23A

1) $(X - 0)^2 + (Y - 0)^2 = 6^2$
center (0, 0)
radius 6

2) on the graph

3) $(X - 3)^2 + (Y + 3)^2 = 4^2 = 16$

4) on the graph

5) $X^2 + 2X + 1 + Y^2 + 4Y + 4 = 4 + 5$
$(X + 1)^2 + (Y + 2)^2 = 9$
center (-1, -2)
radius 3

6) on the graph

7) $4(X - 0)^2 + (Y - 0)^2 = 6^2$
center (0, 0)

$4X^2 + (0)^2 = 36$ $\quad$ $4(0)^2 + Y^2 = 36$
$4X^2 = 36$ $\quad$ $Y^2 = 36$
$X^2 = 9$ $\quad$ $Y = \pm 6$
$X = \pm 3$

8) on the graph

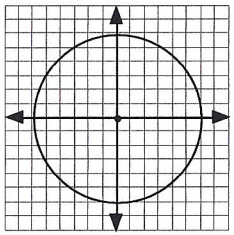
9) $16(X + 1)^2 + 9(Y - 1)^2 = 144$
center (-1, 1)

$16(X + 1)^2 + 9(0)^2 = 144$ $\quad$ $16(0)^2 + 9(Y - 1)^2 = 144$
$16(X + 1)^2 = 144$ $\quad$ $9(Y - 1)^2 = 144$
$(X + 1)^2 = 9$ $\quad$ $(Y - 1)^2 = 16$
$X + 1 = \pm 3$ $\quad$ $Y - 1 = \pm 4$
$X = 2, -4$ $\quad$ $Y = 5, -3$

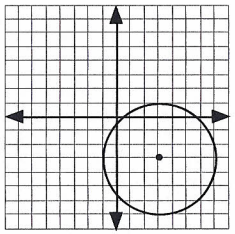
X	Y
-1	5
-1	-3
2	1
-4	1

10) on the graph

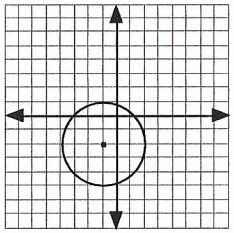
#2



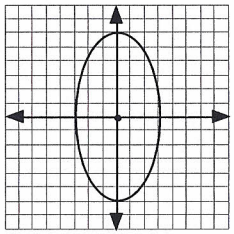
#4



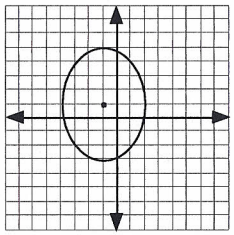
#6



#8



#10



23B

1) $(X + 4)^2 + (Y + 4)^2 = 5$
center (-4, -4)
radius $\sqrt{5} \approx 2.24$

2) on the graph

3) $(X - 2)^2 + (Y - 1)^2 = (4.5)^2 = 20.25$

4) on the graph

5) $X^2 - 8X + 16 + Y^2 + 12Y + 36 = -48 + 52$
$(X - 4)^2 + (Y + 6)^2 = 4$
center (4, -6)
radius 2

6) on the graph

7) $4(X - 2)^2 + 16(Y + 1)^2 = 64$
center (2, -1)

$4(0)^2 + 16(Y + 1)^2 = 64$ $\quad$ $4(X - 2)^2 + 16(0)^2 = 64$
$16(Y + 1)^2 = 64$ $\quad$ $4(X - 2)^2 = 64$
$(Y + 1)^2 = 4$ $\quad$ $(X - 2)^2 = 16$
$Y + 1 = \pm 2$ $\quad$ $X - 2 = \pm 4$
$Y = 1, -3$ $\quad$ $X = 6, -2$

X	Y
2	1
2	-3
6	-1
-2	-1

8) on the graph

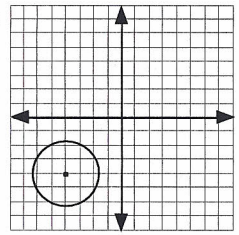
9) $(X - 1)^2 + 9(Y + 1)^2 = 9$
center (1, -1)

$(0)^2 + 9(Y + 1)^2 = 9$ $\quad$ $(X - 1)^2 + 9(0)^2 = 9$
$9(Y + 1)^2 = 9$ $\quad$ $(X - 1)^2 = 9$
$(Y + 1)^2 = 1$ $\quad$ $X - 1 = \pm 3$
$Y + 1 = \pm 1$ $\quad$ $X = 4, -2$
$Y = 0, -2$

