Algebra 2B
Chapter 10 – Practice 10.1

Name Key

Date _____ Period _____

Find the distance between each pair of points. Leave in radical form.

1. (–4, 9), (1, –3)

$d = \sqrt{(1+4)^2 + (-3-9)^2}$
$= \sqrt{5^2 + (-12)^2}$
$= \sqrt{25 + 144}$
$= \sqrt{169}$
$= 13$ units

2. (9, –2), (12, –14)

$d = \sqrt{(12-9)^2 + (-14+2)^2}$
$= \sqrt{3^2 + (-12)^2}$
$= \sqrt{9 + 144} = \sqrt{153}$
$= 3\sqrt{17}$ units

3. $(-2\sqrt{7}, 10), (4\sqrt{7}, 8)$

$d = \sqrt{(4\sqrt{7} + 2\sqrt{7})^2 + (10-8)^2}$
$= \sqrt{(6\sqrt{7})^2 + (2)^2}$
$= \sqrt{36 \cdot 7 + 4}$
$= \sqrt{256}$
$= 16$ units

4. $(2\sqrt{3}, 4\sqrt{3}), (2\sqrt{3}, -\sqrt{3})$

$d = \sqrt{(2\sqrt{3} - 2\sqrt{3})^2 + (4\sqrt{3} + \sqrt{3})^2}$
$= \sqrt{0^2 + (5\sqrt{3})^2}$
$= \sqrt{0 + 25 \cdot 3}$
$= \sqrt{75}$
$= 5\sqrt{3}$ units

5. $\left(-3, -\frac{2}{11}\right), \left(5, \frac{9}{11}\right)$

$d = \sqrt{(-3-5)^2 + (-\frac{2}{11} + -\frac{9}{11})^2}$
$d = \sqrt{64 + 1}$
$d = \sqrt{65}$ units

Find the value of *a* so that the distance between the points with the given coordinates is 10.

6. (7, 2), (–1, *a*)

$10 = \sqrt{(-1-7)^2 + (a-2)^2}$
$100 = (-8)^2 + (a-2)^2$
$100 = 64 + (a-2)^2$
$36 = (a-2)^2$
$\pm 6 = a - 2$
$a = 8$ or $a = -4$

7. (–8, 8), (*a*, 11) (Round to the nearest tenth)

$10 = \sqrt{(a+8)^2 + (11-8)^2}$
$10 = \sqrt{(a+8)^2 + (3)^2}$
$10 = \sqrt{(a+8)^2 + 9}$
$100 = (a+8)^2 + 9$
$91 = (a+8)^2$
$\sqrt{91} = a + 8$
$a = -8 \pm \sqrt{91}$
$a = 1.5$ or -17.5

Algebra 2B
Chapter 10 – Practice 10.1

Find the midpoint of each line segment.

8. (8, 3), (16, 7)

$x_m = \frac{8+16}{2} = \frac{24}{2}$ $y_m = \frac{7+3}{2} = \frac{10}{2}$

(12, 5)

9. (6, –5), (–2, –7)

$x_m = \frac{6-2}{2} = \frac{4}{2} = 2$ $y_m = \frac{-5-7}{2} = \frac{-12}{2} = -6$

(2, –6)

10. (5, 9), (12, 18)

$x_m = \frac{12+5}{2} = \frac{17}{2}$ $y_m = \frac{9+18}{2} = \frac{27}{2}$

(8.5, 13.5)

11. (43, –18), (–78, –32)

$x_m = \frac{43-78}{2} = \frac{-35}{2}$ $y_m = \frac{-18-32}{2} = \frac{-50}{2}$

(–17.5, –25)

Given the coordinates of one endpoint of $\overline{AB}$ and its midpoint, M, find the coordinates of the other endpoint.

