*AAT

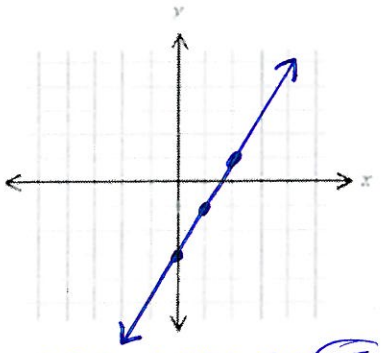
Name: Key

Chapter 3: 3-2 Graphs of Equations (IC/HW)-Days 1 & 2

Date: _____ Period: _____

Sketch the graph of the equation, and label the x- and y-intercepts.

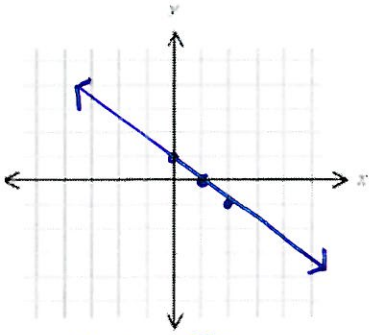
1. $y = 2x - 3$



x-int: $0 = 2x - 3$; 1.5

y-int: $y = 2(0) - 3$; -3

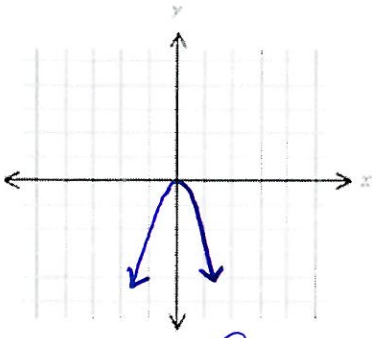
2. $y = -x + 1$



x-int: 1

y-int: 1

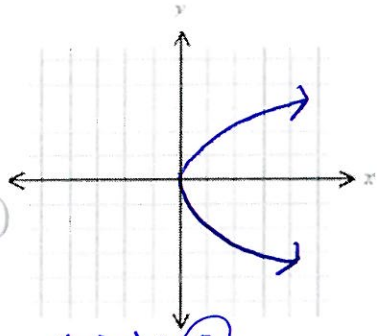
3. $y = -4x^2$



x-int: 0

y-int: 0

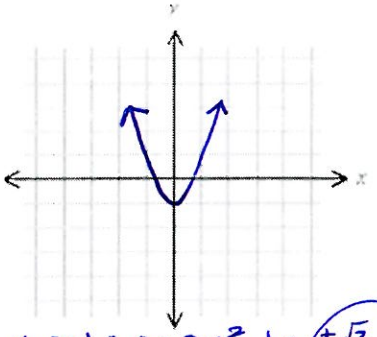
4. $x = 1/4y^2$



x-int: 0

y-int: 0

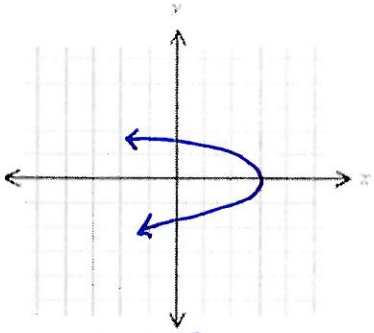
5. $y = 2x^2 - 1$



x-int: $0 = 2x^2 - 1$; $\pm\frac{\sqrt{2}}{2}$

y-int: -1

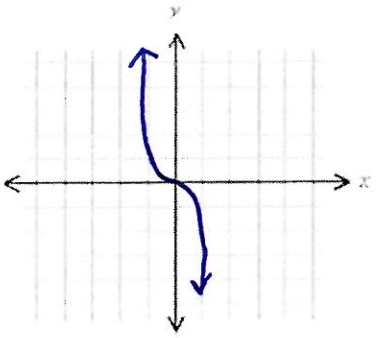
6. $x = -y^2 + 3$



x-int: 3

y-int: $\pm\sqrt{3}$

