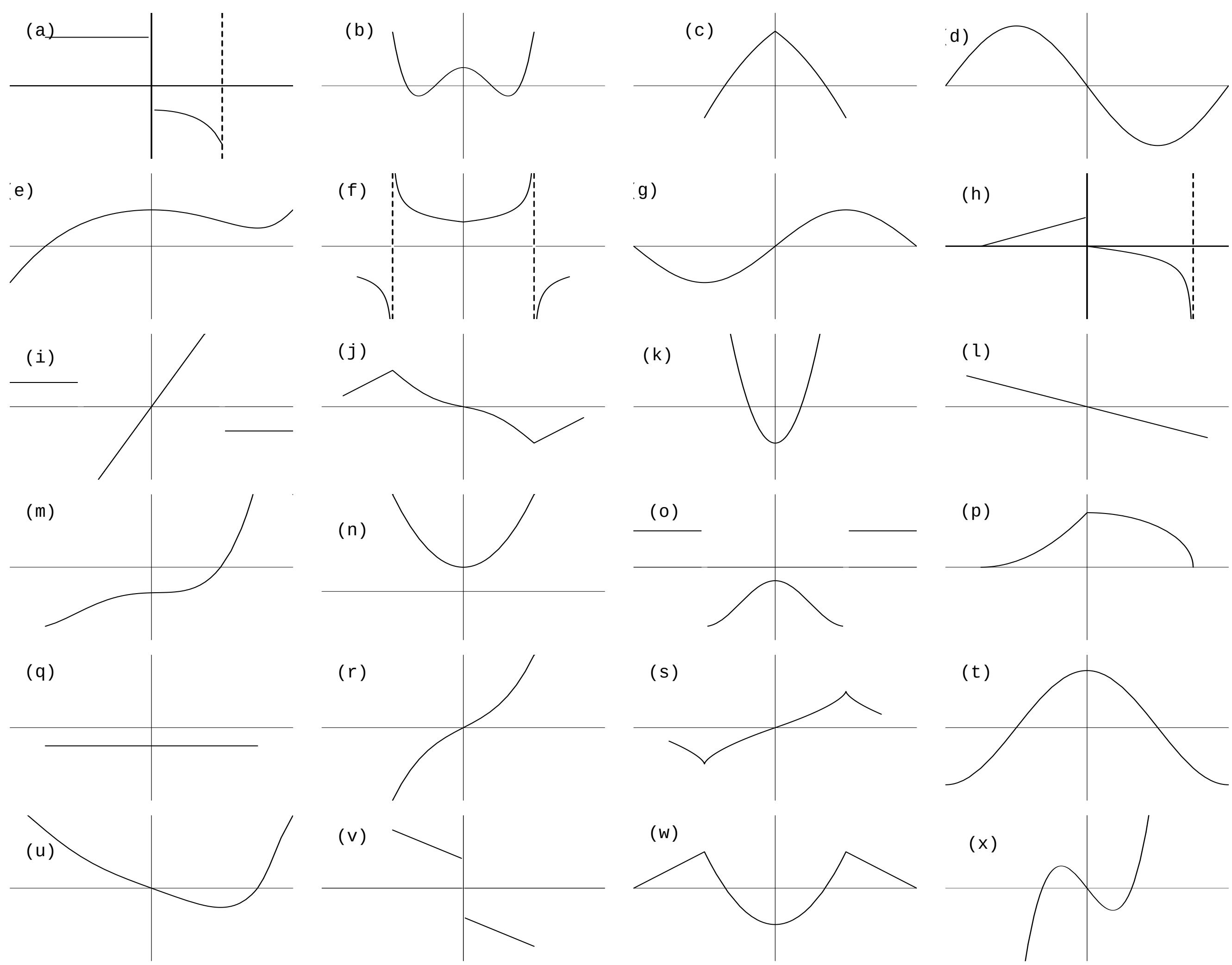
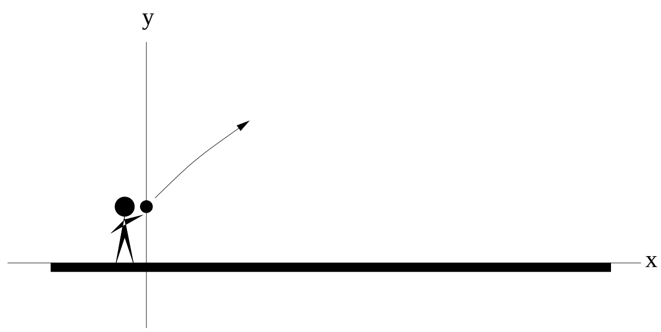
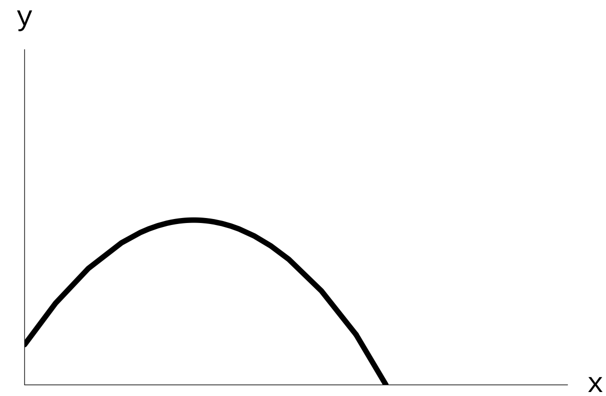
HOMEWORK, Week 4