12. B(2, 5), M(–1, 7)

$-1 = \frac{2+x_a}{2}$ $7 = \frac{5+y_b}{2}$

$-2 = 2 + x_a$ $14 = 5 + y_b$

$-4 = x_a$ $9 = y_b$ A(–4, 9)

13. A(5, –16), M(–13, 2)

$-13 = \frac{5+x_b}{2}$ $2 = \frac{-16+y_b}{2}$

$-26 = 5 + x_b$ $4 = -16 + y_b$

$-31 = x_b$ $20 = y_b$

B(–31, 20)

14. $M\left(\frac{5}{8}, \frac{7}{12}\right)$, $A\left(\frac{2}{3}, \frac{5}{4}\right)$

$\frac{5}{8} = \frac{\frac{2}{3}+x_b}{2}$ (2) $\frac{7}{12} = \frac{\frac{5}{4}+y_b}{2}$

$\frac{5}{4} = \frac{2}{3} + x_b$ $\frac{7}{6} = \frac{5}{4} + y_b$

$\frac{15}{12} = \frac{8}{12} + x_b$ $\frac{14}{12} = \frac{15}{12} + y_b$

$\frac{7}{12} = x_b$ $\frac{-1}{12} = y_b$

B$\left(\frac{7}{12}, \frac{-1}{12}\right)$

Answers:

1. 13 units
2. $3\sqrt{17}$ units
3. 16 units
4. $5\sqrt{3}$ units
5. $\sqrt{65}$ units
6. –4 or 8
7. 1.5 or –17.5
8. (12, 5)
9. (2, –6)
10. (8.5, 13.5)
11. (–17.5, –25)
12. A(–4, 9)
13. B(–31, 20)
14. $B\left(\frac{7}{12}, -\frac{1}{12}\right)$

Algebra 2B
Practice 10.3

Name Key

Date _____ Period _____

Give the center and radius of each circle. Leave in simplified radical form if needed.

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

C: (3, -2)
r = 4

2. $x^2+(y-4)^2=9$

C: (0, 4)
r = 3

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

C: (0, 0)
r: 4

4. $(x+1)^2+(y+4)^2=7$

C: (-1, -4)
r: $\sqrt{7}$

5. $(x-2)^2+y^2=12$

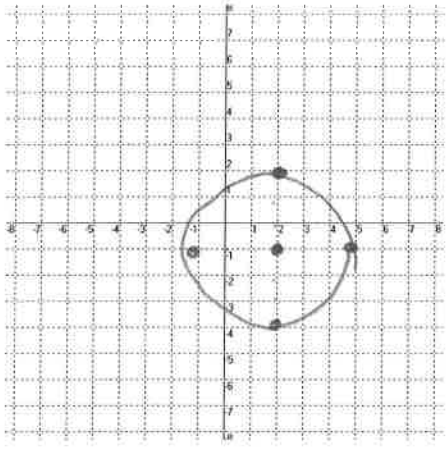
C: (2, 0)
r: $2\sqrt{3}$

6. $x^2+y^2=\frac{16}{9}$

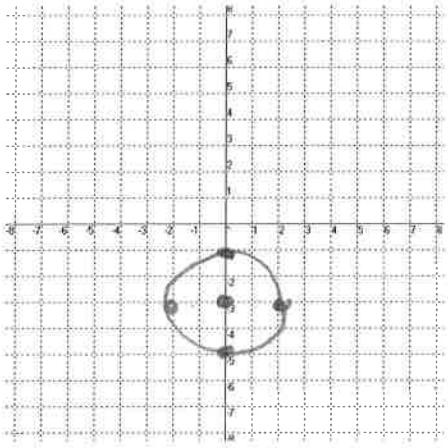
C: (0, 0)
r: $\frac{4}{3}$

Graph. Show center and radius.