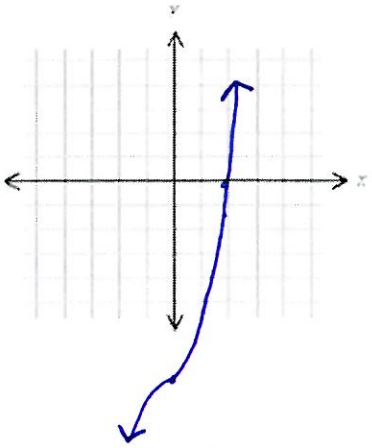
7. $y = -1/2x^3$



x-int: 0

y-int: 0

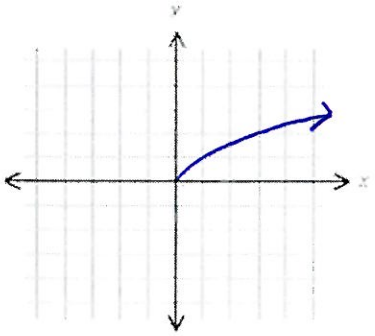
8. $y = x^3 - 8$



x-int: 2

y-int: -8

9. $y = \sqrt{x}$



x-int: 0

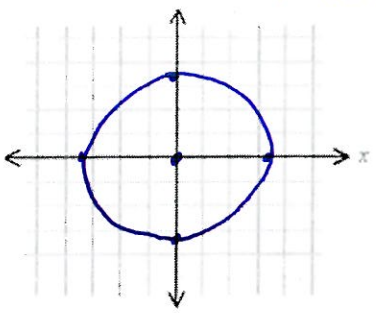
y-int: 0

Use tests for symmetry to determine which graphs in the indicated excercises are symmetric with respect to (a) the y-axis, (b) the x-axis, and (c) the origin.

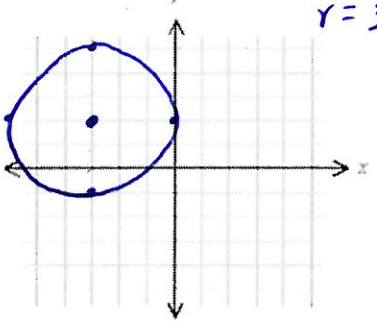
10. Exercises 1-9 (a) #3, #5 (b) #4, #6 (c) #7

Sketch the graph of the circle or semi-circle.

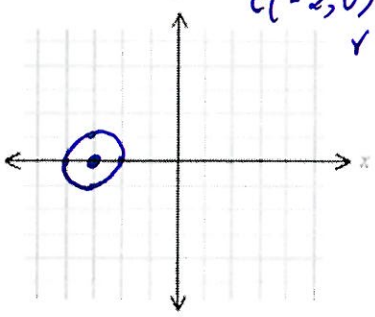
11. $x^2 + y^2 = 11$ $C(0,0)$ $r = \sqrt{11}$



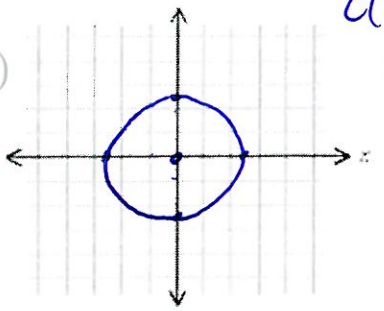
12. $(x+3)^2 + (y-2)^2 = 9$ $C(-3,2)$ $r = 3$



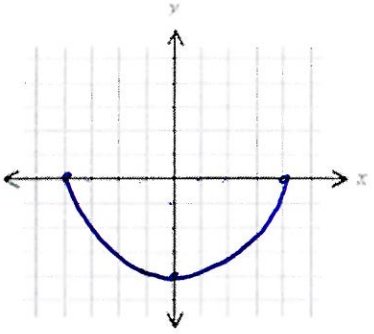
13. $(x+3)^2 + y^2 = 1$ $C(-3,0)$ $r = 1$



