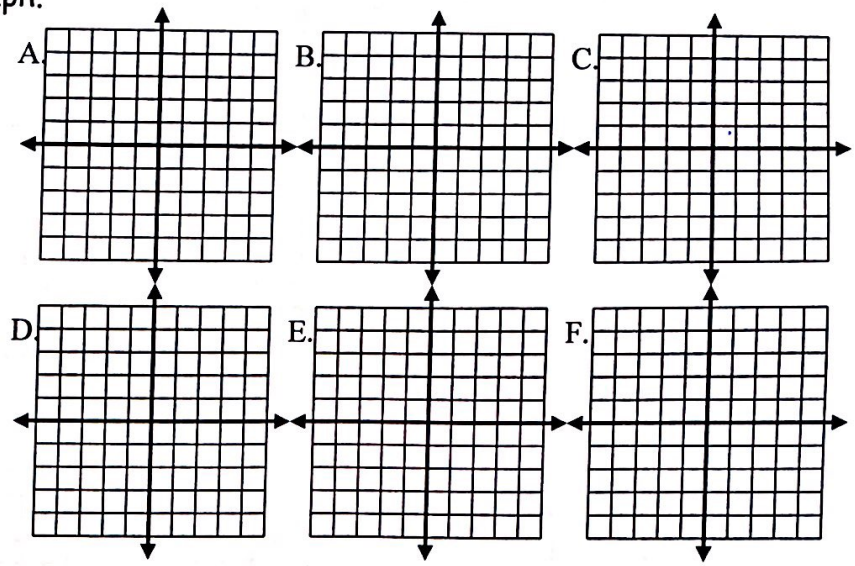
Honors Precalculus
Unit 4 Lesson 2

Name Key

Ellipses

Match each equation to its graph.

1. $\frac{(x-2)^2}{4}+\frac{(y+3)^2}{9}=1$ E
2. $\frac{(x+1)^2}{25}+\frac{(y-2)^2}{16}=1$ A
3. $\frac{(x-2)^2}{9}+\frac{(y+1)^2}{16}=1$ B
4. $\frac{(y+1)^2}{16}+\frac{(x-2)^2}{25}=1$ F
5. $\frac{(x-2)^2}{9}+\frac{(y+3)^2}{4}=1$ D
6. $\frac{(x+2)^2}{9}+\frac{(y-3)^2}{4}=1$ C



Find the center, foci, and vertices of each ellipse.

7. $\frac{x^2}{25}+\frac{y^2}{16}=1$ C: (0,0) F: (-3,0)(3,0) V: (-5,0)(5,0) $c^2 = 25-16 = 9$

8. $\frac{(x-3)^2}{144}+\frac{(y+4)^2}{169}=1$ C: (3,-4) F: (3,1)(3,-9) V: (3,9)(3,-17) $c^2 = 169-144$ $c^2 = 25$

9. $\frac{(x-1)^2}{16}+\frac{(y+2)^2}{36}=1$ C: (1,-2) F: (1,-2+2√5)(1,-2-2√5) V: (1,-8)(1,4) $c^2 = 36-16$ $c = \sqrt{20} = 2\sqrt{5}$

Write the equation of the ellipse with the information given.

10. Vertices: (3, 4), (3, -4), (-3, 0), (9, 0) — 8 units (2b), 12 units (2a); $a=6$ $b=4$ center (3,0) $\frac{(x-3)^2}{36}+\frac{(y-0)^2}{16}=1$

11. Vertices: (-2, -1), (-2, 9)
Foci: (-2, 8), (-2, 0)
$\frac{(x+2)^2}{9}+\frac{(y-4)^2}{25}=1$

12. ~~Major Axis Endpoints~~ foci: ~~(0, 5), (0, -5)~~ (5,0) (-5,0)
~~Foci~~: (12, 0), (-12, 0)
maj axis
$2a = 24$ $a = 12$ c(0,0) $2b = 10$ $b = 5$
$\frac{(x)^2}{144}+\frac{y^2}{25}=1$

Write the equation in standard form. Find the foci and vertices.

13. $49x^2 + 16y^2 = 784$
V: (0,7)(0,-7)
$\frac{x^2}{16}+\frac{y^2}{49}=1$
F: (0,√33)(0,-√33)

14. $8(x+1)^2 + 32y^2 = 128$
V (-5,0)(3,0)
$\frac{(x+1)^2}{16}+\frac{y^2}{4}=1$
F $(-1+2\sqrt{3},0)(-1-2\sqrt{3},0)$

15. $4x^2 + 8x + 9y^2 - 54y + 84 = 0$
V $(-\frac{3}{2},3)(-\frac{1}{2},3)$
c (-1,3)
$a = 1/2$ $b = 1/3$
$c^2 = \frac{1}{4}-\frac{1}{9} = \frac{5}{36}$ $c = \sqrt{5}/6$
F: $(-1+\frac{\sqrt{5}}{6},3)(-1-\frac{\sqrt{5}}{6},3)$
$\frac{(x+1)^2}{\frac{1}{4}}+\frac{(y-3)^2}{1/9}=1$

Sketch the ellipse.

16. $\frac{x^2}{4}+\frac{y^2}{25}=1$

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

18. $\frac{(x+2)^2}{16}+\frac{(y-1)^2}{49}=1$

19. $\frac{(x-2)^2}{144}+\frac{y^2}{169}=1$

20. $16x^2 + 64(y+2)^2 = 1024$
$\frac{16x^2}{1024}+\frac{64(y+2)^2}{1024}=\frac{1024}{1024}$
$\frac{x^2}{64}+\frac{(y+2)^2}{16}=1$

21. $9x^2 - 18x + y^2 + 6y + 17 = 0$
$9(x^2-2x+1)+(y^2+6y+9) = -17+9+9$
$9(x-1)^2+(y+3)^2 = 1$
$\frac{(x-1)^2}{1/9}+(y+3)^2=1$