7. $(x-2)^2+(y+1)^2=9$

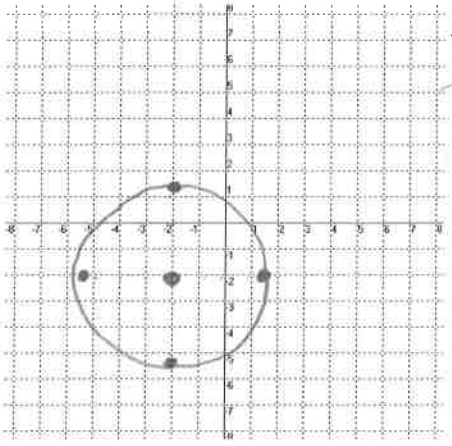


8. $x^2+(y-3)^2=4$



9. $(x+2)^2+(y+2)^2=10$

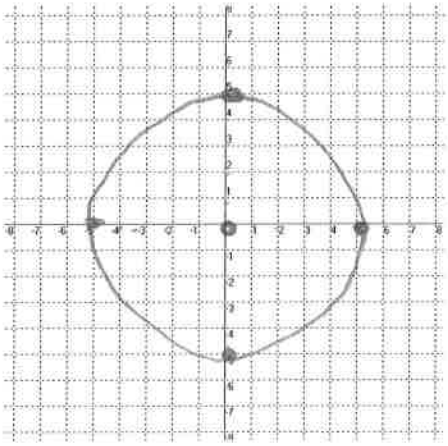
$\sqrt{10}$
$r^2 = 3$
$r^6 = 4$



10. $x^2+y^2=24$

$r^{24} = 2\sqrt{6}$

$\sqrt{6}$
$r^4 = 2$
$r^9 = 3$
$2 \cdot 2 = 4$
$2 \cdot 3 = 6$
$r \approx 5$



Algebra 2B
Practice 10.3

Give the center and radius of each circle.

11. $x^2 + y^2 + 6x - 4y = 3$

$x^2+6x+y^2-4y=3$
$(x^2+6x+9)+(y^2-4y+4)=3+9+4$
$(x+3)^2+(y-2)^2=16$
C: (−3, 2) r: 4

12. $x^2 + y^2 - 2x = 8$

$x^2-2x+y^2=8$
$(x^2-2x+1)+y^2=8+1$
$(x-1)^2+y^2=9$
C: (1, 0) r: 3

13. $x^2 + y^2 - 8x + 4y = -2$

$x^2-8x+y^2+4y=-2$
$x^2-8x+16+y^2+4y+4=-2+16+4$
$(x-4)^2+(y+2)^2=18$
C: (4, −2) r: $3\sqrt{2}$

Write the equation of the circle with the given center and radius.

14. (3, –1) r = 4

$(x-3)^2+(y+1)^2=16$

15. (–2, –5) r = 3

$(x+2)^2+(y+5)^2=9$

16. (0, 4) r = $2\sqrt{2}$

$x^2+(y-4)^2=4\cdot2$
$x^2+(y-4)^2=8$

Write the equation of the circle described.

17. Circle with a center of (2, 5) and passing through (6, 3).

$d=\sqrt{(3-5)^2+(6-2)^2}$
$=\sqrt{4+16}$
$=\sqrt{20}$
$r=\sqrt{20}$
$(x-2)^2+(y-5)^2=20$

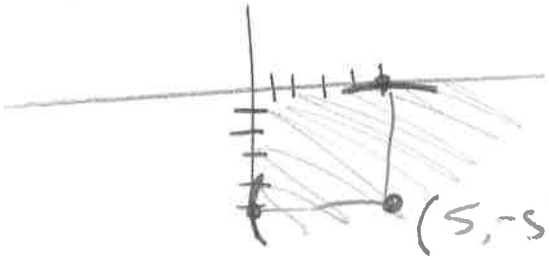
18. Circle with a diameter having endpoints of (1, 7) and (5, 11).

$d=\sqrt{(5-1)^2+(11-7)^2}$
$d=\sqrt{16+16}$
$d=\sqrt{32}$
$\frac{4\sqrt{2}}{2}$
$r=2\sqrt{2}$
$x_m=\frac{6}{2}$ $y_m=\frac{18}{2}$
(3, 9)
$(x-3)^2+(y-9)^2=8$

19. Circle with a center of (3, 1) and tangent to the x-axis.

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

20. Circle with a center in the 4th quadrant, a radius of 5 and tangent to the x- and y- axis.



$(x-5)^2+(y+5)^2=25$

Algebra 2B
Practice 10.4

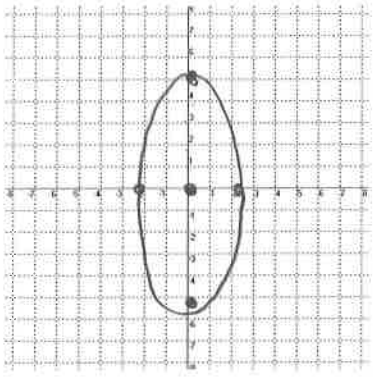
Name Key

Date _____ Period _____

Graph each ellipse. Give the length of the major and minor axes.

