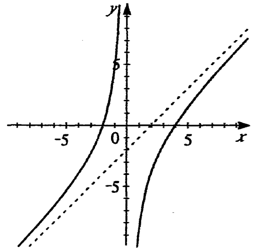
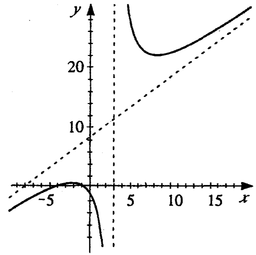
49. $r(x) = \dfrac{x^2 - 2x - 8}{x} = \dfrac{(x-4)(x+2)}{x}$. The vertical asymptote is $x = 0$, thus, there is no y-intercept. If $y = 0$, then $(x-4)(x+2) = 0$ $\Rightarrow$ $x = -2, 4$, so the x-intercepts are -2 and 4. Because the degree f the numerator is greater than the degree of the denominator, there are no horizontal asymptotes. By using long division, we see that $y = x - 2 - \dfrac{8}{x}$, so $y = x - 2$ is a slant asymptote.



51. $r(x) = \dfrac{x^2 + 5x + 4}{x - 3} = \dfrac{(x+4)(x+1)}{x-3}$. When $x = 0$, $y = -\frac{4}{3}$, so the y-intercept is $-\frac{4}{3}$. When $y = 0$, $(x+4)(x+1) = 0$ $\Leftrightarrow$ $x = -4$, -1, so the two x-intercepts are -4 and -1. A vertical asymptote occurs when $x = 3$, with $y \to \infty$ as $x \to 3^+$, and $y \to -\infty$ as $x \to 3^-$. Using long division, we see that $y = x + 8 + \dfrac{28}{x-3}$, so $y = x + 8$ is a slant asymptote.



53. $r(x) = \dfrac{x^3 + x^2}{x^2 - 4} = \dfrac{x^2(x+1)}{(x-2)(x+2)}$. When $x = 0$, $y = 0$, so the graph passes through the origin. Moreover, when $y = 0$, we have $x^2(x+1) = 0$ $\Rightarrow$ $x = 0, -1$, so the x-intercepts are 0 and -1. Vertical asymptotes occur when $x = \pm 2$, and because the degree of the numerator is greater than the degree of the dominator there are no horizontal asymptotes. Using long division, we see that $y = x + 1 + \dfrac{4x+4}{x^2 - 4}$, so $y = x + 1$ is a slant asymptote.