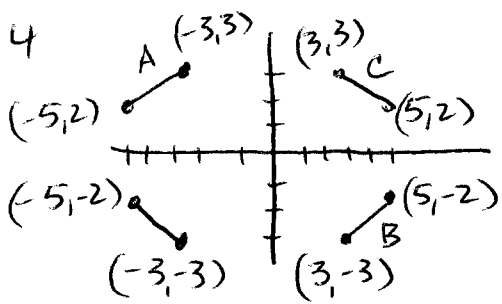
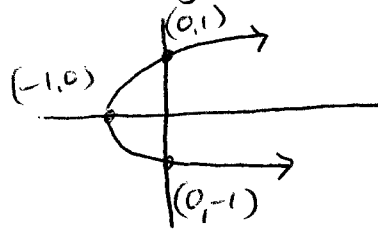


# Section 1.7

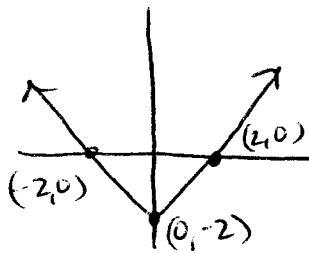


10.  $x = y^2 - 1$



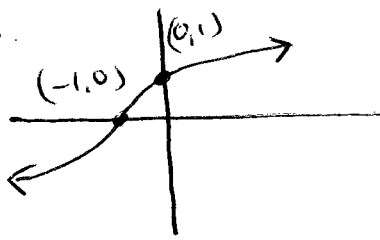
horizontal axis symmetry

14.



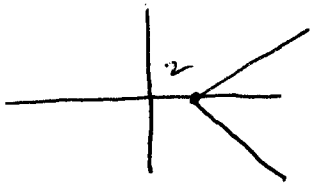
$y = |x| - 2$   
vertical axis symmetry

18.



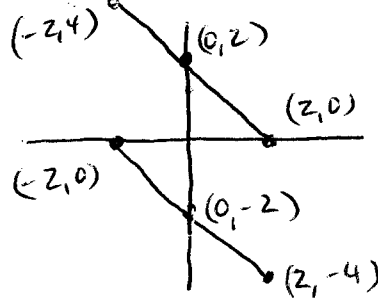
$x = y^3 - 1$   
 $y = \sqrt[3]{x+1}$

24. A.  $x + |y| = 2 \Rightarrow |y| = x - 2$



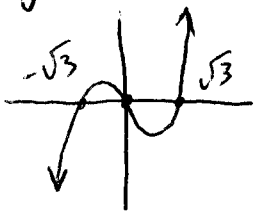
horizontal axis symmetry

B.  $|x + y| = 2$



Symmetry to origin

26.  $y = x^3 - 3x = x(x^2 - 3)$

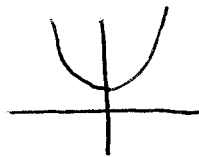


Symmetric to origin

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

28.

$y = 2^{|x|}$

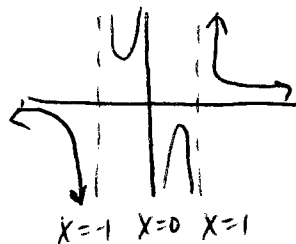


Symmetry to vertical axis

$y = 2^{|-x|} \Rightarrow y = 2^{|x|}$

30.

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



Symmetry to origin

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

40.  $(x+4)^2 + (y+2)^2 = 20$  center  $(-4, -2)$  radius  $\sqrt{20}$

$(0+4)^2 + (1+2)^2 = 16+9=25$  so  $(0,1)$  lies on circle

46.  $4x^2 - 4x + 4y^2 - 63 = 0 \Rightarrow 4(x^2 - x + \frac{1}{4} - \frac{1}{4}) + 4(y^2) = 63$

$\Rightarrow (x^2 - x + \frac{1}{4}) + y^2 = \frac{63}{4} + \frac{1}{4} \Rightarrow (x - \frac{1}{2})^2 + y^2 = 16$

center  $(\frac{1}{2}, 0)$  radius 4

48.  $3x^2 + 3y^2 + 5x - 4y = 1 \Rightarrow 3(x^2 + \frac{5}{3}x) + 3(y^2 - \frac{4}{3}y) = 1$

$\Rightarrow (x^2 + \frac{5}{3}x + \frac{25}{36}) + (y^2 - \frac{4}{3}y + \frac{4}{9}) = \frac{1}{3} + \frac{25}{36} + \frac{4}{9}$

$\Rightarrow (x + \frac{5}{6})^2 + (y - \frac{2}{3})^2 = \frac{12}{36} + \frac{25}{36} + \frac{16}{36} = \frac{53}{36}$

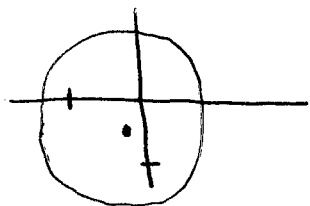
center  $(-\frac{5}{6}, \frac{2}{3})$  radius  $\sqrt{53}/6$

50.  $3x^2 + x + 3y^2 + 3y - 1 = 0 \Rightarrow 3(x^2 + \frac{1}{3}x) + 3(y^2 + y) = 1$

$(x^2 + \frac{1}{3}x + \frac{1}{36}) + (y^2 + y + \frac{1}{4}) = 1 + \frac{1}{36} + \frac{1}{4} = \frac{46}{36} \Rightarrow$

$(x + \frac{1}{6})^2 + (y + \frac{1}{2})^2 = \frac{46}{36}$  center  $(-\frac{1}{6}, -\frac{1}{2})$

radius  $\sqrt{46}/6$

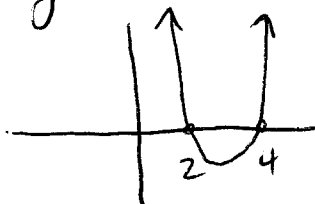


$x=0 \quad (\frac{1}{6})^2 + (y + \frac{1}{2})^2 = \frac{46}{36}$

$(y + \frac{1}{2})^2 = \frac{45}{36} \Rightarrow y = \pm \frac{\sqrt{45}}{6} - \frac{1}{2}$

$y=0 \quad (x + \frac{1}{6})^2 + (\frac{1}{2})^2 = \frac{46}{36} \Rightarrow x = \pm \frac{\sqrt{37}}{6} - \frac{1}{2}$

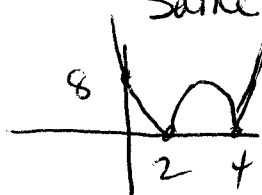
60.  $y = x^2 - 6x + 8 = (x-4)(x-2)$



$y=0 \quad x=2, 4$

$x=0 \quad y=8$

$y = |x^2 - 6x + 8|$   
Same intercepts



B. Identical  $(-\infty, 2)$  and  $(4, \infty)$

C. reflect the negative portion of  $y = x^2 - 6x + 8$  across horizontal axis to get  $y = |x^2 - 6x + 8|$