $\frac{\sqrt{3}}{2}$

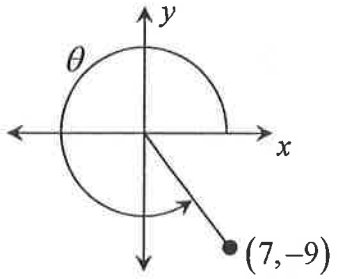
c) $\frac{\sqrt{3}}{3}$ d) 2 e) None of these

7. A man that is 6 feet tall casts a shadow 14 feet long. Find the angle of elevation of the sun.

a) 23.2^0 b) 66.8^0

c) 25.4^0 d) 64.6^0 e) None of these

8. For the angle θ shown at the right, find $\tan\theta$



a) $-\frac{9\sqrt{130}}{7}$ b) $\frac{\sqrt{130}}{7}$

c) $-\frac{7}{9}$ d) $-\frac{9}{7}$ e) None of these

9. Given $\sin\theta = \frac{7}{13}$, and $\tan\theta < 0$, find $\tan\theta$.

a) $-\frac{7\sqrt{3}}{2}$ b) $-\frac{2\sqrt{3}}{2}$

c) $-\frac{2\sqrt{3}}{13}$ d) $-\frac{7\sqrt{30}}{60}$ e) None of these

10. Describe the horizontal shift of the graph of g with respect to the graph of f:

$$g(x) = 4\sin\left(2x - \frac{\pi}{3}\right) \quad \text{and} \quad f(x) = 4\sin(2x)$$

a) $\frac{\pi}{6}$ units to the left

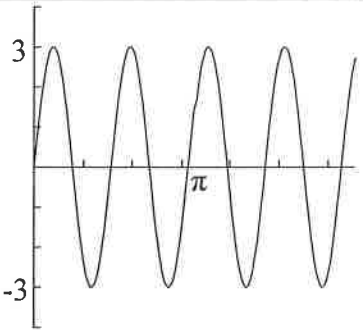
b) $\frac{\pi}{6}$ units to the right

c) $\frac{2\pi}{3}$ units to the left

d) $\frac{2\pi}{3}$ units to the right

e) None of these

11. Match the graph at the right with the correct function.



a) $y = 3\sin 4x$

b) $y = 3\sin\left(\frac{x}{4}\right)$

c) $y = 3\cos 4x$

d) $y = 3\cos\left(\frac{x}{4}\right)$

e) None of these

12. Find the period of the function: $y = 3\tan 7x$

a) $\frac{\pi}{3}$

b) $\frac{\pi}{7}$

c) $\frac{2\pi}{7}$

d) 6π

e) None of these

13. Evaluate: $\arccos 0$

a) 0

b) π

c) $\frac{\pi}{2}$

d) $-\frac{\pi}{2}$

e) None of these

14. Evaluate: $\cos\left[\arctan\left(-\frac{2}{3}\right)\right]$

a) $-\frac{3\sqrt{13}}{13}$ b) $\frac{3\sqrt{13}}{13}$

c) $-\frac{2\sqrt{13}}{13}$ d) $\frac{2\sqrt{13}}{13}$ e) None of these

15. Write an algebraic expression for $\tan[\arcsin x]$

a) $\frac{x\sqrt{1+x^2}}{1+x^2}$ b) $\frac{1}{x}$

c) $\frac{\sqrt{1-x^2}}{x}$ d) $\frac{x\sqrt{1-x^2}}{1-x^2}$ e) None of these

16. A ladder is leaning against the side of a house. The base of the ladder is 5 feet from the wall and makes an angle of 39^0 with the ground. Find the length of the ladder.

a) $3.89\,feet$ b) $6.43\,feet$

c) $4.05\,feet$ d) $7.95\,feet$ e) None of these

Chapter 4

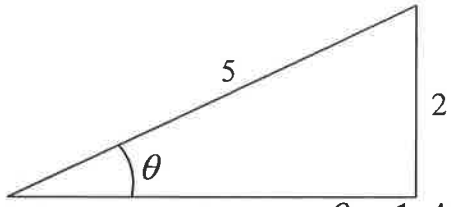
1. Find the point *(x,y)* on the unit circle that corresponds to the real number $t = \frac{5\pi}{6}$.

2. Evaluate: $\arctan(-\sqrt{3})$

3. Convert the angle $\theta = 128^0 35'18''$ to (degree) decimal form.

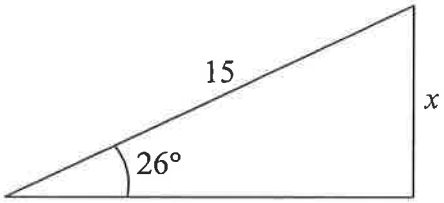
4. In the triangle shown at the right,

   Use the fact that $\sin\theta = \frac{2}{5}$ to find $\tan\theta$.