1. Stewart, section 2.8: #3, 5, 7, 13, 15, 17, 28, 29.
2. Stewart, section 2.9: #3, 5, 7, 11, 13, 14, 15, 29, 35, 37, 48, 49.
3. Stewart, section 3.1: #3-27(odd), 45, 54, 59.
4. Stewart, section 3.2: #3-25(odd), 31, 33, 35, 39, 41.
5. The 24 graphs below are labeled by letters from (a) to (x). For each of the following graphs of $f(x)$, give the letter of the graph that looks most like it could be the graph of the derivative function $f'(x)$: (1) b, (2) c, (3) e, (4) g, (5) h, (6) j, (7) l, (8) p, (9) r, (10) s, (11) t, (12) u, (13) w, (14) x. .



6. Lee throws a ball. Impose a coordinate system as pictured and assume the parametric equations for the motion of the ball are given by $x(t) = 28.925t$, $y(t) = -16t^2+34.472t+6$. We have graphed the points $P(t) = (x(t), y(t))$ on the right.





   (a) Where is the point $P(0)$ on the graph?

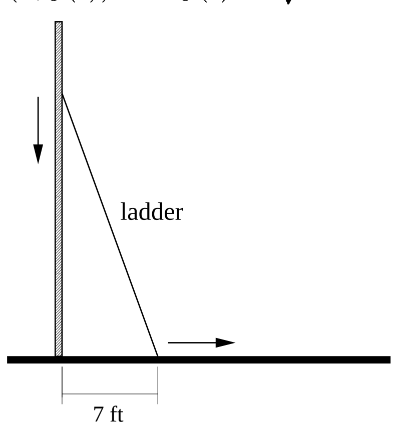
   (b) Label the point where the ball hits the ground, find the coordinates and determine when this happens.

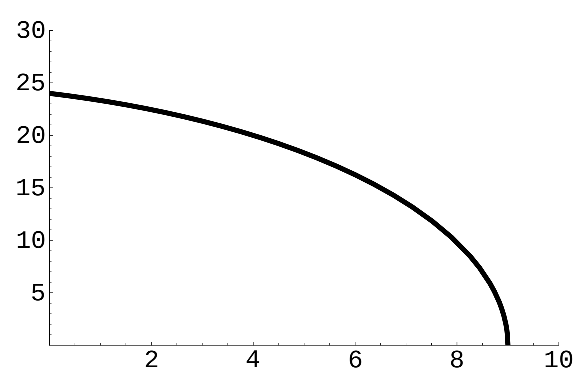
   (c) Calculate $x'(t)$ and $y'(t)$; these are called the horizontal and vertical velocity of the ball.

   (d) When is the vertical velocity zero? Find the coordinates of the ball when this happens.

   (e) What is the vertical velocity of the ball when it hits the ground?

7. Recall this problem from week2: A ladder 25 feet long is leaning against the wall of a building. Initially, the foot of the ladder is 7 feet from the wall. The foot of the ladder begins to slide at a rate of 2 ft/sec, causing the top of the ladder to slide down the wall. The location of the foot of the ladder at time t seconds is given by the parametric equations $(7 + 2t, 0)$. The location of the top of the ladder will be given by parametric equations $(0, y(t))$ and $y(t) = \sqrt{625 - (7 + 2t)^2}$. The graph of $y(t)$ is pictured below.





   (a) Sketch the graph of the derivative of $y(t)$. What is the domain of $y'(t)$?

   (b) Compute the formula for the derivative function $y'(t)$.