Law & Economics
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Problem Set 1: Introductory Material

Assigned: Sept. 7
Answers: Sept. 15

Part A: Mathematical Review

Question A1. Graph the line $y = 16 - 5x$. What is its slope, y-intercept and x-intercept?

Question A2. Solve the following system of equations for Q^* and P^*:

$$Q = 1000 - 100P$$
$$Q = 125P - 125.$$

Question A3. Graph the function $f(t) = 10 + 2t - t^2$. Find its slope, $f'(t)$. Find t^*, the value of t for which $f(t)$ is maximized.

Question A4. Differentiate the following functions:

(a) $f(x) = 17$
(b) $f(x) = 5x^3$
(c) $f(x) = 3x^{1/3}$
(d) $f(x) = 1/x^2$
(e) $f(x) = \ln(x^3)$
(f) $f(x) - e^x$
(g) $f(x) = 5e^{3x}$
(h) $f(x) = x^3 - 5x^2 + 6x + 2$
(i) $f(x) = x^3 x^5$

Question A5. Treat a as a parameter in the following functions and differentiate with respect to x:

(a) $f(x) = a^3 x^4$
(b) $f(x) = a/x$
(c) $f(x) = 2x + 4a + x^2 + \ln(x^2 + a^2)$

Part B: Legal Analysis

Read the attached appeals case *British Columbia Electric Railway Co., Ltd.* V. *Loach.* Answer the following questions.

Question B1. Who is Loach?

Question B2. Did the court inquire into factual questions such as the negligence of parties? Why or why not?

Question B3. What was decided in the case?

Question B4. How does this decision change the standard set in *Davies v. Mann?*

British Columbia Electric Railway Co. Ltd. v. Loach
[1916 1 A.C. 719[3]]

LORD Sumner. This is an appeal from a judgment of the Court of Appeal of British Columbia in favour of the Administrator of the Estate of Benjamin Sands, who was run down at a level crossing by a car of the appellant railway company and was killed. One Hall took Sands with him in a cart, and they drove together on the level crossing and neither heard nor saw the approaching car till they were close to the rails and the car was nearly on them. There was plenty of light, and there was no other traffic about. The verdict, though rather curiously expresses, clearly finds Sands guilty of negligence in not looking to see that the road was clear… Hall, who escaped, said that they went "right on to the track," when he heard Sands, who was sitting on his left, say "Oh," and looking up saw the car about 50 yards off. HE says he could then do nothing, and with a loaded wagon [sic[and horses going two to three miles an hour he probably could not. It does not seem to have been suggested that Sands could have done any good by trying to jump off the cart and clear the rails. The car knocked cart, horses, and men over, and ran some distance beyond the crossing before it could be stopped. It approached the crossing at from thirty-five to forty-five miles an hour. the driver saw horses as they came into view from behind a shed at the crossing of the road and the railway, when they would be 10ft. or 12 ft. from the nearest rail, and he at once applied his brake. He was then 400 ft. from the crossing. If the brake had been in good order it should have stopped the car in 300 Ft. Apart from the fact that the car did not stop in time, but overran the crossing, there was evidence for the jury that the brake was defective and inefficient and that the car had come out in the morning with the brake in that condition. The jury found that the car was approaching at an excessive speed and should have been brought under complete control, and although they gave their reason for saying so the presence of possible passengers at the station by the crossing, and not the possibility of vehicles being on the road, there can be no mistake in the matter and their finding stands…

Clearly if the deceased had not got on to the lie he would have suffered no harm, in spite of the excessive speed the defective brake, and if he had kept his eyes about him he would have perceived the approach of the car, and would have kept out of mischief. If the matter stopped there, his administrator's action must have failed, for he would certainly have been guilty of contributory negligence. He would have owed hi death to his own fault and whether his negligence was the sole cause or the cause jointly with the railway company's negligence would not have mattered… If the jury accepted the facts above stated, as certainly they well might do, there was no further negligence on the part of Sands after he looked up and saw the car, and there was then nothing that he could do. There he was in a position of extreme peril and by his own fault, but after that he was guilty of no fresh fault. The driver of the car, however, had seen the horses some perceptible time earlier, had duly applied his brakes, and if they had effective, he could, as the jury found, have pulled up in time. Indeed, he would have had 100 ft. to spare. If the car was 150 ft. off the Sands looked up and said "Oh," then each had the view for 50 ft. before the car reached the point at which it should have stopped. It was the motorman's duty, on seeing the peril of Sands, to make a reasonable use of his brakes in order to avoid injuring him, although it was by his own negligence that Sands was in danger. Apparently he did his best as things then were, but partly the bad brake and partly the excessive speed, for both of which the appellants were responsible, prevented him from stopping, as he could otherwise have done. On these facts, which the jury were entitled to accept and appear to have accepted, only one conclusion is possible. What actually killed Sands was the negligence of the railway company, and not his own, though it was a close thing….

Their Lordships are of opinion that, on the facts of the present case, the above observations apply and are correct. Were it otherwise the defendant company would be in a better position, when they had supplied a bad brake but a good motorman, than when the motorman was careless but the brake efficient. If the superintendent engineer sent out the car in the morning with a defective brake, which on seeing Sands, the motorman strove to apply, they would not be liable, but if the motorman failed to apply the brake, which , if applied, would have averted the accident, they would be liable…

In the present case their Lordships are clearly of opinion that, under proper direction, it was for the jury to find the facts and to determine the responsibility, and that upon the answers which they returned, reasonably construed, the responsibility for the accident was upon the appellants solely, because, whether Sands got in the way of the car with or without negligence on his part, the appellants could and ought to have avoided the consequences of that negligence, and failed to do so, not by any combination of negligence on the part of Sands with their own, but solely by the negligence of their servants in sending out the car with a brake whose inefficiency operated to cause the collision at the last moment, and in running the car at an excessive speed, which required a perfectly efficient brake to arrest it. Their Lordships will accordingly humbly advise His Majesty that the appeal should be dismissed with costs.