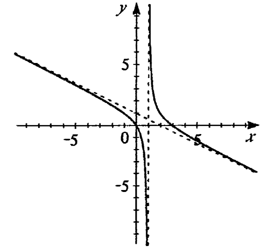
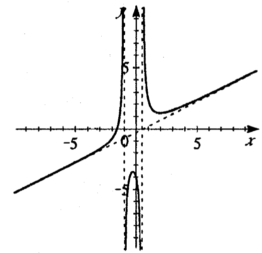
50. $r(x) = \dfrac{3x - x^2}{2x - 2} = \dfrac{x(3-x)}{2(x-1)}$. When $x = 0$, we have $y = 0$, so the graph passes through the origin. Also, when $y = 0$, we have $x = 0$ or $x = 3$, so the x-intercepts are 0 and 3. The vertical asymptote is $x = 1$. There is no horizontal asymptote, and the line $y = -\frac{1}{2}x + 1$ is a slant asymptote because by long division we have $y = -\frac{1}{2}x + 1 + \dfrac{1}{x-1}$.



52. $r(x) = \dfrac{x^3 + 4}{2x^2 + x - 1} = \dfrac{x^3 + 4}{(2x-1)(x+1)}$. When $x = 0$, we have $y = \frac{0+4}{0+0-1} = -4$, so the y-intercept is -4. Since $x^3 + 4 = 0 \quad \Rightarrow \quad x = -\sqrt[3]{4}$, the x-intercept is $x = -\sqrt[3]{4}$. There are vertical asymptotes where $(2x-1)(x+1) = 0$ $\Rightarrow \quad x = \frac{1}{2}$ or $x = -1$. Since the degree of the numerator is greater than the degree of the denominator, there is no horizontal asymptote.

By long division, we have $y = \frac{1}{2}x - \frac{1}{4} + \dfrac{\frac{3}{4}x + \frac{15}{4}}{2x^2 - x - 1}$, so the line $y = \frac{1}{2}x - \frac{1}{4}$ is a slant asymptote.



54. $r(x) = \dfrac{2x^3 + 2x}{x^2 - 1} = \dfrac{2x(x^2+1)}{(x-1)(x+1)}$. When $x = 0$, we have $y = 0$, so the graph passes through the origin. Also, note that $x^2 + 1 > 0$, for all real x, so the only x-intercept is 0. There are two vertical asymptotes at $x = -1$ and $x = 1$. There is no horizontal asymptote, and the line $y = 2x$ is a slant asymptote because by long division, we have $y = 2x + \dfrac{4x}{x^2 - 1}$.