c) $f(2n) - f(n) \neq f(n)$

The seven points on the Statue of Liberty's crown represent the seven seas and the seven continents. In her left hand, Lady Liberty holds a tablet on which the date of the Declaration of Independence, July 4, 1776, is inscribed. In her right hand, she holds aloft a torch as a welcoming beacon for the millions of immigrants who come to America.

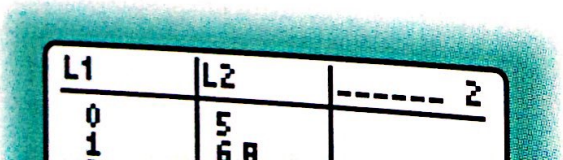
26. In the 16th century Isaac Newton discovered that the height h attained by a thrown object depends on its initial speed s_0, the elapsed time t, since its release, and the initial height h_0 from which it was thrown. The formula below illustrates the relationship between these variables.

$$h = -4.9t^2 + s_0t + h_0$$

a) Find the height of an object, relative to the ground, 5 s after it was thrown upwards at a speed of 10 m/s from the top of the Statue of Liberty.

b) How long will it be before the object hits the ground?

27. A pig farmer compiles the data below regarding the age, in months, ar mass, in kilograms, of his pigs.



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16. The function $f(x) = \frac{[10x + 0.5]}{10}$ is a greatest integer function corresponding to a function that rounds to the nearest tenth. State the rule for the greatest integer function used to round a number to the nearest:

a) Hundredth. ***b)*** Thousandth. ***c)*** nth decimal.

Johann Bernoulli (1718) clarified the meaning of a function rule.

17. Can a function that truncates to the nearest integer be expressed using the greatest integer concept? If so, state the rule.

18. Describe what function f does if its rule is $f(x) = \text{iPart}\,(100x) \div 100$.

19. A person's cardiovascular capacity can be calculated using the $MaxVO_2$ index, which stands for Maximum Volume of Oxygen. To measure the $MaxVO_2$ index of a 45-year-old man, the subject must take a test where he runs at the same speed on a treadmill for 30 min. At the start of the test, the treadmill is at a 10° angle relative to the ground. The angle is increased by 3° every 5 min. The data below are compiled during the test. Note that the subject's pulse is stable at each of the difficulty levels.

Period (min)	2	4	6	8	10	12	14	16	18
Pulse during period (beats/min)	90	92	102	106	120	122	123	136	136

a) Draw the step function that corresponds to this scenario.

b) What is the rule for calculating the pulse of the subject as a function of time?

c) State the rule for calculating the treadmill's angle as a function of time.

20. Is the function $f(x) = f\text{Part}\ x$ a step function?

21. Find the rule for a function that always rounds a number down to the nearest unit.

22. A store's accountant calculates the weekly commission paid to its sales staff using the rule $C(x) = 30\left[\frac{x}{1000}\right]$, where x is the weekly sales total of the salesperson and $C(x)$, the size of the commission. Both of these amounts are in dollars.

a) What is the minimum weekly sales total a salesperson must attain to earn a commission?

b) How much commission will a saleswoman earn if her weekly sales total is $12 354.45?

c) How much must a salesman sell in a week to earn a commission of at least $120?

d) Under what circumstances will a salesperson earn a commission of exactly $100?

e) In your own words, explain how the accountant calculates a salesperson's commission.

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