Related Rates Problems

1. Two cars leave the same location at the same instant. One car travels north at a constant speed of 40 mph and the other travels east at a constant speed of 30 mph. At what rate is the distance between them increasing when the northbound car is 1.6 miles from the starting point and the eastbound car is 1.2 miles from the starting point?

2. An observer watches a rocket launch at Cape Canaveral. The observer is standing 6 miles away from the launch pad. If the rocket flies upward at a speed of 7 miles per second, how fast is the angle of the observer changing (in degrees/second) when the rocket is 14 miles above the launch pad?

3. Water is being pumped out of an inverted conical tank at a rate of 9 ft^3/min. The tank has a height of 10 feet and a diameter of 12 feet at the top. How fast is the water level sinking when the water is 6 feet deep?

4. A 5 foot tall woman is walking towards a 20 foot tall lamppost at a rate of 4 feet/second. The light at the top is casting the woman's shadow on the ground. At what rate is the tip of her shadow moving when she is 10 feet from the base of the post?

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