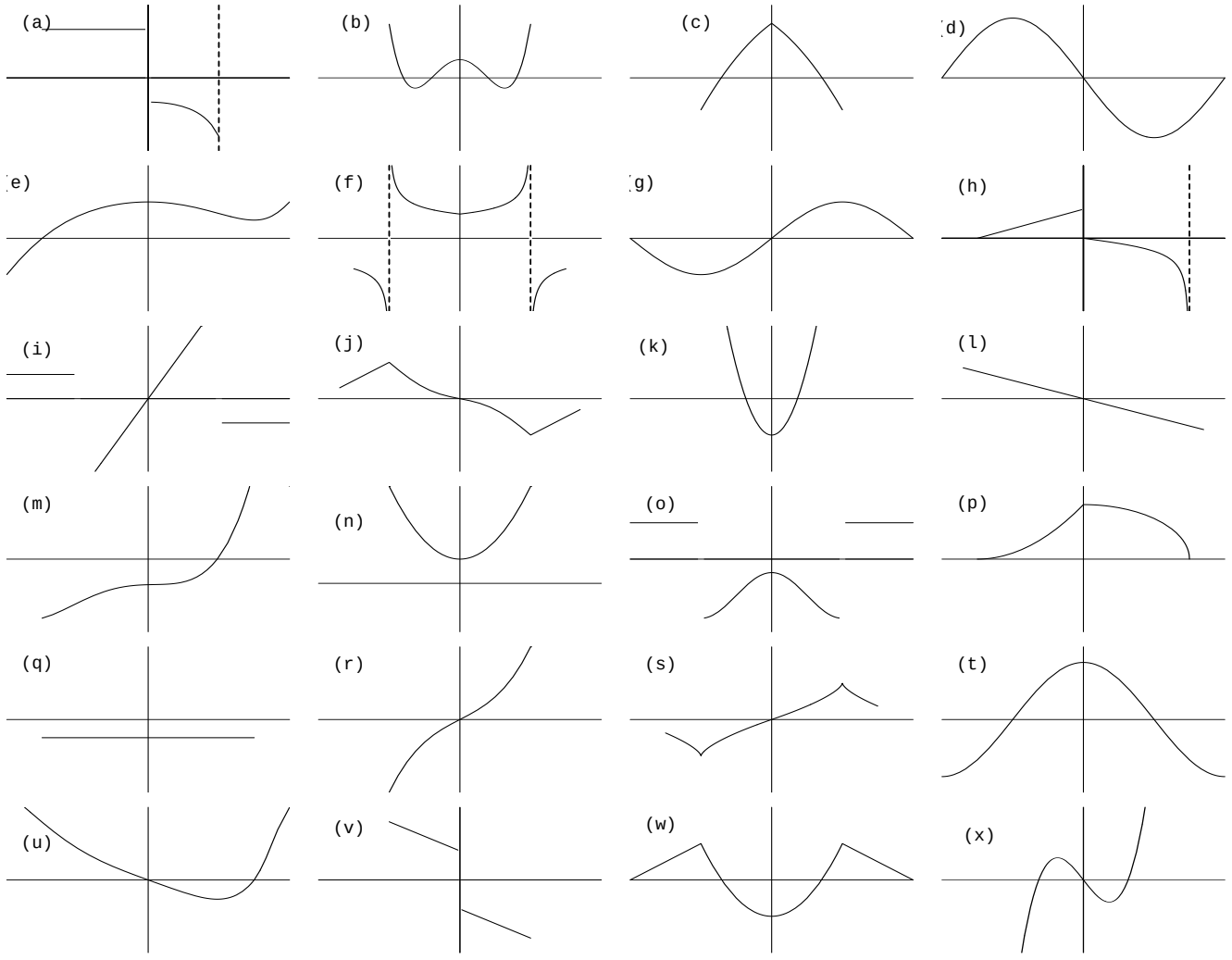
HOMEWORK (winter/spring), Week 3

1. Stewart, section 2.8: #1, 3, 5, 6, 9, 11, 12, 13, 27, 33, 36, 43, 56, 57.

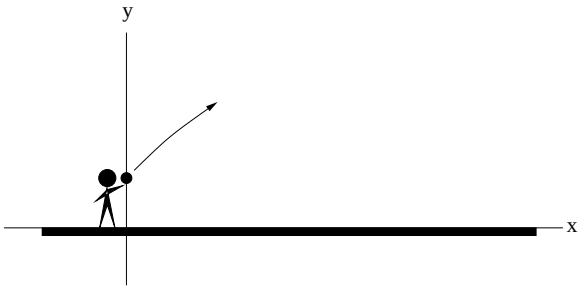
2. Stewart, section 3.1: # 3-31 (odd), 51, 66, 73, 80.

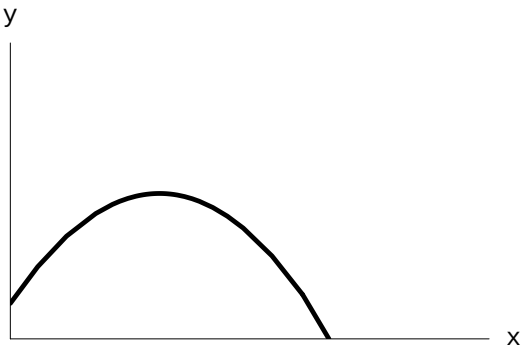
3. Stewart, section 3.2: # 3-25 (odd), 28, 43, 47, 51, 53.

4. 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. .



5. 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?

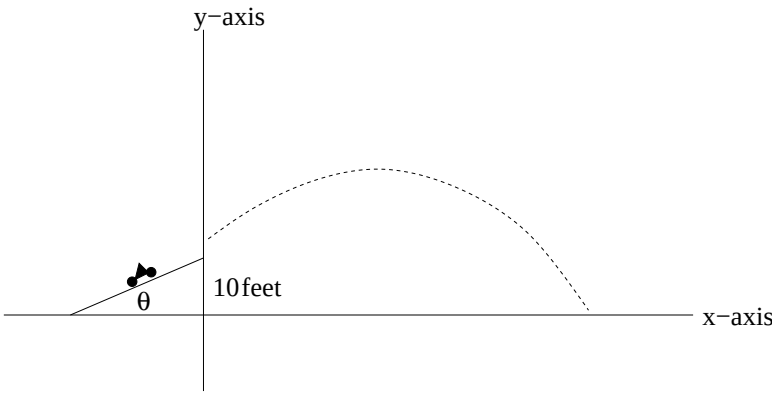
   (b) Label the point where the ball hits the ground, find the coordinates and determine when this happens.

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

   (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?

6. A stunt cyclist needs to make a calculation for an upcoming cycle jump. The cyclist is traveling 100 ft/sec toward an inclined ramp which ends 10 feet above a level landing zone. Assume the cyclist maintains a constant speed up the ramp and the ramp is inclined θ^o above horizontal. With the pictured imposed coordinate system, the parametric equations of the cyclist will be: $x(t) = 100t\cos(\theta)$, $y(t) = -16t^2+100t\sin(\theta)+10$. (We will assume these equations.)



   (a) Calculate the horizontal and vertical velocity of the cyclist at time t. What are these velocities if the angle $\theta = 20^o$? What if $\theta = 45^o$?

   (b) Determine when the vertical velocity of the cyclist is zero. (The answer involves θ.)

   (c) Assume the cyclist wants to have a maximum height of 35 feet above the landing zone. What is the required launch angle θ?