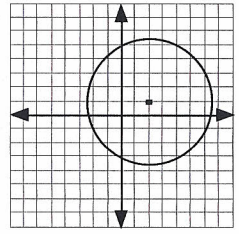
X	Y
1	0
1	-2
4	-1
-2	-1

10) on the graph

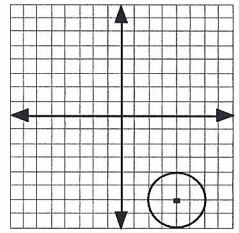
#2



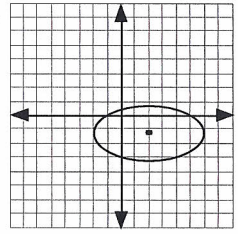
#4



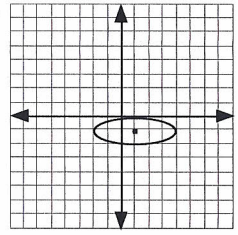
#6



#8



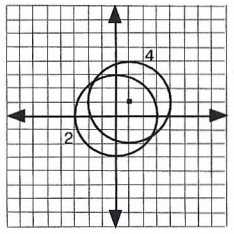
#10



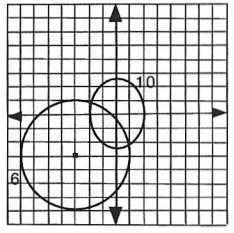
23C

1) $(X - 0)^2 + (Y - 0)^2 = 3^2 \Rightarrow X = 0, Y = 0$
   $C = (0, 0)$ $R = 3$
2) on the graph
3) $(X - 1)^2 + (Y - 1)^2 = 3^2 \Rightarrow (X - 1)^2 + (Y - 1)^2 = 9$
4) on the graph
5) $X^2 + 6X + 9 + Y^2 + 6Y + 9 = -2 + 18$
   $(X + 3)^2 + (Y + 3)^2 = 4^2$
   $C = (-3, -3)$ $R = 4$
6) on the graph
7) (0, 0)
8) $Y = 0 \Rightarrow 6X^2 = 24$
   $X^2 = 4 \Rightarrow X = \pm 2$
9) $X = 0 \Rightarrow 4Y^2 = 24$
   $Y^2 = 6 \Rightarrow Y = \pm\sqrt{6} \approx \pm 2.5$ This is an estimation of the value chosen to make it easy to graph.
10) on the graph
11) $BC^2 = 49 + 16 = 65$
    $BC = \sqrt{65}$
12) $AB^2 = 9 + 81 = 90$
    $AB = \sqrt{90}$ $AB = 3\sqrt{10}$
13) $\left(\frac{2 - 2}{2}\right), \left(\frac{3 - 4}{2}\right) = \left(0, -\frac{1}{2}\right)$
14) $\left(\frac{5 - 2}{2}\right), \left(\frac{-6 - 4}{2}\right) = \left(1\frac{1}{2}, -5\right)$
15) $Y = 1/3X - 2$, $m = 1/3$
    $Y = 1/3X + b \Rightarrow (4) = 1/3(-3) + b$
    $5 = b$ $Y = 1/3X + 5$
16) on the graph
17) $Y = -1/5X - 1$, $m = -1/5$ so perpendicular is 5
    $Y = 5X + b \Rightarrow (-3) = 5(-1) + b$
    $2 = b$ $Y = 5X + 2$
18) on the graph
    $[2Y \geq 2X + 3] \div 2 \Rightarrow Y \geq X + 3/2$
19) $(0) \geq (0) + 3/2$ $(2) \geq (-2) + 3/2$
    $0 \geq 3/2$ $2 \geq -1/2$
    no yes
20) solid, on the graph

