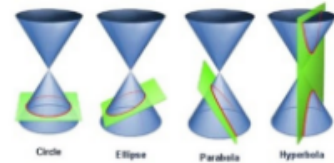




Keeper #7: General → Standard Form (circles and ellipses)

Conic Sections - Four Types



Find the center and radius:

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

$C: (5, -3)$
 $r = \sqrt{15}$

Find the center, vertices, and co-vertices:

$$\frac{(x+1)^2}{4} + \frac{(y-4)^2}{25} = 1$$

$C: (-1, 4)$
 $Co-v: (1, 4)$
 $(-3, 4)$

$\sqrt{\begin{matrix} (-1, 9) \\ (-1, -1) \end{matrix}}$

State the coordinates of the foci:

$$\frac{(x-3)^2}{9} + (y+6)^2 = 1$$

$c^2 = 9 - 1$
 $c^2 = 8$
 $c = 2\sqrt{2} \approx 2.8$

$c^2 = a^2 - b^2$
 $(3, -6)$
 $(3 + 2\sqrt{2}, -6)$
 $(3 - 2\sqrt{2}, -6)$

Yesterday Recap

Vertices: on major axis, larger denominator, foci on same axis

Co-vertices: on minor axis, small denom.

Foci: inside of ellipse, major axis, $c^2 = a^2 - b^2$ ← denominators

Major axis: vertices and foci, largest distance from center

Minor axis: co-vertices, shortest distance from center

Eccentricity: $\frac{c}{a}$
bigger number

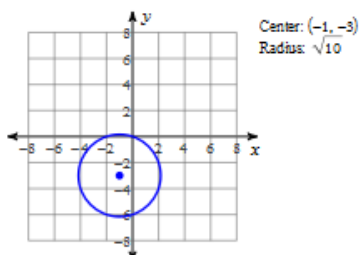
Completing the Square (remember??)

$$\frac{6}{2} = 3^2 = 9 \quad \frac{-8}{2} = (-4)^2 = 16 \quad (x+3)^2 + (y-4)^2 = 36$$

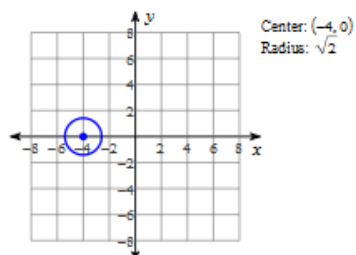
$$\text{Ex. } 2x^2 - 8x + 16 + 5y^2 - 30y - 39 + 16 + 45$$

$$5(y^2 - 6y + 9)$$

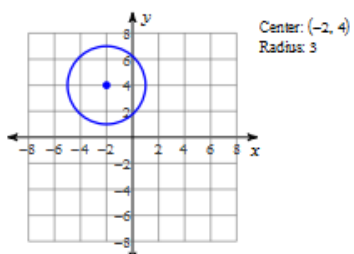
1)



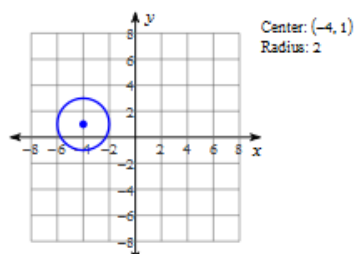
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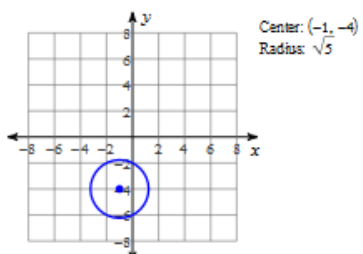
3)



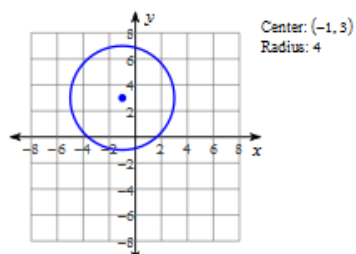
4)



