

MATH 10250 Quiz 3**NAME:**

July 5, 2018

You have **10 minutes** for the quiz. Please show your work and write neatly.

NO CALCULATOR please!

1. Compute
- $h'(x)$
- given

$$h(x) = \frac{(2x+1)(x^3+x+7)}{(x^2+4x)^3}$$

(You don't need to simplify your solution.)

Solution: There are several ways to approach this problem. Here is mine: Let

$$p(x) = (2x+1)(x^3+x+7) \quad \text{and} \quad q(x) = (x^2+4x)^3.$$

So, $h(x) = \frac{p(x)}{q(x)}$. Using the product rule and chain rule, we find

$$p'(x) = 2(x^3+x+7) + (2x+1)(3x^2+1) \quad \text{and} \quad q'(x) = 3(x^2+4x)^2(2x+4).$$

By quotient rule, we have

$$\begin{aligned} h'(x) &= \frac{p'(x)q(x) - p(x)q'(x)}{[q(x)]^2} \\ &= \frac{[2(x^3+x+7) + (2x+1)(3x^2+1)] [(x^2+4x)^3] - [(2x+1)(x^3+x+7)] [3(x^2+4x)^2(2x+4)]}{[(x^2+4x)^3]^2} \end{aligned}$$

2. Given the demand equation:

$$x = 4 - 2p$$

- (a) Compute the elasticity of demand when
- $p = 1$
- .

Solution: Let $f(p) = 4 - 2p$. Then,

$$E(p) = -\frac{pf'(x)}{f(p)} = -\frac{p(-2)}{4-2p}.$$

Therefore,

$$E(1) = -\frac{(1)(-2)}{4-2(1)} = 1$$

- (b) The demand at this price is (circle one): Elastic
-
- Unitary Inelastic