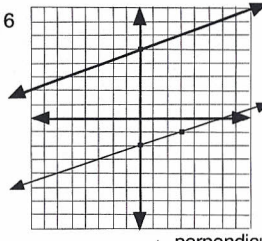
#2 & 4



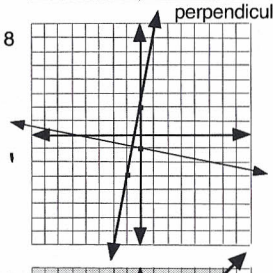
#6 & 10



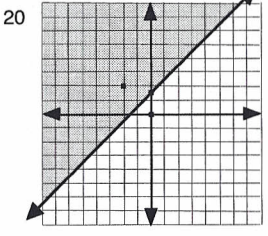
#16



#18



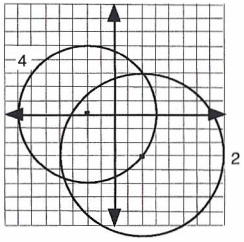
#19 & 20



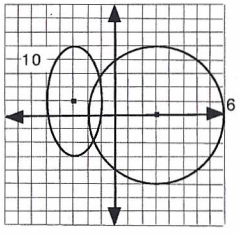
23D

1) $X - 2 = 0$ $Y + 3 = 0$ $R^2 = 36$
   $X = 2$ $Y = -3$ $R = 6$
   $C = (2, -3)$ $R = 6$
2) on the graph
3) $(X + 2)^2 + (Y - 0)^2 = 5^2 \Rightarrow (X + 2)^2 + (Y)^2 = 25$
4) on the graph
5) $X^2 - 6X + 9 + Y^2 = 16 + 9$
   $(X - 3)^2 + (Y - 0)^2 = 5^2$
   $C = (3, 0)$ $R = 5$
6) on the graph
7) $X + 3 = 0$, $Y - 1 = 0$, $C = (-3, 1)$ (multiply by 16 first)
8) If $Y=1$, Y term $= 0 \Rightarrow 4(X+3)^2 = 16$, $2(X+3) = \pm 4$, $X = -1, -5$
9) If $X=-3$, X term $= 0 \Rightarrow (Y-1)^2 = 16$, $Y-1 = \pm 4$, $Y = +5, -3$
10) on the graph
11) $AB^2 = 64 + 4 = 68$
    $AB = \sqrt{68} = 2\sqrt{17}$
12) $AC^2 = 100 + 9 = 109$
    $AC = \sqrt{109}$
13) $\left(\frac{-4 - 2}{2}\right), \left(\frac{4 - 1}{2}\right) = \left(-3, 1\frac{1}{2}\right)$
14) $\left(\frac{6 - 4}{2}\right), \left(\frac{1 + 4}{2}\right) = \left(1, 2\frac{1}{2}\right)$
15) $4Y = -X - 2 \Rightarrow Y = -1/4\ X - 1/2$
    $m = -1/4$
    $Y = -1/4\ X + b \Rightarrow (-4) = -1/4(0) + b$
    $-4 = b$ $Y = -1/4\ X - 4$
16) on the graph
17) $Y = 1/2\ X + 5/2$, $m = 1/2$ so perpendicular is -2
    $Y = -2X + b \Rightarrow (3) = -2(2) + b$
    $7 = b$ $Y = -2X + 7$
18) on the graph
    $Y < 2/5\ X + 1/2$
19) $(0) < 2/5(0) + 1/2$ $(2) < 2/5(0) + 1/2$
    $0 < 1/2$ yes $2 < 1/2$ no
20) dotted, on the graph

