Q1: A. The number of species of lizards, \( N \), found on islands off the coast of Baja, California is proportional to the fourth root of the area, \( A \), of the island. Write a formula for \( N \) as a function of \( A \).

\[
N = f(A)^{1/4}
\]

B. One of the islands has an area of 10 square miles and contains 20 species of lizards. Find the constant of proportionality. Then estimate the number of species of lizards on an island whose area is 50 square miles.

\[
20 = f \cdot 10^{1/4}
\]

\[
f = \frac{20}{10^{0.25}}
\]

\[
f = 11.2468
\]

\[
N = 11.2468 A^{0.25}
\]

\[
N = 11.2468(50^{0.25})
\]

\[
N = 299.069
\]

30 species of lizards

Q2: Pictured is the global graph of a cubic polynomial, \( p(x) \).

A. Complete:

\[
\lim_{x \to -\infty} p(x) = \pm \infty \quad \text{or} \quad \infty
\]

\[
\lim_{x \to +\infty} p(x) = \pm \infty
\]

B. (Circle) For the dominant term \( a \cdot x^3 \), the constant coefficient \( a \) is

i. negative  
ii. positive  
iii. not enough information to determine

Q3: The Heaviside step function, \( H \), is graphed below. Graph the new functions in A and B:

A. \(-2H(x)\)

B. \(H(x - 1)\)
Q1: A. The number of species of lizards, \( N \), found on islands off the coast of Baja, California is proportional to the cube root of the area, \( A \), of the island. Write a formula for \( N \) as a function of \( A \).

\[ N = k A^{\frac{1}{3}} \]

B. One of the islands has an area of 10 square miles and contains 20 species of lizards. Find the constant of proportionality. Then estimate the number of species of lizards on an island whose area is 50 square miles.

\[ 20 = k (10)^{\frac{1}{3}} \]

\[ k = \frac{20}{10^{\frac{1}{3}}} \]

\[ k = 9.2832 \]

\[ N = 9.2832 \cdot 10^{\frac{1}{3}} \]

\[ N = 34.2 \]

34 species of lizards

Q2: Pictured is the global graph of a cubic polynomial, \( p(x) \).

A. Complete:

\[ \lim_{x \to -\infty} p(x) = \quad \text{or} \quad \infty \]

\[ \lim_{x \to +\infty} p(x) = \quad -\infty \]

B. (Circle) For the dominant term \( a \cdot x^3 \), the constant coefficient \( a \) is

i. positive

ii. negative

iii. not enough information to determine

Q1: The Heaviside step function, \( H \), is graphed below. Graph the new functions in A and B:

A. \(-2H(x)\)

B. \(H(x + 1)\)
Q1: A. The number of species of lizards, $N$, found on islands off the coast of Baja, California is proportional to the fourth root of the area, $A$, of the island. Write a formula for $N$ as a function of $A$.

B. One of the islands has an area of 10 square miles and contains 20 species of lizards. Find the constant of proportionality. Then estimate the number of species of lizards on an island whose area is 50 square miles.

Q2: Pictured is the global graph of a cubic polynomial, $p(x)$.

A. Complete:

$$\lim_{x \to -\infty} p(x) = \underline{\phantom{0}}$$

$$\lim_{x \to +\infty} p(x) = \underline{\phantom{0}}$$

B. (Circle) For the dominant term $\alpha \cdot x^3$, the constant coefficient $\alpha$ is

i. negative  ii. positive  iii. not enough information to determine

Q1: The Heaviside step function, $H$, is graphed below. Graph the new functions in A and B:

A. $-2H(x)$

B. $H(x - 1)$
Q1: A. The number of species of lizards, $N$, found on islands off the coast of Baja, California is proportional to the cube root of the area, $A$, of the island. Write a formula for $N$ as a function of $A$.

B. One of the islands has an area of 10 square miles and contains 20 species of lizards. Find the constant of proportionality. Then estimate the number of species of lizards on an island whose area is 50 square miles.

Q2: Pictured is the global graph of a cubic polynomial, $p(x)$.

A. Complete:

$$\lim_{x \to -\infty} p(x) = \phantom{}$$

$$\lim_{x \to +\infty} p(x) = \phantom{}$$

B. (Circle) For the dominant term $\alpha \cdot x^3$, the constant coefficient $\alpha$ is

i. positive    ii. negative    iii. not enough information to determine

Q1: The Heaviside step function, $H$, is graphed below. Graph the new functions in A and B:

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