

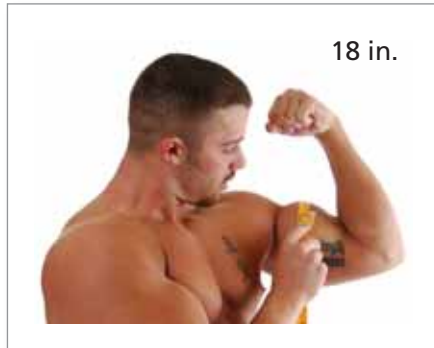
EXAMPLE 6 Describing Muscle Strength

The muscle strength of a person’s upper arm is related to its circumference. The greater the circumference, the greater the muscle strength, as indicated in the table.

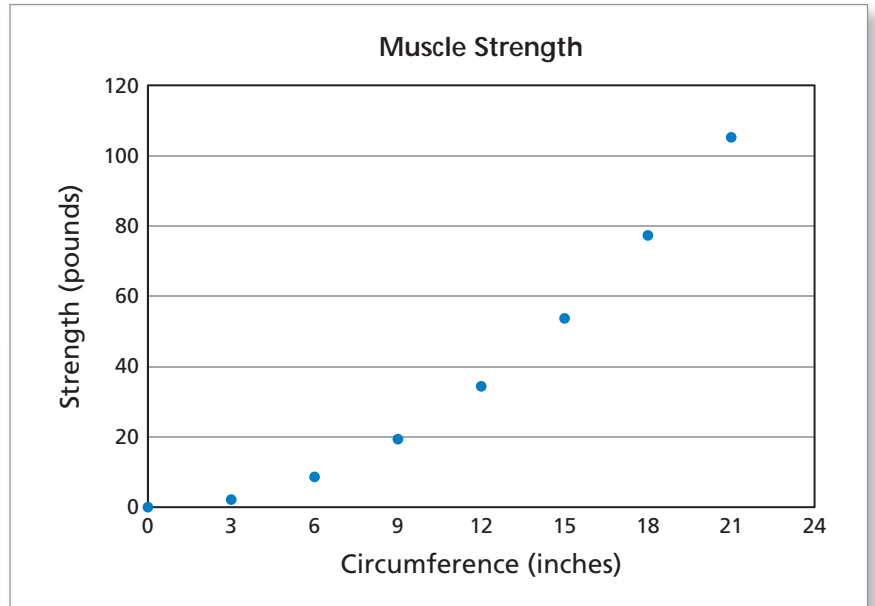
Circumference (in.)	0	3	6	9	12	15	18	21
Muscle strength (lb)	0	2.16	8.61	19.35	34.38	53.70	77.31	105.21

Is the pattern of the muscle strengths linear, exponential, quadratic, or none of these? Explain your reasoning.

SOLUTION

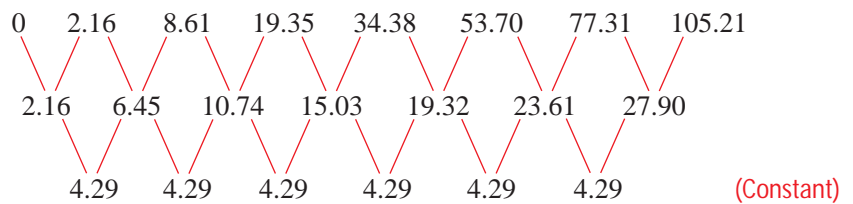


Begin by sketching a graph of the data.



As in Example 5, the pattern is not linear or exponential. By calculating the second differences, you can see that the pattern is quadratic.

A typical upper arm circumference is about 12 inches for women and 13 inches for men.



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Example 6 shows that the muscle strength of a person’s upper arm is proportional to the square of its circumference. Which of the following are also true? Explain your reasoning.

- a. Muscle strength is proportional to the diameter of the muscle.
- b. Muscle strength is proportional to the square of the diameter of the muscle.
- c. Muscle strength is proportional to the cross-sectional area of the muscle.