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Assignment 1

1.) OMITTED

PDF: $f(x) = \frac{25}{5}y^2;\ 0 < y < 5$

1a.

$$\mu_Y = \int_0^5 f(x)ydy = 5\int_0^5 y^3\,dy = \frac{5}{4}[y^4]_0^5 = 781.25$$

$$\sigma_Y^2 = \int_0^5 f(x)(y-\mu_Y)^2\,dy = 125938997$$

1b.

P(Y > 5) = 0

1c.

$$P(1.5 < Y < 2.5) = \int_{1.5}^{2.5} f(x)dy = 5\int_{1.5}^{2.5} y^2\,dy = \frac{5}{3}[y^3]_{1.5}^{2.5} = 20.42$$

2.)

2a.

$$P(Hours = 6-8, Grade = C) = 2/20 = 0.10$$

2b.

$$P(Grade = B|Hours = 3-5) = \frac{P(Grade = B,\ Hours = 3-5)}{P(Hours\ =\ 3-5)} = \frac{\frac{1}{20}}{\frac{6}{20}} = \frac{1}{6}$$

3.

$$P(B) = 0.3$$

$$P(defective|B) = 0.2$$

$$P(B, defective) = P(B)\cdot P(defective|B) = 0.3\cdot 0.2 = 0.06$$

4. OMITTED

$$P(Tea \mid Coffee, Tea) = \frac{P(Tea, Coffee)}{P(Tea, Coffee)} = 1$$

5.

$$P(Male, Age > 30) = P(Male) \cdot P(Age > 30) = 0.5 \cdot 0.6 = 0.3$$