ECON 331 Tutorial Questions #3

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

1) Find y' if $y = (x^3 - 10x + 2)(x^2 + 7x + 1)$. 1) _____

2) Find y' if $y = \dfrac{2x + 3}{7 - 5x}$. 2) _____

3) Find y' if $y = \dfrac{x^2 + 1.}{2x^3 - 1}$. 3) _____

4) Find the slope of the curve $y = \dfrac{2x + 5}{x - 3}$ at the point (4, 13). 4) _____

5) The average cost $\bar{c}$ of producing q units of a product is given by $\bar{c} = \dfrac{4q}{q + 2} + \dfrac{10{,}000}{q}$. Find the marginal cost function. 5) _____

6) For the consumption function $C = 10 + \dfrac{5}{8}I - \dfrac{\sqrt{I}}{2}$, 6) _____

(a) find the marginal propensity to consume when $I = 16$;
(b) find the marginal propensity to save with $I = 16$.

7) If $y = 4u^2 - 13u + 3$ and $u = 7x^3 + 5x^2 + 4x - 14$, then by direct use of the chain rule find $\dfrac{dy}{dx}$ and evaluate when $x = 1$. 7) _____

8) If $y = (6u^2 - 7)^3$ and $u = (9 - 2x)^5$, then by direct use of the chain rule find $\dfrac{dy}{dx}$ and evaluate when $x = 5$. 8) _____

9) Find y' if $y = 5(2x^2 - 3x + 4)^8$. 9) _____

10) Find y' if $y = \left(\dfrac{x + 2}{x - 3}\right)^4$. 10) _____

11) The demand function for a manufacturer's product is given by $p = 300 - q^2$, where p is the price per unit when q units are demanded. 11) _____
(a) Determine the point elasticity of demand when $q = 5$.
(b) For $q = 5$, is demand elastic, inelastic, or does it have unit elasticity?
(c) For what value of q does demand have unit elasticity?

12) The demand function for a manufacturer's product is given by $p = \dfrac{400}{q + 2}$, where p is the price per unit when q units are demanded. 12) _____
(a) Find the point elasticity of demand when $q = 100$.
(b) For $q = 100$, is demand elastic, inelastic, or does it have unit elasticity?

13) Determine the point elasticity η of the demand equation $(p + 1)\sqrt{q + 3} = 1000$, when $p = 24$. 13) _____

14) If $f(x, y) = 4x^3y^2 + 3x^2y^4 - 7xy^2 + 4x - 3y + 2$, find (a) $f_x(x, y)$ and (b) $f_y(x, y)$. 14) _____

15) If $z = \dfrac{x^2 + 1}{y}$, find (a) $\dfrac{\partial z}{\partial x}$ and (b) $\dfrac{\partial z}{\partial y}$. 15) _____

16) Find $\dfrac{\partial f}{\partial x}$ and $\dfrac{\partial f}{\partial y}$ where $f(x, y) = \dfrac{5xy^2}{(x^3 + y^3)}$. 16) _____

17) Find $\dfrac{\partial f}{\partial x}$ and $\dfrac{\partial f}{\partial y}$ where $f(x, y, z) = \dfrac{4y^3}{x^3 + y^2}$. 17) _____

18) A sporting goods store determines that the optimal quantity of athletic shoes (in pairs) to order each month is given by the Wilson lot size formula: $Q(C, M, s) = \sqrt{\dfrac{2CM}{s}}$, where C is the cost (in dollars) of placing an order, M is the number of pairs sold each month, and s is the monthly storage cost (in dollars) per pair of shoes. Find $\dfrac{\partial Q}{\partial C}$. Then find and interpret $\left.\dfrac{\partial Q}{\partial C}\right|_{(100, 500, 3)}$. 18) _____