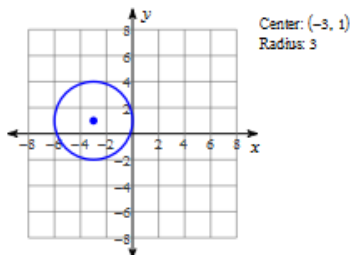
5)



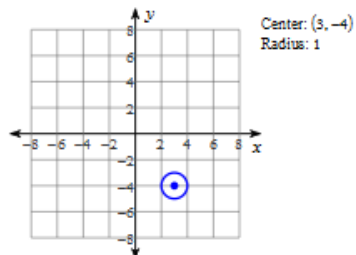
6)



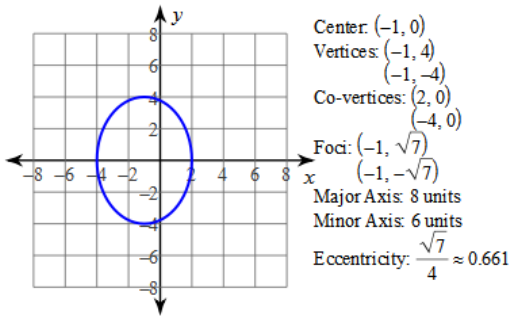
7)



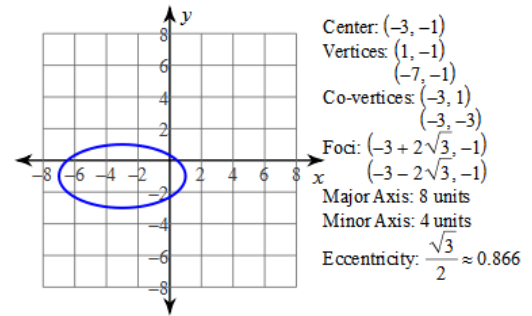
8)



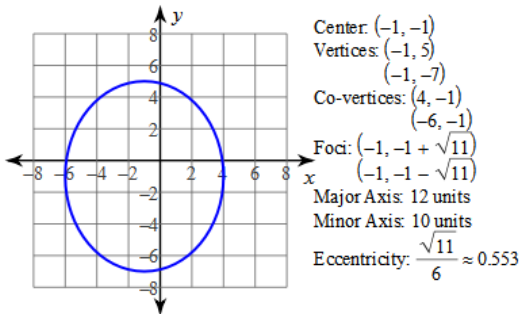
1)



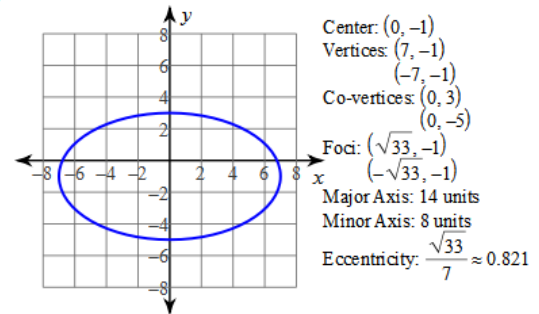
2)



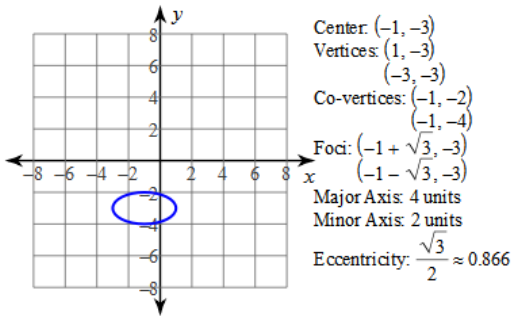
3)



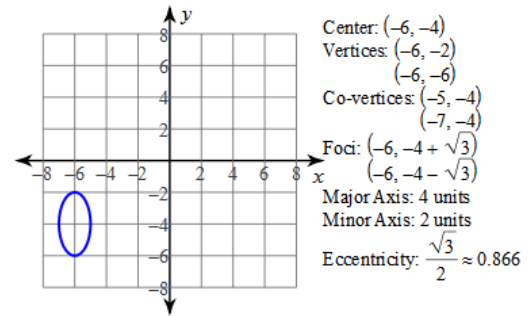
4)



