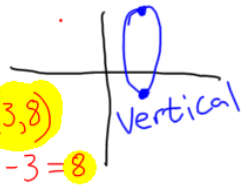
Algebra 2 Name Solutions

# 11.2 Practice - Ellipses and Circles

Period____

**Use the information provided to write the standard form equation of each ellipse.**

1) Vertices: (3, 19), (3, –3)
Co-vertices: (11, 8), (–5, 8)




center: $\left(\frac{3+3}{2}, \frac{19+-3}{2}\right) = (3, 8)$

$a = 19-8 = 11$ $b = 11-3 = 8$

$$\frac{(x-3)^2}{64} + \frac{(y-8)^2}{121} = 1$$

2) Vertices: (6, 8), (–20, 8)
Co-vertices: (–7, 18), (–7, –2)


center: $\left(\frac{6+-20}{2}, \frac{8+8}{2}\right) = (-7, 8)$

$a = 6--7 = 13$ $b = 18-8 = 10$

$$\frac{(x+7)^2}{169} + \frac{(y-8)^2}{100} = 1$$

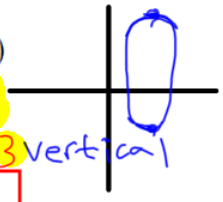
3) Vertices: (11, –4), (–9, –4)
Co-vertices: (1, –1), (1, –7)


center: $\left(\frac{11+-9}{2}, \frac{-4+-4}{2}\right) = (1, -4)$

$a = 11-1 = 10$ $b = -1--4 = 3$

$$\frac{(x-1)^2}{100} + \frac{(y+4)^2}{9} = 1$$

4) Vertices: (4, 8), (4, –4)
Co-vertices: (7, 2), (1, 2)

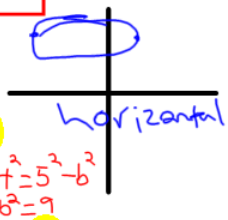



center: $\left(\frac{4+4}{2}, \frac{8+-4}{2}\right) = (4, 2)$

$a = 8-2 = 6$ $b = 7-4 = 3$

$$\frac{(x-4)^2}{9} + \frac{(y-2)^2}{36} = 1$$

5) Vertices: (2, 7), (–8, 7)
Foci: (1, 7), (–7, 7)




center: $\left(\frac{2+-8}{2}, \frac{7+7}{2}\right) = (-3, 7)$

$a = 2--3 = 5$ $c^2 = a^2 - b^2$

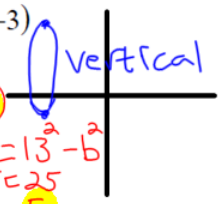
$4^2 = 5^2 - b^2$

$b^2 = 9$

$b = 3$

$$\frac{(x+3)^2}{25} + \frac{(y-7)^2}{9} = 1$$

6) Vertices: (–6, 23), (–6, –3)
Foci: (–6, 22), (–6, –2)