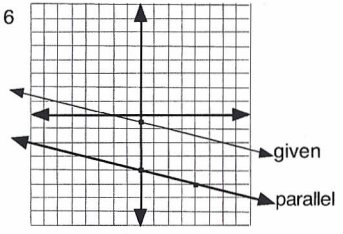
#2 & 4



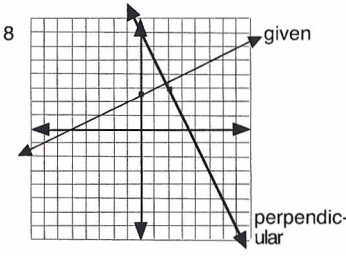
#6 & 10



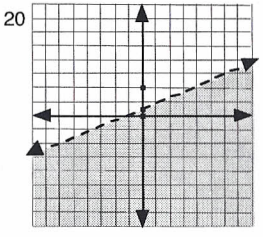
#16



#18



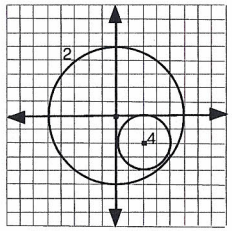
#19 & 20



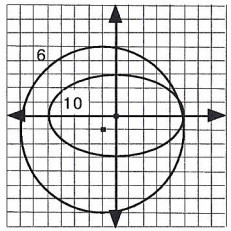
23E

1) $[3X^2 + 3Y^2 = 75] \div 3 \Rightarrow (X - 0)^2 + (Y - 0)^2 = 5^2$
   C = (0, 0) R = 5
2) on the graph
3) $(X - 2)^2 + (Y + 2)^2 = 2^2$
4) on the graph
5) $X^2 + 2X + 1 + Y^2 + 2Y + 1 = 34 + 2$
   $(X + 1)^2 + (Y + 1)^2 = 6^2$
   C = (-1, -1) R = 6
6) on the graph
7) $9X^2 + 25Y^2 = 225$, center = (0, 0)
8) $Y = 0 \Rightarrow 9X^2 = 225$
   $X^2 = 25 \Rightarrow X = \pm 5$
9) $X = 0 \Rightarrow 25Y^2 = 225$
   $Y^2 = 9 \Rightarrow Y = \pm 3$
10) on the graph
11) $AC^2 = 9 + 9 = 18$
    $AC = \sqrt{18} = 3\sqrt{2}$
12) $BC^2 = 9 + 36 = 45$
    $BC = \sqrt{45} = 3\sqrt{5}$
13) $\left(\frac{3+0}{2}\right), \left(\frac{6+0}{2}\right) = \left(\frac{3}{2}, 3\right)$
14) $\left(\frac{3+6}{2}\right), \left(\frac{6+3}{2}\right) = \left(\frac{9}{2}, \frac{9}{2}\right)$
15) $2Y = -2X - 3 \Rightarrow Y = -X - 3/2$
    $Y = -X + b \Rightarrow (4) = -(-2) + b$
    $2 = b$ $Y = -X + 2$
16) on the graph
17) m = -3 so perpendicular is 1/3
    $Y = 1/3\ X + b \Rightarrow (3) = 1/3(1) + b$
    $2\ 2/3 = b$ $Y = 1/3\ X + 2\ 2/3$
18) on the graph
    $5Y \le -4X \Rightarrow Y \le -4/5\ X$
19) $(-2) \le -4/5(-2)$ $(2) \le -4/5\ (2)$
    $-2 \le 8/5$ yes $2 \le -8/5$ no
20) solid, on the graph

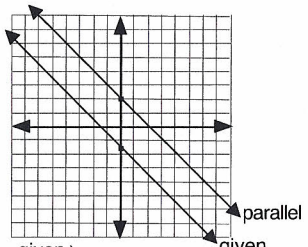
#2 & 4



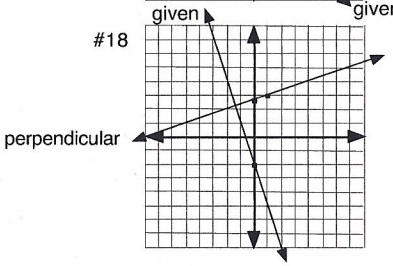
#6 & 10



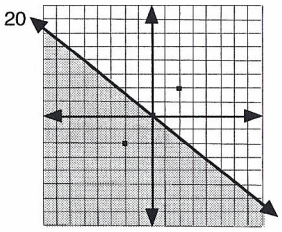
#16



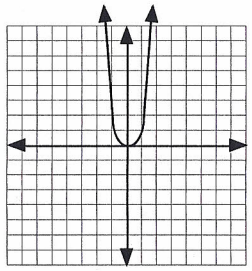
#18



#19 & 20

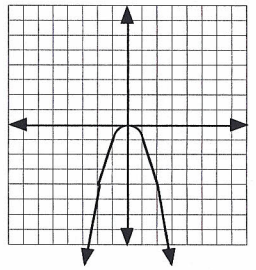


24A



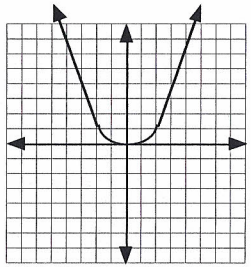
X	Y
0	0
1	3
-1	3
2	12
-2	12

1) $Y = 3X^2$



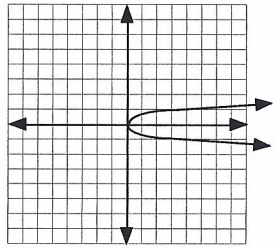
X	Y
0	0
1	-1
-1	-1
2	-4
-2	-4

2) $Y = -X^2$



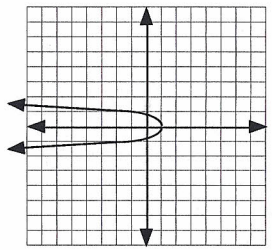
X	Y
0	0
1	1/3
-1	1/3
2	4/3
-2	4/3

3) $Y = 1/3X^2$



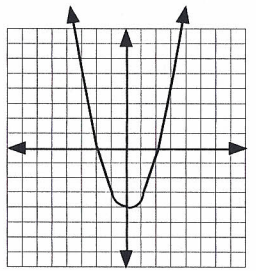
X	Y
0	0
4	1
4	-1
16	2
16	-2

4) $X = 4Y^2$



X	Y
1	0
-2	1
-2	-1
-11	2
-11	-2

5) $X = -3Y^2 + 1$



X	Y
0	-4
1	-3
-1	-3
2	0
-2	0

6) $Y = X^2 - 4$