5)



6)





College Spotlight



Out of state tuition: \$8,644

4,800 students

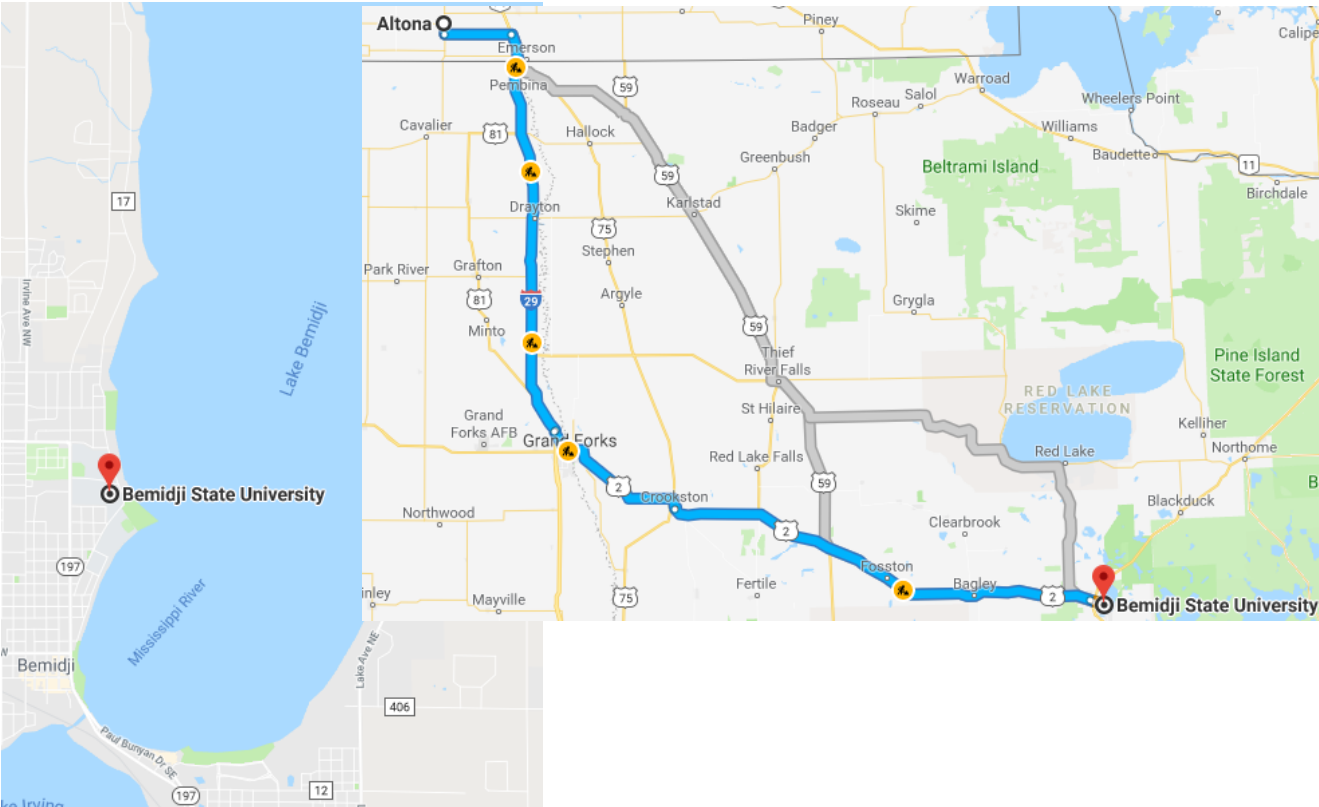
57% female

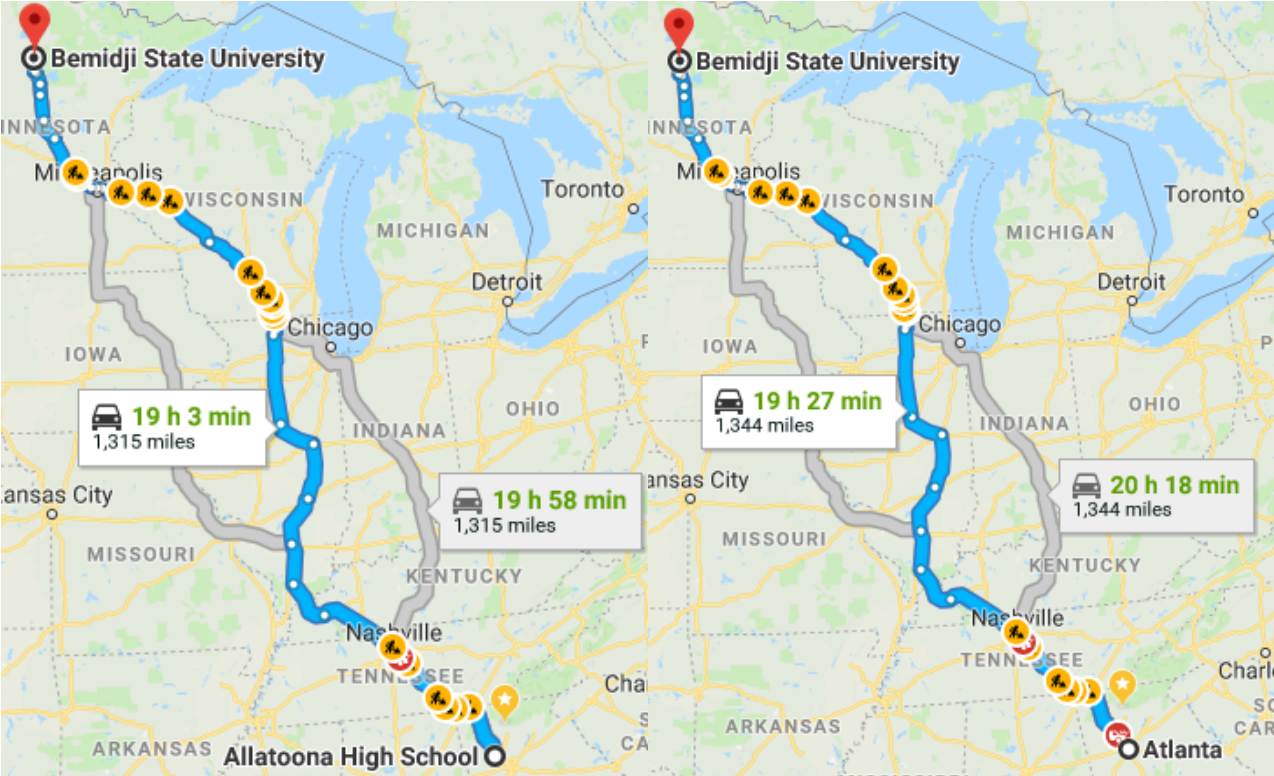
**Ranked #109 in
regional midwest
universities**