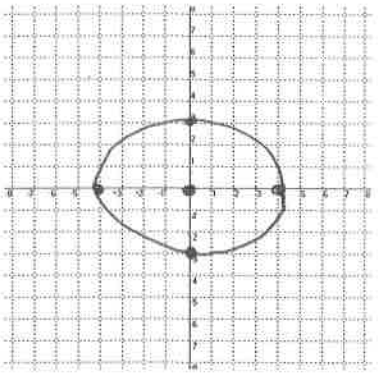
1. $\frac{x^2}{4}+\frac{y^2}{25}=1$

Major: 10 units
Minor: 4 units



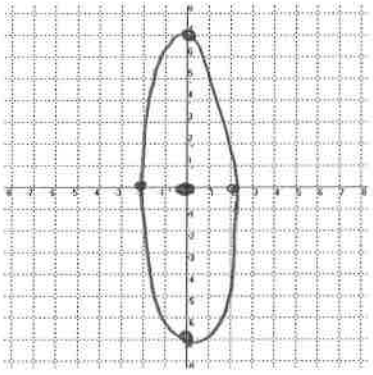
2. $\frac{x^2}{16}+\frac{y^2}{9}=1$

Major: 8 units
Minor: 6 units



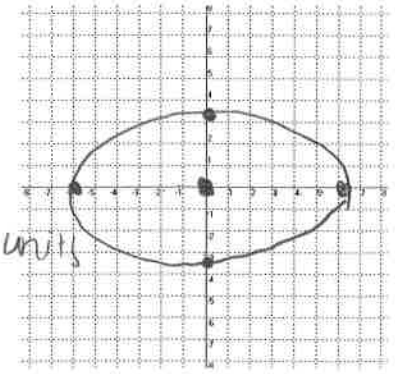
3. $\frac{x^2}{4}+\frac{y^2}{49}=1$

Major: 14 units
Minor: 4 units



4. $\frac{x^2}{36}+\frac{y^2}{10}=1$

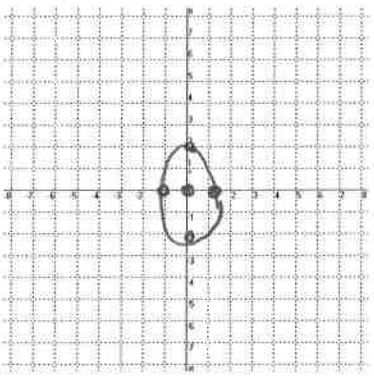
$\pi\sqrt{10} \approx 3.16$
Major: 12 units
Minor: $2\pi\sqrt{10}$ units



