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1. $O(n)$
- 2.

```
def factorial(n):  
    if n == 1 :  
        return 1  
    elif n != 1:  
        return (n * factorial(n-1))  
print(factorial(5))
```

3. $O(n^2)$

4. $\begin{bmatrix} a & b \\ c & d \end{bmatrix} \times \begin{bmatrix} e \\ f \end{bmatrix} = \begin{bmatrix} ae + bf \\ ce + df \end{bmatrix}$ 2×1 matrix

5a. $f'(x) = 6x + 5$ $\frac{d}{dx}(x^n) = n \cdot x^{n-1}$

5b. $f'(5) = 35$

5c. $f''(x) = 6$ $\frac{d}{dx}(f'(x)^n) = n \cdot f'(x)^{n-1}$

5d. $f''(5) = 6$

6a. $\frac{df}{dx}(3x^2y + 5x - 7y) = 6xy + 5$

6b. $6(5)(2) + 5 = 65$

7

$$\begin{aligned} A &= .3 \quad B = .6 \\ P(A \cap B) &= A \cdot B = .18 \\ P(A \cup B) &= A + B - P(A \cap B) = .72 \\ P(\text{not}(A)) &= 1 - A = .7 \\ P(A \mid B) &= P(A \cap B) / P(B) = .18 / .6 = .3 \end{aligned}$$

8

C	20 – 40	50 – 70	80 – 100	Total
r	40	20	35	145
g	15	50	30	95
b	60	20	80	160
T	115	140	145	400

8a. $P(\text{price} < \$75) = 255/400 = .637$

8b. $P(\text{price} < \$75 \mid \text{color} = \text{green}) = 65/95 = .684$

$$\frac{65/400}{95/400} = \frac{65}{95} \quad \frac{p(\text{price} < 75 \text{ and color} = \textit{green})}{p(\text{color} = \textit{green})} \geq \frac{65/400}{95/400}$$

8c. $P(\text{price} < \$ 75, \text{color} = \textit{green}) = 65/400 = .162$

9.

$$\frac{2 \text{ egg}}{2 \text{ hens}} \text{ per 2 days} = \frac{.5 \text{ egg}}{1 \text{ hen}} \text{ per 1 day} = .5 \text{ egg per hen per day } 10 \times .5 \times 10 = 50 \text{ eggs in 10 day}$$

12a. C

12b. C

13a. C