5. Find two values of θ in radians $(0 \le \theta < 2\pi)$ that satisfy the equation $\csc\theta = 1.4736$.

7. Find x in the triangle shown at the right.



8. Given that $\tan\theta = -\frac{7}{8}$ and $\cos > 0$, find $\csc\theta$.

9. Determine the period and amplitude of the function: $f(x) = -7\cos 3x$

10. Sketch the graph of the function : $f(x) = \frac{1}{2}\cos\left(x - \frac{\pi}{2}\right)$

11. Evaluate: $\cos\left[\arctan\left(-\frac{3}{10}\right)\right]$

12. The angle of depression from the top of one building to tht foot of a building across the street is 63^0. The angle of depression to the top of the same building is 33^0. The two buildings are 40 feet apart. What is the height of the shorter building?

Chapter 5

1. Simplify: $\sec x \cos\left(\frac{\pi}{2} - x\right)$

a) 1 b) $\frac{1}{\cos^2 x}$

c) $\tan x$ d) $\cot x$ e) None of these

2. Given $\csc x = -3$ and $\tan x > 0$, find $\cos x$.

a) $\frac{2\sqrt{2}}{3}$ b) $-\frac{3\sqrt{2}}{2}$

c) $-\frac{2\sqrt{2}}{3}$ d) $\frac{3\sqrt{2}}{2}$ e) None of these

3. Rewrite: $\frac{\cot^2\theta + 1}{\cos^2\theta - 1}$

a) $-\frac{1}{\sin^4\theta}$ b) -1

c) $\csc^4\theta$ d) $\cot^2\theta$ e) None of these

4. Simplify: $\frac{1+\cos\theta}{\sin\theta} + \frac{\sin\theta}{1+\cos\theta}$

a) $\frac{1+\cos\theta+\sin\theta}{\sin\theta+\sin\theta\cos\theta}$ b) $1+2\cos\theta+\cos^2\theta$

c) $\frac{2}{\sin\theta}$ d) $\cos^2\theta$ e) None of these

5. Simplify: $\dfrac{\cos x}{1+\sin x}$

a) $\cos x + \cot x$ b) $\sec x - \tan x$

c) $\sec x - \cot x$ d) $\cos x + \tan x$ e) None of these

6. Factor and simplify: $\sec^4 x - 2\sec^2 x \tan^2 x + \tan^4 x$

a) -1 b) $\sec x - \tan x$

c) $\sec x + \tan x$ d) 1 e) None of these

7. Simplify: $\sin 8x \cos 2x + \cos 8x \sin 2x$

a) $\sin 10x$ b) $\sin 6x$

c) $\cos 10x$ d) $\cos 6x$ e) None of these

8. Simplify: $y = \pm\sqrt{\dfrac{1-\cos 16x}{2}}$

a) $y = \sin 32x$ b) $y = \cos 32x$

c) $y = \sin 8x$ d) $y = \cos 8x$ e) None of these

9. Rewrite as a product: $\sin 7\theta - \sin 3\theta$

a) $2\sin 5\theta \cos 2\theta$ b) $2\cos 5\theta \sin 2\theta$

c) $2\cos 5\theta \cos 2\theta$ d) $-2\sin 5\theta \cos 2\theta$ e) None of these