5. $\frac{36x^2}{36}+\frac{9y^2}{36}=\frac{36}{36}$

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

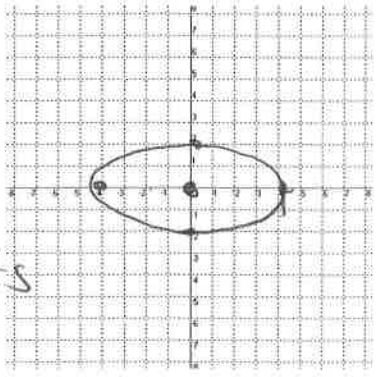
Major: 4 units
Minor: 2 units



6. $\frac{3x^2}{48}+\frac{12y^2}{48}=\frac{48}{48}$

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

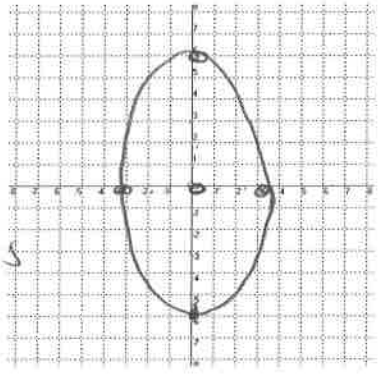
Major: 8 units
Minor: 4 units



7. $\frac{4x^2}{36}+\frac{y^2}{36}=\frac{36}{36}$

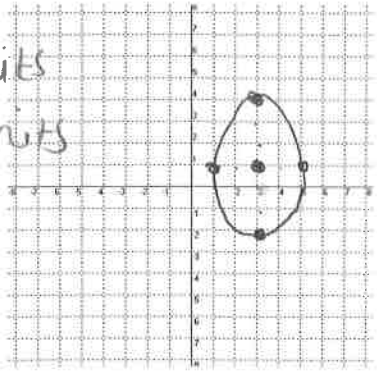
$\frac{x^2}{9}+\frac{y^2}{36}=1$

Major: 12 units
Minor: 6 units



8. $\frac{(x-3)^2}{4}+\frac{(y+1)^2}{9}=1$

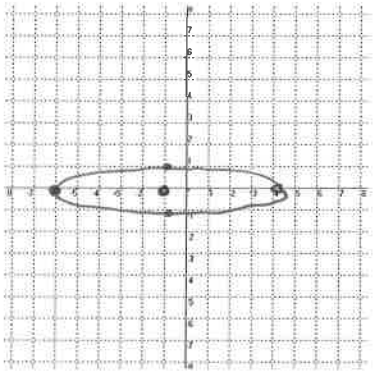
Major: 6 units
Minor: 4 units



Algebra 2B
Practice 10.4

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

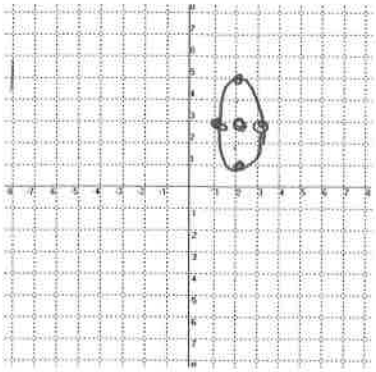
Major: 10 units
Minor: 2 units



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

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

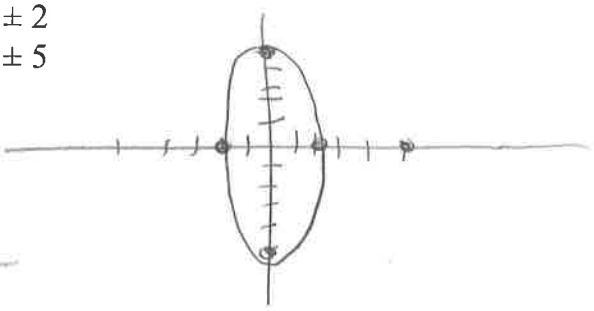
Major: 4 units
Minor: 2 units



Write the equation of the ellipse that has the given points and a center of (0, 0).

13. x-intercepts: ± 2
y-intercepts: ± 5

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



Answers:

1. C(0, 0) major = 10; minor = 4
2. C(0, 0) major = 8; minor = 6
3. C(0, 0) major = 14; minor = 4
4. C(0, 0) major = 12; minor $2\sqrt{10}$
5. C(0, 0) major = 4; minor = 2
6. C(0, 0) major = 8; minor = 4
7. C(0, 0) major = ~~$4\sqrt{8}$~~ 12 ; minor = ~~$2\sqrt{5}$~~ 6
8. C(3, –1) major = 6; minor = 4
11. C(–1, 0) major = 10; minor = 2
12. C(2, 3); major = 4; minor = 2
13. $\frac{x^2}{4} + \frac{y^2}{25} = 1$

10.1,10.3, 10.4 Quiz Review
Algebra 2B

Name Key

Find the *distance and midpoint* between each pair of points.

1. (0,0)(3,4)

$d = \sqrt{(0-3)^2 + (0-4)^2}$
$= \sqrt{9+16}$
$= \sqrt{25}$
$= 5$

$x_m = \frac{0+3}{2} = \frac{3}{2}$ $y_m = \frac{0+4}{2} = 2$ $\left(\frac{3}{2}, 2\right)$

2. (0,4)(8,–3)

$d = \sqrt{(8-0)^2 + (4+3)^2}$
$= \sqrt{64+49}$
$= \sqrt{113}$

$x_m = \frac{0+8}{2} = 4$ $y_m = \frac{4-3}{2} = \frac{1}{2}$ $\left(4, \frac{1}{2}\right)$

3. (9,–2)(3,6)

$d = \sqrt{(3-9)^2 + (6+2)^2}$
$= \sqrt{36+64}$
$= \sqrt{100}$
$= 10$

$x_m = \frac{12}{2} = 6$ $y_m = \frac{6-2}{2} = \frac{4}{2} = 2$ $(6,2)$

4. (6.3,–9)(1.3,–8.5)

$d = \sqrt{(1.3-6.3)^2 + (-8.5+9.)^2}$
$= \sqrt{(-5)^2 + (.5)^2}$
$= \sqrt{25 + (.25)}$
$\sqrt{25.25} = \sqrt{101} \approx 5.02$

