Classroom Examples for Pre-Calculus #6

1) Nina leaves the church at 4pm and walks due south at a rate of 3 mph. Emily leaves the church at 9am and walks due west at a rate of 4 mph. What time of day will it be when they are exactly 41 miles away from each other?
2) Find the equations for all of the vertical, horizontal, and oblique asymptotes for the function $f(x)=\dfrac{6x^4-9x^2-2x+10}{3x^3-15x^2-18x}$
3) List all of the possible rational zeros, find all of the rational, irrational, or imaginary zeros if $f(x)=0$, then factor $f(x)$ and then use this information, along with your knowledge of end behavior, to make an approximate graph for the function if $f(x)=3x^4+14x^3+x^2-26x+8$ Ans: x=-4,1,-2,1/3
4) Audrey leaves the church at 1pm and jogs due north at a rate of 6 mph. Ronnie leaves the church at 10am and jogs due east at a rate of 7 mph. What time of day will it be when they are exactly 37 miles away from each other?
5) Find the equations for all of the vertical, horizontal, and oblique asymptotes for the function $f(x)=\dfrac{-48x^2+4x-9}{12x^2-5x-3}$
6) List all of the possible rational zeros, find all of the rational, irrational, or imaginary zeros if $f(x)=0$, then factor $f(x)$ and then use this information, along with your knowledge of end behavior, to make an approximate graph for the function if $f(x)=4x^5+12x^4-36x^3-12x^2-208x-240$ Ans: x=-5,3,-1,2i,-2i
7) A truck drops off a hot air balloon in a field so that it can be prepared for a flight and then leaves the field at noon travelling in a straight line at 7 mph. If the hot air balloon takes off at 11am and travels straight up at a rate of 5 mph, what time of day will it be when the truck and balloon are exactly 29 miles away from each other?
8) Find the equations for all of the vertical, horizontal, and oblique asymptotes for the function $f(x)=\dfrac{30x^3-6x^2-5x+7}{10x^2+23x+12}$
9) List all of the possible rational zeros, find all of the rational, irrational, or imaginary zeros if $f(x)=0$, then factor $f(x)$ and then use this information, along with your knowledge of end behavior to make an approximate graph for the function if $f(x)=x^4+5x^3-x^2-35x-42$ Ans: x=-2,-3,sqrt(7),-sqrt(7)
10) A boat drops off a diving vessel in the middle of the ocean. If the boat speeds away at 10am, in a straight line, at a speed of 12 mph and the diving vessel starts its decent, straight down, at 2pm at a rate of 11 mph, what time of day will it be when the boat and the diving vessel are exactly 61 miles apart from each other?
11) Find the equations for all of the vertical, horizontal, and oblique asymptotes for the function $f(x)=\dfrac{17x+1}{x^2-10x+24}$