10. Rewrite as a sum: $\sin 3x \cos 4y$

a) $\frac{1}{2}\left[\sin(3x+4y)+\sin(3x-4y)\right]$

b) $\frac{1}{2}\left[\sin(3x+4y)-\sin(3x-4y)\right]$

c) $2\left[\cos(3x+4y)+\cos(3x-4y)\right]$

d) $2\left[\sin(3x-4y)+\cos(3x-4y)\right]$

e) None of these

11. Find all solutions in the interval $[0,2\pi)$: $\tan\frac{x}{4}=\frac{\sqrt{3}}{3}$

a) $\frac{2\pi}{3}$

b) $\frac{10\pi}{3}$

c) $\frac{\pi}{4}$

d) $\frac{\pi}{4},\frac{5\pi}{4}$

e) None of these

12. Find all solutions in the interval $[0,2\pi)$: $2\sin x\cos x+\cos x=0$

a) $\frac{\pi}{6},\frac{\pi}{2},\frac{5\pi}{6},\frac{3\pi}{2}$

b) $\frac{\pi}{2},\frac{7\pi}{6},\frac{3\pi}{2},\frac{11\pi}{6}$

c) $\frac{5\pi}{6},\frac{11\pi}{6}$

d) $0,\pi$

e) None of these

Chapter 5

1. Use the trigonometric identities to simplify: $\dfrac{\csc x \cos^2 x}{1+\csc x}$

2. For what values of θ, $0 \le \theta < 2\pi$ is it true that $\sec\theta = -\sqrt{1+\tan^2\theta}$

3. Simplify: $\sin\left(\dfrac{\pi}{2}+x\right)\cos(-x)$

4. Factor and simplify: $1+2\tan^2\theta+\tan^4\theta$

5. Subtract and simplify: $\dfrac{1+\sin\theta}{\cos\theta} - \dfrac{\cos\theta}{\sin\theta-1}$

6. Verify the identity: $\dfrac{\tan^2 x+1}{\tan^2 x} = \csc^2 x$

7. Simplify: $\dfrac{\tan 7x+\tan 5x}{1-\tan 7x\tan 5x}$

8. Given $\sin x = -\dfrac{1}{8}$ and $\tan x < 0$, find $\sin 2x$

9. Rewrite in terms of the first power of cosine: $\cos^2 2x \sin^2 2x$

10. Rewrite as a sum : $\dfrac{1}{4}\cos 12x \cos 4x$

11. Rewrite as a product: $\sin(x+2y)-\sin(x-2y)$

12. Find all solutions in the interval $[0,2\pi)$: $3\tan^2 2x - 1 = 0$

13. Find all solutions in the interval $[0,2\pi)$: $2\sin^2 x = \sin x$

Chapter 8

1. Write out the first 5 terms of the sequence whose nth term is $a_n = n!$
(Assume that *n* begins with 0)

a) $0,1,2,6,24$ b) $1,1,2,6,24$

c) $1,1,2,6,12$ d) $0,1,2,6,12$ e) None of these

2. Find the sum: $\sum_{n=1}^{4} \frac{n+1}{n+2}$

a) $\frac{61}{20}$ b) $\frac{31}{20}$

c) $\frac{143}{60}$ d) $\frac{131}{60}$ e) None of these

3. Write an expression for the *nth* term of the sequence. (Assume that *n* begins with 1)

$$\left\{\frac{1}{4}, \frac{2}{9}, \frac{3}{16}, \frac{4}{25}, \ldots\right\}$$

a) $a_n = 1 - \frac{3n}{n^2}$ b) $a_n = \frac{n}{(n+1)!}$

c) $a_n = \frac{1}{2} + \frac{n}{(n+1)^3}$ d) $a_n = \frac{n}{(n+1)^2}$ e) None of these

4. Find the 99th term of the arithmetic sequence with $a_1 = 7$ and $d = -3$.

a) -287 b) -290

c) -293 d) -297 e) None of these

5. Find the sum of the first 50 terms of the arithmetic sequence: $\{25, 35, 45, 55, 65, \ldots\}$

a) $27,000$ b) $13,750$

c) $12,875$ d) $13,500$ e) None of these

6. Write the first five terms of the geometric sequence with $a_1 = 2$ and $r = \frac{2}{3}$

a) $2, \frac{4}{3}, \frac{8}{9}, \frac{16}{27}, \frac{32}{81}$ b) $2, 3, \frac{9}{2}, \frac{27}{4}, \frac{81}{8}$

c) $2, \frac{8}{3}, \frac{10}{3}, 4, \frac{14}{3}$ d) $2, \frac{4}{3}, \frac{2}{3}, -\frac{2}{3}$ e) None of these

7. Find the sum of the infinite series: $1 + 0.9 + 0.81 + 0.729 + \ldots$

a) 23 b) 90

c) 10 d) 57 e) None of these

8. Find the 20th term of the geometric sequence with $a_1 = 5$ and $r = 1.1$

a) 1.1665 b) 37.0012

c) 33.6375 d) 30.5795 e) None of these

9. Find a formula for the nth term of the sequence: $\left\{\frac{2}{1},\frac{4}{1},\frac{6}{2},\frac{8}{6},\frac{10}{24},\ldots\right\}$