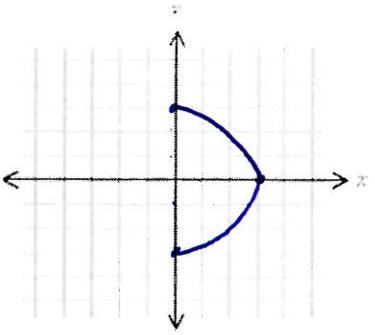
14. $\frac{4x^2}{4} + \frac{4y^2}{4} = \frac{25}{4}$ $x^2 + y^2 = \frac{25}{4}$ $C(0,0)$ $r = \frac{5}{2}$



15. $y = -\sqrt{16 - x^2}$



16. $x = \sqrt{9 - y^2}$



Find an equation of the circle that satisfies the stated conditions.

17. Center C(2, -3), radius 5

$(x-2)^2 + (y+3)^2 = 25$

18. Center C(1/4, 0), radius $\sqrt{5}$

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

19. Center C(-4,6), passing through P(1,2)

$(x+4)^2 + (y-6)^2 = r^2$

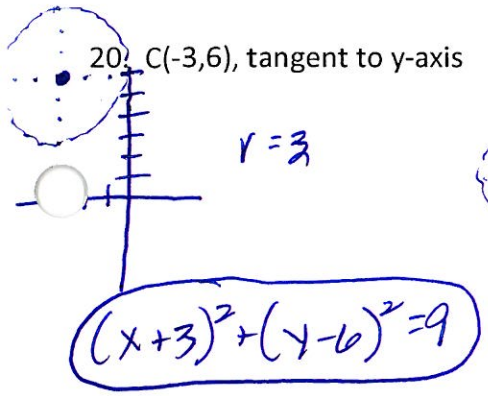
$(1+4)^2 + (2-6)^2 = r^2$

$25 + (-4)^2 = r^2$

$41 = r^2$

$(x+4)^2 + (y-6)^2 = 41$

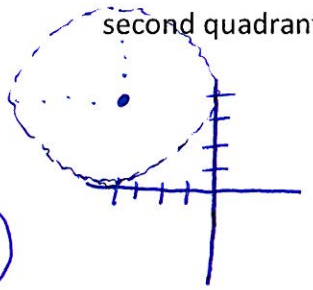
20. C(-3,6), tangent to y-axis



$r = 3$

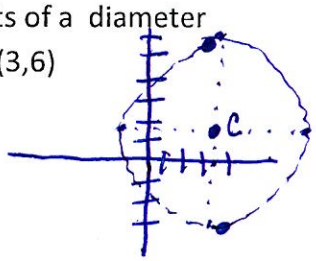
$(x+3)^2+(y-6)^2=9$

21. Tangent to both axes, center in second quadrant, radius = 4



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

22. Endpoints of a diameter A(4,-3) and B(3,6)



$M\left(\frac{4+3}{2}, \frac{-3+6}{2}\right)=M\left(\frac{7}{2}, \frac{3}{2}\right)$

$\left(x-\frac{7}{2}\right)^2+\left(y-\frac{3}{2}\right)^2=r^2$

$d=\sqrt{\left(4-\frac{7}{2}\right)^2+\left(-3-\frac{3}{2}\right)^2}=\sqrt{20.5}=r$