center: $\left(\frac{-6+-6}{2}, \frac{23+-3}{2}\right) = (-6, 10)$

$a = 23-10 = 13$ $c = 12$

$12^2 = 13^2 - b^2$

$b^2 = 25$

$b = 5$

$$\frac{(x+6)^2}{25} + \frac{(y-10)^2}{169} = 1$$

**Use the information provided to write the standard form equation of each circle.**

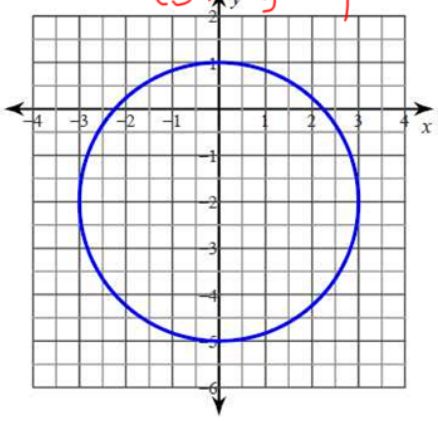
7) Center: (–14, 15)
Radius: 3

$(x+14)^2 + (y-15)^2 = 9$

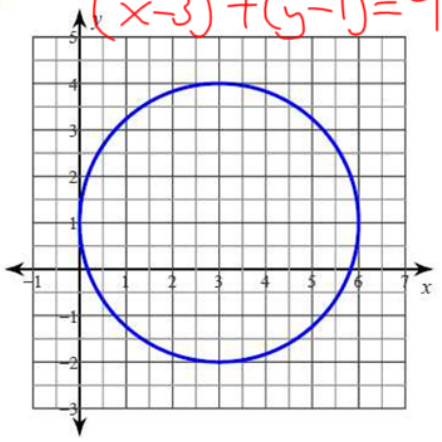
8) Center: (–5, 4)
Radius: 9

$(x+5)^2 + (y-4)^2 = 81$

9) $x^2 + (y+2)^2 = 9$



10) $(x-3)^2 + (y-1)^2 = 9$



11) Center: $(-5, 13)$
Point on Circle: $(-11, 13)$

$(-11+5)^2+(13-13)^2=r^2$

$36=r^2$

$\boxed{(x+5)^2+(y-13)^2=36}$

12) Center: $(12, 1)$
Point on Circle: $(5, 1)$

$(5-12)^2+(1-1)^2=r^2$

$49=r^2$

$\boxed{(x-12)^2+(y-1)^2=49}$

13) Center: $(-11, -1)$
Point on Circle: $(-13, -6)$

$(-13+11)^2+(-6+1)^2=r^2$

$29=r^2$

$\boxed{(x+11)^2+(y+1)^2=29}$

14) Center: $(7, -8)$
Point on Circle: $(6, -12)$

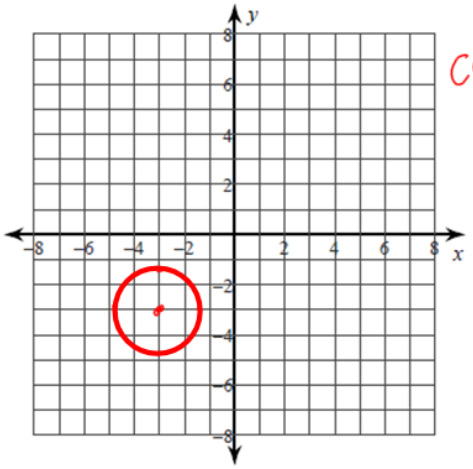
$(6-7)^2+(-12+8)^2=r^2$

$17=r^2$

$\boxed{(x-7)^2+(y+8)^2=17}$

**Identify the center and radius of each. Then sketch the graph.**

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

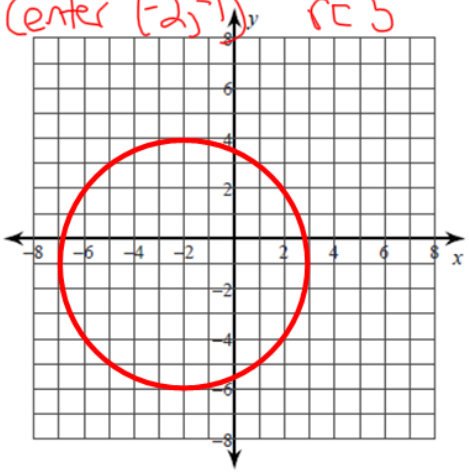



center: $(-3,-3)$

$r=\sqrt{3}\approx 1.7$

16) $(x+2)^2+(y+1)^2=25$

center $(-2,-1)$ $r=5$




**Classify the conic section as an ellipse, circle, or parabola.**

17) $\dfrac{(x+3)^2}{16}+(y-6)^2=1$

ellipse

18) $(x-1)^2+(y+1)^2=25$

Circle

19) $x=(y+2)^2-6$

parabola

20) $x^2+(y+2)^2=11$

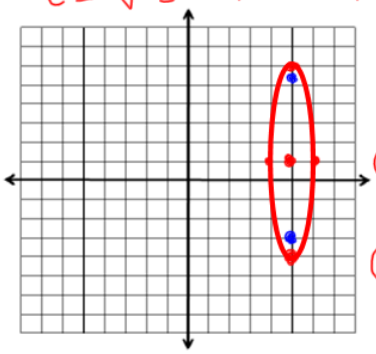
Circle

**In problems 21-24, sketch the graph of the given equation and fill in the blanks for the given information.**

21. $(x-5)^2 + \frac{(y-1)^2}{25} = 1$

$a=5$ $b=1$ vertical!