5. If $(5,1)$ is the midpoint of a line segment and $(8,3)$ is one of the endpoints, find the other endpoint.

$5 = \frac{x+8}{2}$
$10 = x+8$
$2 = x$

$1 = \frac{y+3}{2}$
$2 = y+3$
$-1 = y$

$(2,-1)$

6. Find the length of $\overline{AB}$ if the midpoint is at (1, 4) and B is at (0, 6)

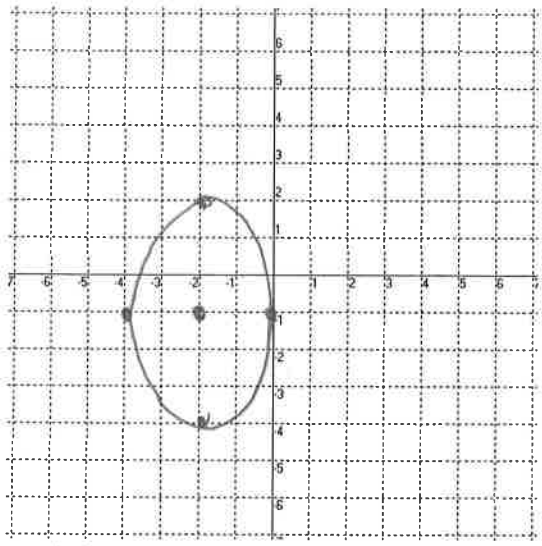
$1 = \frac{0+x}{2}$
$2 = x$

$4 = \frac{6+y}{2}$
$-2 = y$

$(2,-2)$

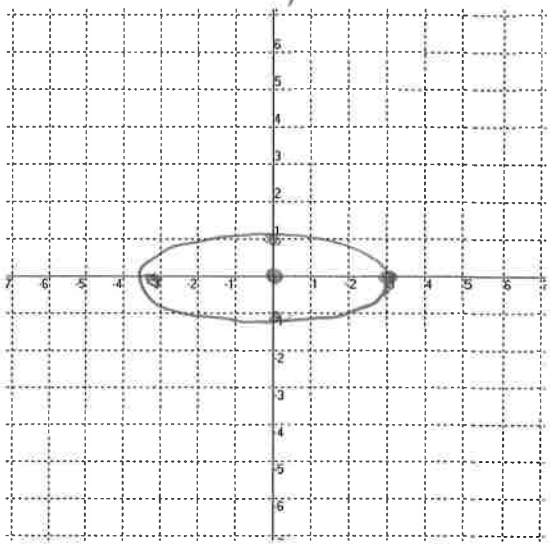
Graph each ellipse. Give the lengths of the major and minor axes.