a) $\frac{2^n}{(n+1)!}$

b) $\frac{3-2^n}{n(2^n)}$

c) $\frac{2^n}{2n-1}$

d) $\frac{2n}{(n-1)!}$

e) None of these

10. Find the first five terms of the geometric sequence with $a_1 = 3$ and $r = \frac{3}{2}$

a) $3,\frac{9}{2},\frac{27}{4},\frac{81}{8},\frac{243}{16}$

b) $3,2,\frac{4}{3},\frac{8}{9},\frac{16}{27}$

c) $3,\frac{9}{2},6,\frac{15}{2},9$

d) $3,\frac{3}{2},0,-\frac{3}{2},-3$

e) None of these

11. Find the formula for the nth partial sum of the sequence.

$$\left\{\frac{1}{1\cdot 3},\frac{1}{3\cdot 5},\frac{1}{5\cdot 7},\frac{1}{7\cdot 9},\frac{1}{9\cdot 11},\ldots,\frac{1}{(2n-1)(2n+1)},\ldots\right\}$$

a) $\frac{n(n^2-1)}{3}$

b) $\frac{n}{n+1}$

c) $\frac{n}{2n+1}$

d) $\frac{n+1}{2n}$

e) None of these

Chapter 8

1. Write the first 4 terms of the sequence whose *nth* term is $\frac{n!}{(n+2)!}$ Assume that n begins with 1.

2. Find the sum: $\sum_{i=1}^{7} 2(i+1)$

3. Find a_n for the arithmetic sequence with $a_1 = 12$, $d = \frac{1}{3}$, and $n = 52$

4. Find the sum of the first 30 terms in the sequence.

$$\sqrt{2}, 2\sqrt{2}, 3\sqrt{2}, 4\sqrt{2}, 5\sqrt{2}, \ldots$$

5. Determine if the sequence $\left\{3, -2, \frac{4}{3}, -\frac{8}{9}, \frac{16}{27}, \ldots\right\}$ is geometric. If it is, find r.

Chapter 9

1. Write the equation of the directrix of the parabola: $x^2-2x-y-1=0$

   a) $x=1$ b) $y=\frac{1}{4}$

   c) $4y+9=0$ d) $9x-4=0$

   e) None of these

2. Find the equation of the parabola with vertex $(3,1)$ and focus $(4,1)$

   a) $y^2-4x-2y+13=0$ b) $4y^2-x-8y+7=0$

   c) $x^2-6x-4y+13=0$ d) $4x^2-24x-y+37=0$

   e) None of these

3. Find one focus for the ellipse: $16x^2+9y^2-160x-36y+292=0$

   a) $(5-\sqrt{7},2)$ b) $(5,2+\sqrt{7})$

   c) $(9,2)$ d) $(5,-2)$

   e) None of these

4. Find the equation of the ellipse with minor axis of length 8 and vertices at $(-9,3)$ and $(7,3)$

   a) $4x^2+8y^2-8x-48y=0$

   b) $16x^2+64y^2+32x-384y-432=0$

   c) $64x^2+128y^2-128x-768y-6976=0$

   d) $x^2+y^2+8x+8y+64=0$

   e) None of these

5. Determine an equation for the hyperbola with center $(0,-2)$, one vertex at $(0,-4)$ and one focus at $(0,2)$

a) $\frac{x^2}{12}-\frac{(y+2)^2}{4}=1$

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

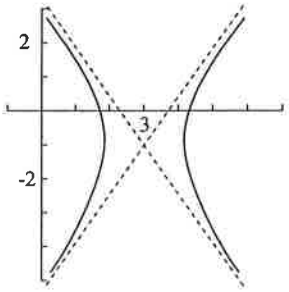
c) $\frac{(y+2)^2}{4}-\frac{x^2}{12}=1$

d) $\frac{(y+2)^2}{12}-\frac{x^2}{4}=1$

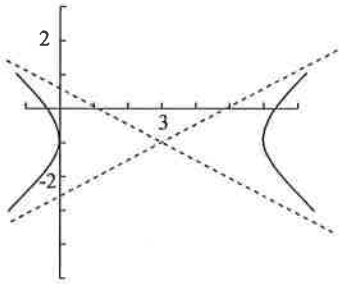
e) None of these

6. Identify the graph of $\frac{(x-3)^2}{2}-\frac{(y+1)^2}{9}=1$

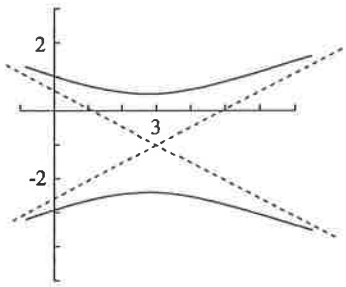
a)