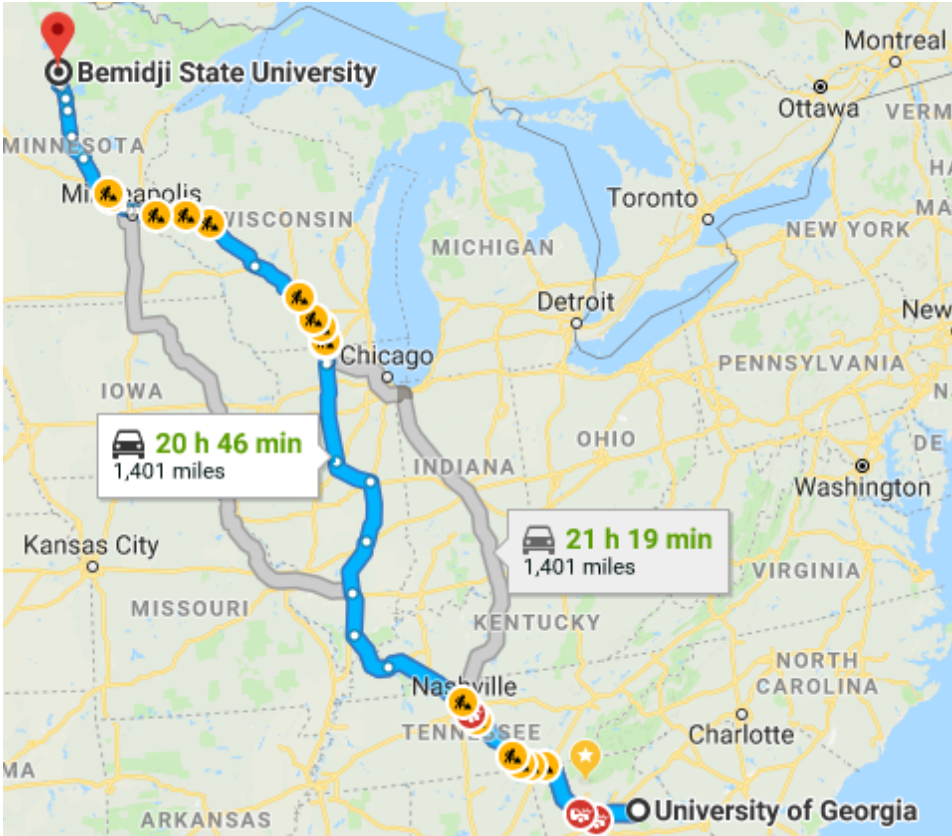
Division-II sports

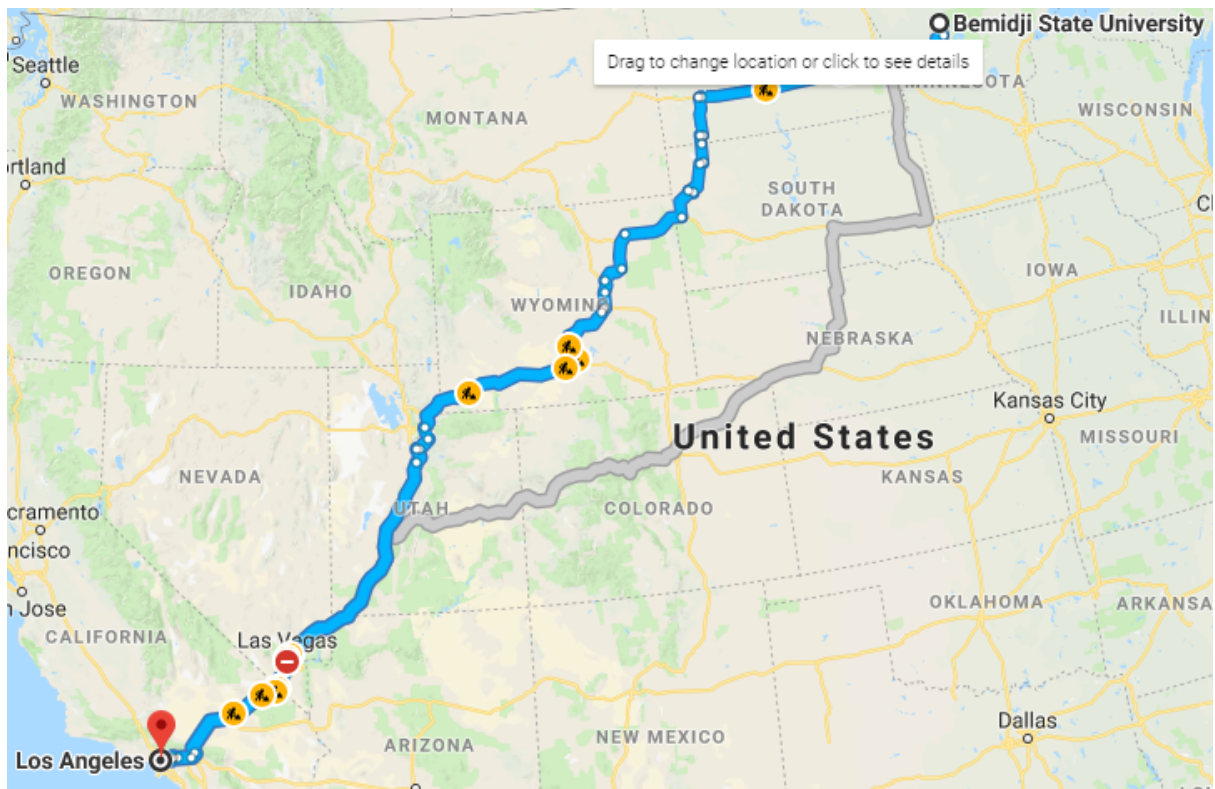
