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Computer Information Systems
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Assignment 4

CIS 27: Data Structures and Algorithms

Answer to Question 1

Expressions from slowest to fastest:

$$n!,\ 3^n,\ 4n^2,\ 20n,\ n^{2/3},\ log_2 n,\ log_3 n,\ 2$$

Answer to Question 2

(a)

$$3 \times 2^x = 64 \times 3 \times 2^n$$
$$3 \times 2^x = 3 \times 2^n \times 2^6$$
$$3 \times 2^x = 3 \times 2^{n+6}$$
$$x = n + 6$$

(b)

$$x^2 = 64 \times n^2$$
$$\sqrt{x^2} = \sqrt{64n^2}$$
$$x = 8n$$

(c)

$$8x = 64 \times 8n$$
$$x = \frac{64 \times 8n}{8}$$
$$x = 64n$$

Answer to Question 3

(n)

$$x = 100n$$

(n^2)

$$x^2 = 100 \times n^2$$
$$\sqrt{x^2} = \sqrt{100n^2}$$
$$x = 10n$$

(n^3)

$$x^3 = 100 \times n^3$$
$$\sqrt[3]{x^3} = \sqrt[3]{100n^3}$$
$$x = \sqrt[3]{100}n$$

(2^n)

$$2^x = 100 \times 2^n$$
$$2^x = 2^n \times 2^{\log_2 100}$$
$$x = n + \log_2 100$$