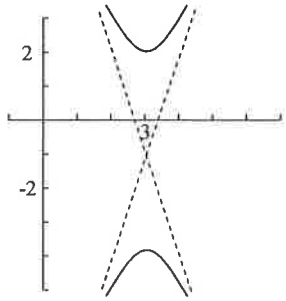
b)



b)



d)



e) None of these

Chapter 9

1. Sketch the graph of the parabola $y^2+8x-6y+17=0$.
   Identify the vertex, focus and directrix.

2. Write the standard equation of the parabola with its vertex at $(1,4)$ and its focus at $(1,7)$.

3. Find the center, vertices , foci and eccentricity of the ellipse, then sketch the graph.

$$\frac{(x-2)^2}{1}+\frac{(y+7)^2}{9}=1$$

4. Find the length of the conjugate axis of the hyperbola:

$$-2x^2+9y^2-20x-108y+256=0$$

5. Sketch a graph and show the center, vertices, foci and asymptotes of the hyperbola.

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

Answers to 2nd Semester Review

Chapter 4 – Multiple Choice

1. d 2. b 3. b 4. a 5. c 6. d 7. a

8. d 9. d 10. b 11. a 12. b 13. c 14. b

15. d 16. b

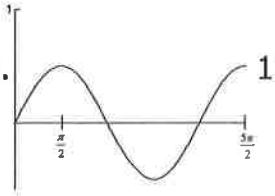
Free Response

1. $\left(\frac{-\sqrt{3}}{2}, \frac{1}{2}\right)$ 2. $-\frac{\pi}{3}$ 3. 128.5883^0 4. $\frac{2\sqrt{21}}{21}$

5. $\frac{\sqrt{3}}{3}$ 6. $\theta = .7459$, $\theta = 2.3957$ 7. 6.5756 8. $-\frac{\sqrt{113}}{7}$

9. Period: $\frac{2\pi}{3}$

   Amplitude: 7

10. 

11. $\frac{10\sqrt{109}}{109}$ 12. 52.5281

Chapter 5 – Multiple Choice

1. c 2. c 3. a 4. c 5. b 6. d 7. a

8. c 9. b 10. a 11. a 12. b

Free Response

1. $1-\sin x$ 2. $\frac{\pi}{2} < \theta < \frac{3\pi}{2}$ 3. $\cos^2 x$ 4. $\sec^4 \theta$

5. $\frac{2(1+\sin\theta)}{\cos\theta}$ 6. $\frac{\tan^2 x+1}{\tan^2 x} = 1+\frac{1}{\tan^2 x} = 1+\cot^2 x = \csc^2 x$

7. $\tan 12x$ 8. $-\frac{3\sqrt{7}}{32}$ 9. $\frac{1-\cos 8x}{8}$

10. $\dfrac{\cos 8x+\cos 16x}{8}$

11. $2\cos x\sin 2y$

12. $\dfrac{\pi}{12},\dfrac{5\pi}{12},\dfrac{7\pi}{12},\dfrac{11\pi}{12},\dfrac{13\pi}{12},\dfrac{17\pi}{12}\dfrac{19\pi}{12},\dfrac{23\pi}{12}$

13. $0,\dfrac{\pi}{6},\dfrac{5\pi}{6},\pi$

Chapter 8 – Multiple Choice

1. b 2. ab 3. d 4. a 5. d 6. a 7. c

8. d 9. d 10. a 11. c

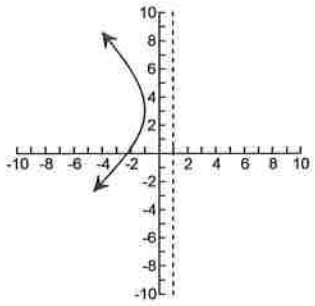
Free Response

Chapter 9 – Multiple Choice

1. c 2. a 3. b 4. b $\dfrac{(x+1)^2}{64}+\dfrac{(y-3)^2}{16}=1$ 5. c 6. a

Free Response

1. $x=-\dfrac{1}{8}(y-3)^2-1$ Vertex: $(-1,3)$ Focus: $(-3,3)$ Directrix: $x=1$



2. $y=\dfrac{1}{12}(x-1)^2+4$

3. Center: $(2,-7)$, Vertices: $(2,-4)(2,-10)$, Foci: $\left(2,-7\pm 2\sqrt{2}\right)$, $e=\dfrac{2\sqrt{2}}{3}$

4. 6

5. Center: $(-1,-3)$, Vertices: $\left(-1\pm\sqrt{2},-3\right)$ Foci: $\left(-1\pm\sqrt{5},-3\right)$

Asymptotes: $y = -3 - \frac{\sqrt{6}}{2}(x+1)$