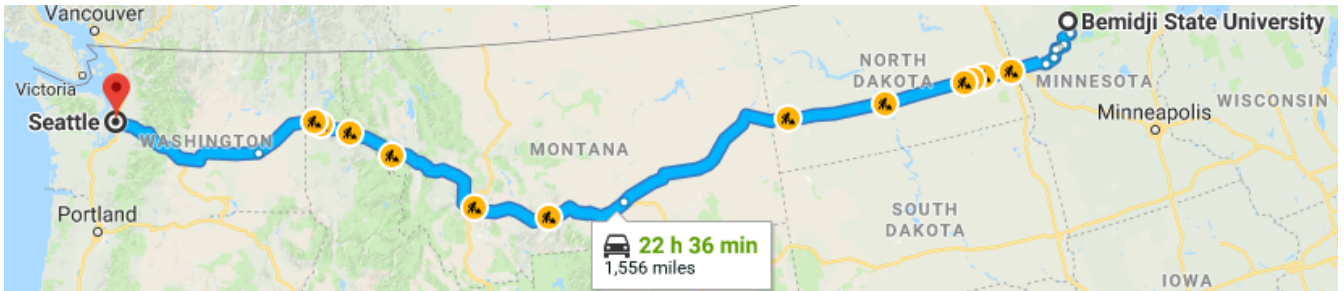
**- football, baseball,
basketball, w soccer, ice
hockey**