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



Major: 6
Minor: 4

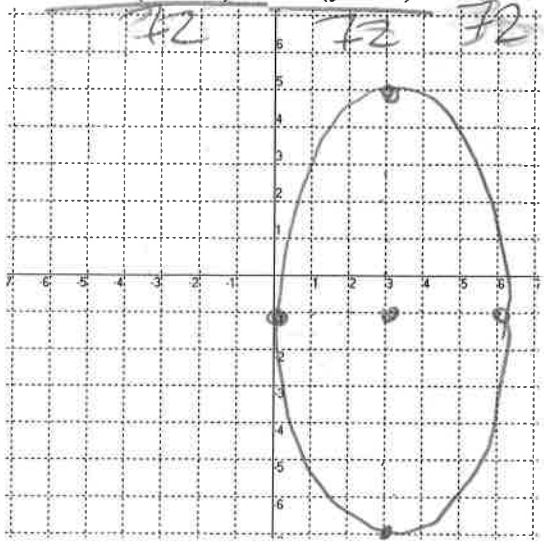
8. $\frac{x^2}{9}+\frac{y^2}{1}=1$



Major: 6
Minor: 2

9. $8(x-3)^2+2(y+1)^2=72$

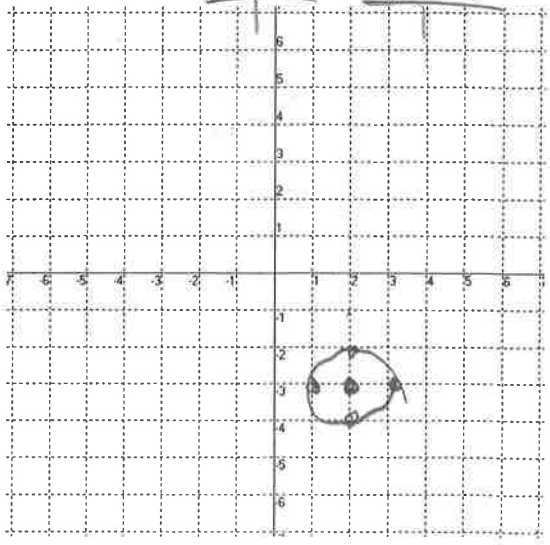
÷72 ÷72 ÷72



$\frac{(x-3)^2}{9}+\frac{(y+1)^2}{36}=1$

Major: 12
Minor: 6

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



Major = Minor = 1
(circle w/ radius 1)!

Identify the center and radius of each.

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

C: (0, 0)
r: 7

12. $x^2 + y^2 = 324$

C: (0, 0)
r: 18

13. $(x+10)^2 + (y+9)^2 = 36$

C: (-10, -9)
r = 6

14. $(x+5)^2 + (y-10)^2 = 9$

C: (-5, 10)
r: 3

15. $x^2 + (y+2)^2 = 121$

C: (0, -2)
r: 11

16. $(x-14)^2 + (y-2)^2 = 4$

C: (14, 2)
r: 2

17. $364 + 28y + y^2 + x^2 = -26x$

$(x^2+26x)+(y^2+28y) = -364$
$+196+196$
$(x^2+26x+169)+y^2+28y+196 = 1$
$(x+13)^2 + (y+14)^2 = 1$

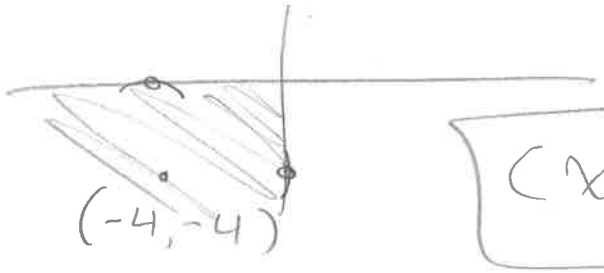
C: (-13, -14)
r = 1

18. $-6x = -x^2 + 32y - 264 - y^2$

$x^2 - 6x - 32y + y^2 = -264$
$(x^2 - 6x + 9) + (y^2 - 32y + 256) = -264$
$(x-3)^2 + (y-16)^2 = -264 + 9 + 256$
$(x-3)^2 + (y-16)^2 = 1$

