

This review sheet is intended as a supplement to the text, your notes, and your graded papers. The lack of a particular type of problem on this review sheet does *not* mean that type of problem won't appear on the test. This review sheet only covers new material since Midterm #3.

1. Find the focus and directrix of the parabola.

a. $x^2 = 20y$

b. $x = 2y^2$

c. $y = 9x^2$

d. $y^2 = 28x$

e. $x^2 = -8y$

f. $y^2 - 32x = 0$

g. $y = x^2 - 1$

h. $y^2 - 3y + 5x = 0$

i. $x^2 + 2x + 3 = 5y - 7$

2. Find the vertices and foci of the ellipse.

a. $\frac{x^2}{225} + \frac{y^2}{81} = 1$

b. $\frac{x^2}{225} + \frac{y^2}{625} = 1$

c. $9x^2 + 100y^2 = 900$

d. $81x^2 + 25y^2 = 2025$

e. $169x^2 + 100y^2 = 16900$

f. $25x^2 + 169y^2 = 4225$

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

h. $x^2 + 13y^2 - 26x = 0$

i. $4x^2 + 3y^2 + 24x - 42y = -135$

3. Find the foci and asymptotes of the hyperbola.

a. $\frac{x^2}{225} - \frac{y^2}{400} = 1$

b. $\frac{y^2}{144} - \frac{x^2}{81} = 1$

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

d. $25x^2 - y^2 = 25$

e. $x^2 - y^2 = 18$

f. $4y^2 - 25x^2 = 100$

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

h. $7y^2 - 14y = x^2$

i. $5x^2 + 20x = y^2 - 3y + 4$

4. Find the standard-form equation for the ellipse which satisfies the given conditions.

a. center $(0,0)$; intercepts $(\pm 6,0)$ and $(0,\pm 4)$

b. y -intercepts $(0,\pm 3)$; vertices $(\pm 9,0)$

c. foci $(0,\pm 5)$; major axis of length 18

d. vertices $(\pm 7,0)$ and foci $(\pm 3,0)$

e. center $(0,0)$; focus $(\sqrt{3},0)$; directrix $x = \frac{4}{\sqrt{3}}$

f. centered at the origin; vertex $(0,-6)$, eccentricity $\frac{1}{3}$

g. foci $(2,0)$ and $(2,6)$; minor axis length 8

h. center $(-1,2)$; includes points $(-1,0)$ and $(0,2)$

i. foci $(\frac{1}{2}, \frac{6}{5})$ and $(\frac{7}{2}, \frac{6}{5})$; passes through the origin

5. Find the standard-form equation for the hyperbola which satisfies the given conditions.

a. vertices $(\pm 5,0)$; foci $(\pm 10,0)$

b. vertices $(0,\pm 10)$; asymptotes $6y = \pm 5x$

c. asymptotes $y = \pm \frac{5}{12}x$; one vertex $(12,0)$

d. foci $(0,\pm 15)$; asymptotes $y = \pm \frac{3}{4}x$

e. center $(0,0)$; vertex $(0,-4)$; eccentricity 2

f. focus $(14,-6)$ with directrix $5x = 61$; eccentricity $\frac{5}{4}$

g. vertices $(0,1)$ and $(-2,1)$; one asymptote passes through the origin

h. asymptotes $3y = 2x - 7$ and $3y = -2x + 1$; one vertex at $(-1,-1)$

i. center $(\sqrt{2}, \sqrt{3})$; passes through the origin and $(\sqrt{8}, 0)$

6. Find the eccentricity of the ellipse.

a. $4x^2 + y^2 = 36$

b. $x^2 + 4y^2 = 4$

c. $144x^2 + y^2 = 144$

7. Find the directrices of the ellipse.

a. $36x^2 + y^2 = 36$

b. $x^2 + 16y^2 = 16$

c. $x^2 + 4y^2 = 100$

8. Find the eccentricity of the hyperbola.

a. $25x^2 - 144y^2 = 3600$

b. $49y^2 - 16x^2 = 784$

c. $49x^2 - 36y^2 = 1764$

9. Find the directrices of the hyperbola.

a. $\frac{(y+5)^2}{9} - \frac{(x-6)^2}{4} = 1$

b. $25x^2 - 144y^2 = 3600$

c. $\frac{(x-4)^2}{64} - \frac{(y+5)^2}{9} = 1$

10. Determine what type of conic section is represented by each equation. If the equation represents a parabola, find the focus and directrix. If the equation represents a circle, find the center and radius. If the equation represents a noncircular ellipse, find the center, vertices, and foci. If the equation represents a hyperbola, find the center, foci, and asymptotes.

a. $-x^2 + y^2 + 12x - 14y = 3$

b. $7x^2 - y^2 - 70x + 8y = 184$

c. $9x^2 + 25y^2 + 18x - 250y = -409$

d. $25x^2 + 16y^2 + 100x + 192y + 276 = 0$

e. $16x^2 + 25y^2 + 192x - 250y + 801 = 0$

f. $2x^2 + 2y^2 - 28x + 8y + 106 = 50$

g. $-x^2 - y^2 + 14x + 10y = 25$

h. $x^2 + 10x - 4y + 41 = 0$

11. The eccentricity is given of a conic section with one focus at the origin, along with the directrix corresponding to that focus. Find a polar equation for the conic section, and determine which kind of conic section it represents.

a. $e = 4; x = 5$

b. $e = \frac{1}{4}; x = 9$

c. $e = 2; y = -5$

d. $e = \frac{1}{2}; x = -7$

e. $e = 5; y = 3$

f. $e = \frac{1}{4}; x = 9$

12. Graph.

a. $x^2 = -4y$

b. $y^2 = 3y$

c. $48x^2 + 27y^2 = 432$

d. $x^2 + 49y^2 = 49$

e. $9x^2 - 4y^2 = 36$

f. $y^2 - x^2 = \frac{1}{9}$

g. $y^2 - x^2 + 2x = 2$

h. $y^2 + x^2 - 2x = 0$

i. $y + x^2 - 2x = 3$

j. $4x^2 + 3y^2 + 5x - 7y = 1$

k. $5y^2 + 7x - 9y = 3$

l. $-8x^2 + y^2 - 2x + 5y = 0$

m. $r = \frac{2}{1 - \sin\theta}$

n. $r = \frac{5}{3 + 2\cos\theta}$

o. $r = \frac{1}{2 - 6\cos\theta}$