

Second Midterm Exam for Econ 1530 Section C
York University
15 November 2005

First name:

Last name:

SID number:

Instructions: Write your name and SID number above; circle your answer below, *and* fill out the same answer on the bubble sheet (as well as SID number and name).

Problem 1. A quantity of 100 decreases by 1% per year (with annual compounding). After 10 years the quantity has decreased to approximately what?

- (a) 110
- (b) 90
- (c) 10
- (d) 270

Problem 2. If $a > 1 > b > 0$, which of these inequalities *can* be true?

- (a) $-a > a$
- (b) $(-b)^2 > ab$
- (c) $b - a^2 < 0$
- (d) none the above

Problem 3. Let $S = \sum_{j=1}^3 j^2$. Then S equals:

- (a) 14
- (b) 12
- (c) 19
- (d) none of the above

Problem 4. The graph of the linear function $f(x)$ passes through the points $(x_1, y_1) = (\alpha, \alpha)$ and $(x_2, y_2) = (10, 10)$. Which is the function?

- (a) $f(x) = x$
- (b) $f(x) = 2 + \alpha x$
- (c) $f(x) = 1 + 2x$
- (d) none of the above

Problem 5. Let $f(x) = e^{ax}$. Which of the below gives a linear approximation of $f(x)$ about $x = 1$?

- (a) $1 + a(x - 1)$
- (b) ax^{a-1}
- (c) $(1 - a)e^a$
- (d) none of the above

Problem 6: Let $y = y^a + \ln(x)$. Which one of the below options gives $\frac{dy}{dx}$?

- (a) $\frac{1}{x}$
- (b) $ay^{a-1} + \frac{1}{x}$
- (c) $\frac{y}{x(y-ay^a)}$
- (d) none of the above

Problem 7: Let $f(x) = [1 + \ln(x)]^2$. Which of the below gives the first derivative of $f(x)$?

- (a) $f'(x) = \frac{2}{x}(1 + \ln x)$
- (b) $f'(x) = \frac{2}{x}(1 + \frac{1}{x})$
- (c) $f'(x) = 2$
- (d) none of the above

Problem 8: Let $U(C) = C - \frac{aC^2}{2}$, where $a > 0$ is a constant. The domain of U is $[0, 1/a)$, and $R(C) = \frac{-U''(C)C}{U'(C)}$. Which of the below options gives a correct expression for $R(C)$?

- (a) $R(C) = a$
- (b) $R(C) = aC$
- (c) $R(C) = \frac{aC}{1-aC}$
- (d) none of the above

Problem 9: Panel A in Figure 1 shows the graph of $f(x)$. Which panel shows the graph of $f'(x)$? (All panels have x on the horizontal axis.)

- (a) Panel A
- (b) Panel B
- (c) Panel C
- (d) Panel D

Problem 10: Let $f(x) = (e^x - 1)/x$. Which one of the below options gives $\lim_{x \rightarrow 0} f(x)$?