C: (3, 16) r: 1

19. What is the equation of the circle with a radius of 4 in the Quadrant III that is tangent to the x and y axes?

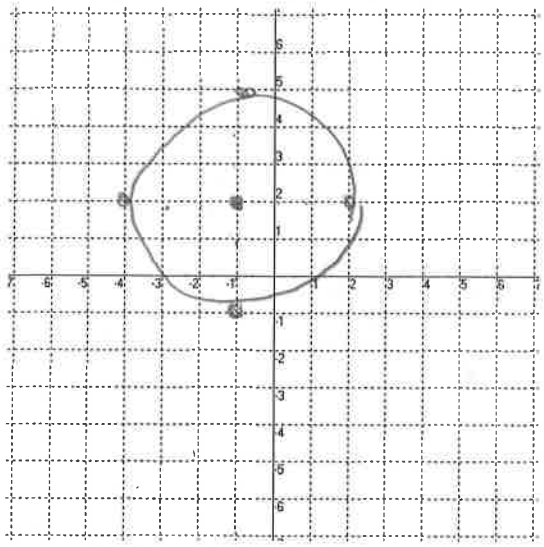


$(x+4)^2 + (y+4)^2 = 16$

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

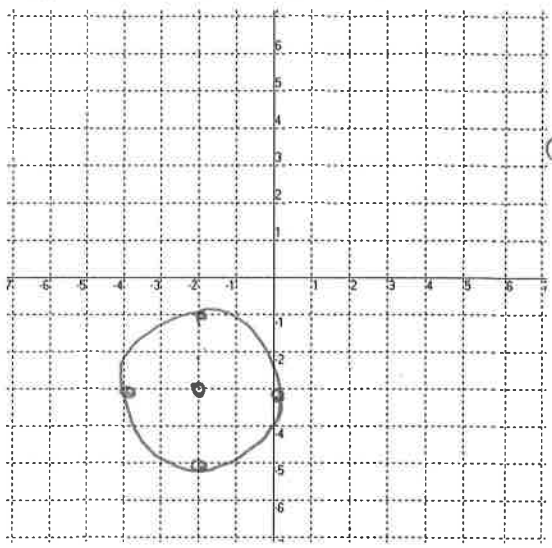
20. $(x+1)^2+(y-2)^2=9$

C: (-1, 2)
r: 3



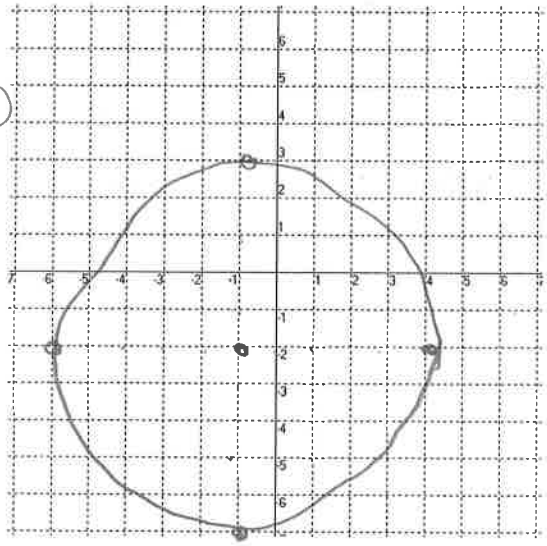
21. $(x+2)^2+(y+3)^2=4$

C: (-2, -3)
r: 2



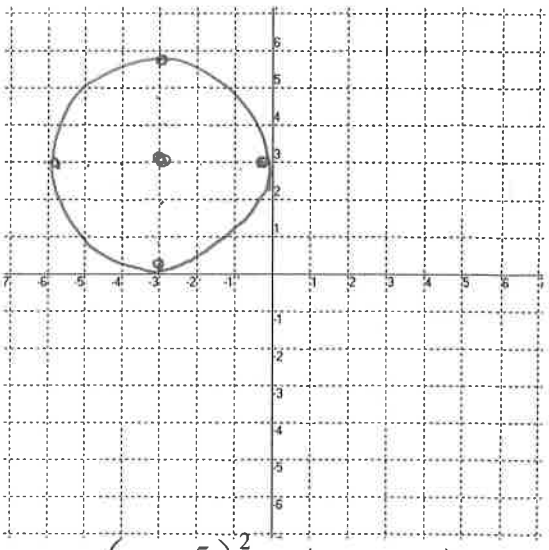
22. $(x+1)^2+(y+2)^2=25$

C: (-1, -2)
r: 5



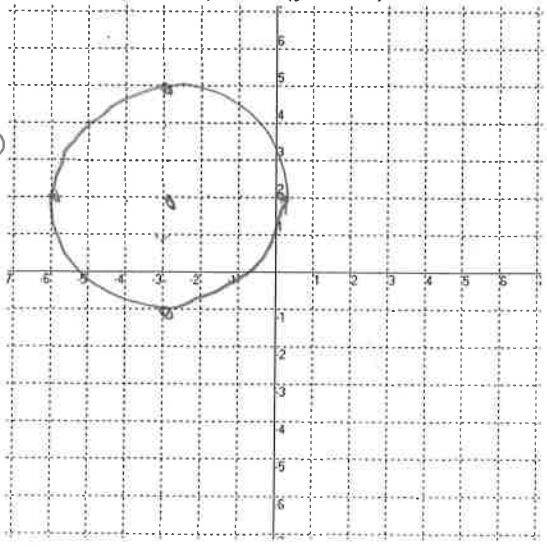
23. $(x+3)^2+(y-3)^2=8$

C: (-3, 3)
$r = 2\sqrt{2} \approx 2.83$



24. $(x+3)^2+(y-2)^2=9$

C: (-3, 2)
r: 3



25. $\left(x+\frac{5}{2}\right)^2+\left(y-\sqrt{14}\right)^2=9$

C: $(-\frac{5}{2}, \sqrt{14})$
r: 3
$\sqrt{14} \approx 3.7$