Math 223

Week 11 Homework due Tuesday, November 9

Sections 13.2, 13.3

Section 13.2, problems 1, 3, 5, 7, 13, 15, 17, 27, 35, 37

Hints:

37. The path taken by the man is $r(t) = (20\cos t, 20\sin t, \frac{90t}{6\pi})$, $0 \leq t \leq 6\pi$. The man is working to lift himself and the paint throughout his journey. Gravity is exerting a constant force of 185 pounds in the direction $(0, 0, -1)$, and the man is opposing this with a constant force of 185 pounds in the direction $(0, 0, 1)$. So the force exerted by the man is $(0, 0, 185)$ throughout the trip. Compute the answer using the appropriate line integral. Is there another way to do this problem that does not involve integration?

Section 13.3, problems 3, 9, 11, 15, 17, 19, 21, 27, 29

Hints:

19. Use the fact that the force is conservative.

21. Regard the vector field as a force field and decide if the work done around every closed curve is equal to zero. Note that work is the integral of the dot product of force vector with tangent vector of the curve.

27, 29. Does every simple closed curve in the set enclose only points in the set?