- (a) e
- (b) 1
- (c) 0
- (d) none of the above

Figure 1: Panel A

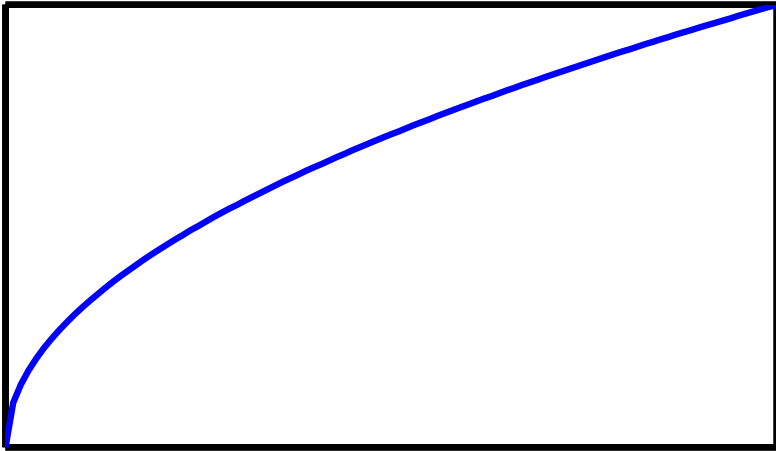


Figure 1: Panel B

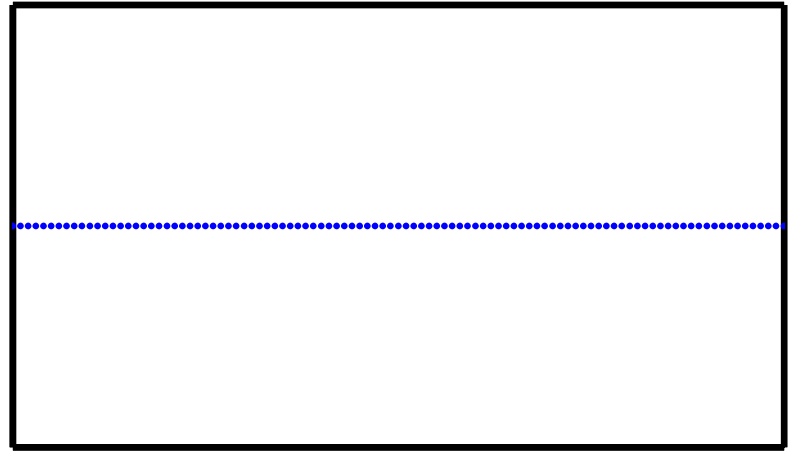


Figure 1: Panel C

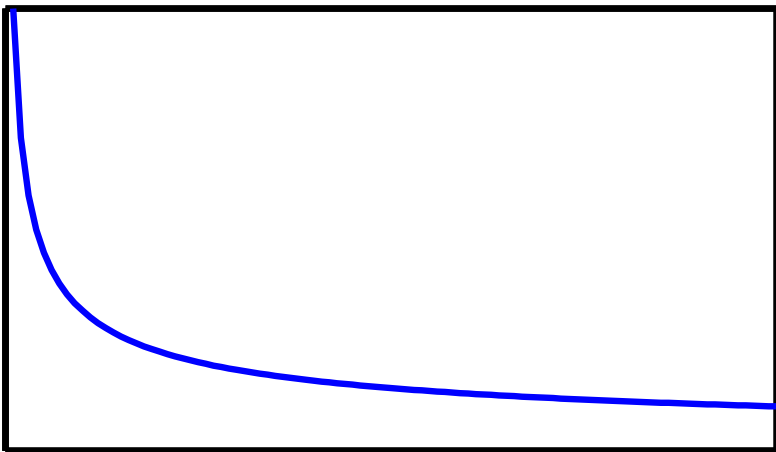
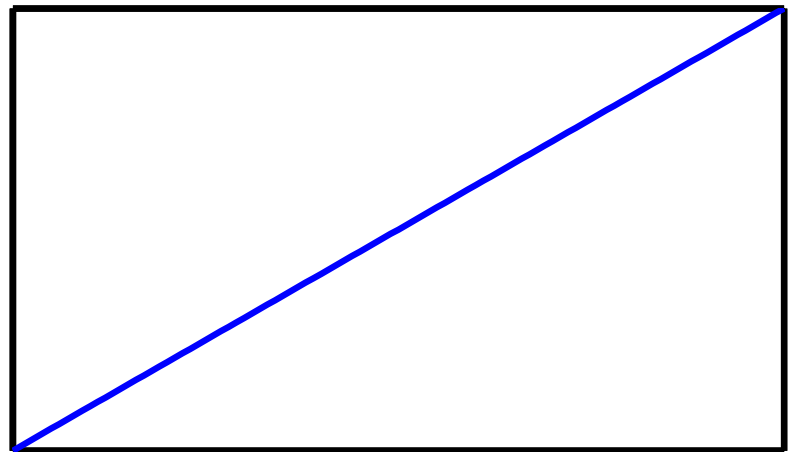


Figure 1: Panel D



Solutions

Problem 1: (b)

Problem 2: (c)

Problem 3: (a)

Problem 4: (a)

Problem 5: (d) Right answer can be written $e^a + ae^a[x - 1]$

Problem 6: (c)

Problem 7: (a)

Problem 8: (c)

Problem 9: (c)

Problem 10: (b)