**Business management,
education, health fields**









$$x^2 + y^2 + 6x - 2y - 6 = 0$$
$$x^2 + 6x + \underline{9} + y^2 - 2y + \underline{1} = 6 + \underline{9} + \underline{1}$$
$$(x+3)^2 + (y-1)^2 = 16$$

$$C: (-3, 1)$$
$$r = 4$$

$$x^2 + y^2 - 8y + \underline{16} = -7 + 16$$
$$x^2 + (y-4)^2 = 9$$

$(0, 4)$ $r = 3$

$$x^2 + 8x + \underline{16} + y^2 - 4y + \underline{4} = -19$$

$+16$
 $+4$

$$(x + 4)^2 + (y - 2)^2 = 1$$

$$C: (-4, 2)$$

$$r = 1$$

$$4x^2 + 24x + _ + 4y^2 + 12y + _ = 19$$

$$4(x^2 + 6x + \underline{9} + y^2 + 3y + \underline{2.25}) = 19$$

$$\frac{4}{4} (x+3)^2 + \frac{4}{4} (y+1.5)^2 = \frac{64}{4}$$

$$(x+3)^2 + (y+1.5)^2 = 16$$

$$C: (-3, -1.5)$$

$$r = 4$$

$$\begin{aligned}x^2 + 9y^2 + 36y &= 0 \\x^2 + 9\left(y^2 + 4y + \frac{4}{9}\right) &= 0 + 36 \\x^2 + 9(y+2)^2 &= 36 \\ \hline \frac{x^2}{36} + \frac{(y+2)^2}{4} &= 1\end{aligned}$$

$$16x^2 + 25y^2 - 50y = 375$$

$$16x^2 + 25(y^2 - 2y + \frac{1}{4}) = 375 + 25$$

(y-1)(y-1)

$$\frac{16x^2 + 25(y-1)^2}{400} = \frac{400}{400}$$

$$\frac{x^2}{25} + \frac{(y-1)^2}{16} = 1$$