$\left(x-\frac{7}{2}\right)^2+\left(y-\frac{3}{2}\right)^2=20.5$

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

23. $x^2 + y^2 - 4x + 6y - 36 = 0$

$x^2-4x+4+y^2+6y+9=36+4+9$

$(x-2)^2+(y+3)^2=49$

$C(2,-3);\ r=7$

24. $x^2 + y^2 + 4y - 117 = 0$

$x^2+y^2+4y+4=117+4$

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

$C(0,-2);\ r=11$

25. $2x^2 + 2y^2 - 12x + 4y - 15 = 0$

$\frac{2x^2}{2}-\frac{12x}{2}+\frac{2y^2}{2}+\frac{4y}{2}=\frac{15}{2}$

$x^2-6x+9+y^2+2y+1=\frac{15}{2}+9+1$

$(x-3)^2+(y+1)^2=\frac{35}{2}$

$C(3,-1);\ r=\frac{\sqrt{70}}{2}$

26. $x^2 + y^2 + 4x - 2y + 5 = 0$

$x^2+4x+4+y^2-2y+1=-5+4+1$

$(x+2)^2+(y-1)^2=0$

$C(-2,1);\ r=0 \therefore$ (a point)

27. $x^2 + y^2 - 2x - 8y + 19 = 0$

$x^2-2x+1+y^2-8y+16=-19+1+16$

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

$\therefore$ Not a circle since r^2 cannot $=-2$

28. $x^2 + y^2 - 6x + 4y + 13 = 0$

$x^2-6x+9+y^2+4y+4=-13+9+4$

$(x-3)^2+(y+2)^2=0$

$C(3,-2);\ r=0 \therefore$ (a point)

Find equations for the upper half, lower half, right half, and left half of the circle.

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

$y^2 = 36 - x^2$

$y = \pm\sqrt{36 - x^2}$; upper; $y = \sqrt{36 - x^2}$, lower; $y = -\sqrt{36 - x^2}$

$x^2 = 36 - y^2$

$x = \pm\sqrt{36 - y^2}$; right; $x = \sqrt{36 - y^2}$, left; $x = -\sqrt{36 - y^2}$

30. $(x - 2)^2 + (y+1)^2 = 49$

$(y+1)^2 = 49 - (x-2)^2$

$y + 1 = \pm\sqrt{49 - (x-2)^2}$

$y = -1 \pm \sqrt{49 - (x-2)^2}$; upper; $y = -1 + \sqrt{49 - (x-2)^2}$, lower; $y = -1 - \sqrt{49 - (x-2)^2}$

$(x-2)^2 = 49 - (y+1)^2$

$x - 2 = \pm\sqrt{49 - (y+1)^2}$

$x = 2 \pm \sqrt{49 - (y+1)^2}$; right; $x = 2 + \sqrt{49 - (y+1)^2}$, left; $x = 2 - \sqrt{49 - (y+1)^2}$

Determine whether the point P is inside, outside, or on the circle with center C and radius r.

31. P(2,3), C(4,6), $r = 4$

$d(P,C) = \sqrt{4 + 9}$

$= \sqrt{13} < r \{r = 4\}$

$\therefore$ P is inside

32. P(4,2), C(1,-2), $r = 5$

$d(P,C) = \sqrt{9 + 16}$

$= \sqrt{25} = 5 = r \{r = 5\}$

$\therefore$ P is on C

33. P(-3,5), C(2,1), $r = 6$

$d(P,C) = \sqrt{25 + 16}$

$= \sqrt{41} > r \{r = 6\}$

$\therefore$ P is outside C

Find the x-intercepts and the y-intercepts of the circle.

34. $x^2 + y^2 - 4x - 6y + 4 = 0$

x-int: $(y = 0)$ $x^2 - 4x + 4 = 0$

$(x-2)^2 = 0$

$x = 2$

x-int: $(2, 0)$

y-int: $(x = 0)$

$y^2 - 6y + 4 = 0$

$y = \frac{6 \pm \sqrt{36 - 16}}{2} = 3 \pm \sqrt{5}$

y-int: $(0, 3 \pm \sqrt{5})$

35. **Find an equation of the circle that is concentric (has the same center) with $x^2 + y^2 + 4x - 6y + 4 = 0$ and passes through P(2,6).**

$x^2 + 4x + 4 + y^2 - 6y + 9 = 9$

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

$C(-2, 3)$; $r = 3$

$r =$

$d(P,C) = \sqrt{16 + 9}$

$= \sqrt{25} = 5$

$(x+2)^2 + (y-3) = 25$