$c=\sqrt{25-1}=\sqrt{24}=2\sqrt{6}$



Center: (5,1)

Vertices: (5,-4) (5,6)

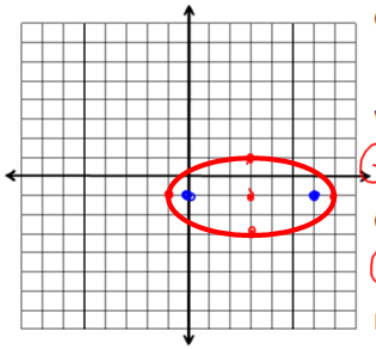
Co-vertices: (4,1) (6,1)

Foci: $(5, 1\pm 2\sqrt{6})$

22. $4(x-3)^2 + 16(y+1)^2 = 64$

$\frac{(x-3)^2}{16} + \frac{(y+1)^2}{4} = 1$ horizontal!

$a=4$ $b=2$ $c=\sqrt{16-4}=2\sqrt{3}$



Center: (3,-1)

Vertices: (-1,-1) (7,-1)

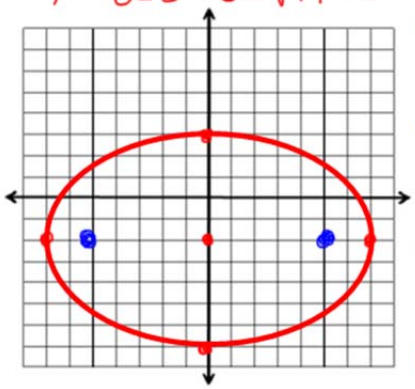
Co-vertices (3,-3) (3,1)

Foci: $(3\pm 2\sqrt{3}, -1)$

23. $25x^2 + 49(y+2)^2 = 1225$

$\frac{x^2}{49} + \frac{(y+2)^2}{25} = 1$ horizontal

$a=7$ $b=5$ $c=\sqrt{49-25}=\sqrt{24}$



Center: (0,-2)

Vertices: (-7,-2) (7,-2)

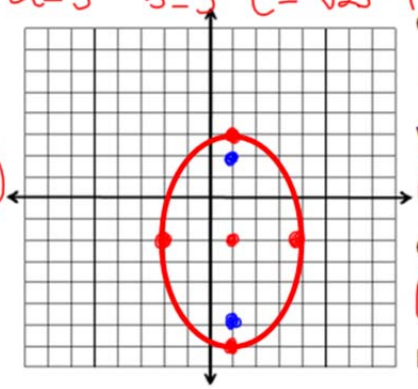
Co-vertices: (0,-7) (0,3)

Foci: $(\pm\sqrt{24}, -2)$

24. $25(x-1)^2 + 9(y+2)^2 = 225$

$\frac{(x-1)^2}{9} + \frac{(y+2)^2}{25} = 1$ Vert.

$a=5$ $b=3$ $c=\sqrt{25-9}=4$



Center: (1,-2)

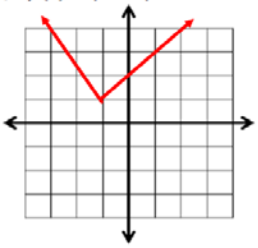
Vertices: (1,-7) (1,3)

Co-vertices (-2,-2) (4,-2)

Foci: (1,-6) (1,2)

**Algebra Skills:**

1. Graph $f(x) = |x+1| + 1$



Multiply.

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

$9-5$

4

3. $(2+\sqrt{x})(3-\sqrt{x})$

$6-2\sqrt{x}+3\sqrt{x}-x$

$6+\sqrt{x}-x$

Solve by factoring.

4. $27x - 3x^3 = 0$

$3x(9-x^2)=0$

$3x(3-x)(3+x)=0$

$x=0,\ x=3,\ x=-3$

5. $x^4 - 6x^2 + 5 = 0$

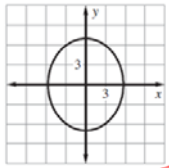
$(x^2-5)(x^2-1)=0$

$x^2=5$ $x=1$

$x=\pm\sqrt{5}$ $x=\pm 1$

**SAT Prep:**

1. Which elliptical equation is represented in the graph shown?



Vertical

$a>6$

$a^2>36$

(A) $\frac{x^2}{49} + \frac{y^2}{33} = 1$ (B) $\frac{x^2}{33} + \frac{y^2}{49} = 1$

(C) $\frac{x^2}{7} + \frac{y^2}{4} = 1$ (D) $\frac{x^2}{4} + \frac{y^2}{7} = 1$

2. The midpoint between $(-1,-3)$ and $(3,y)$ is $(2,\ 0.5)$. What is the value of $y$?

$\frac{-3+y}{2} = 0.5$

$-3+y=1$

$y=4$