Chapter 10 Problems of the Week Answers

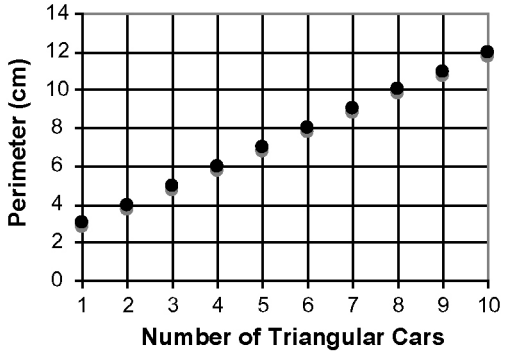
1. a) 16
b) The first insect dies, so the number of insects stops doubling.

2. 7

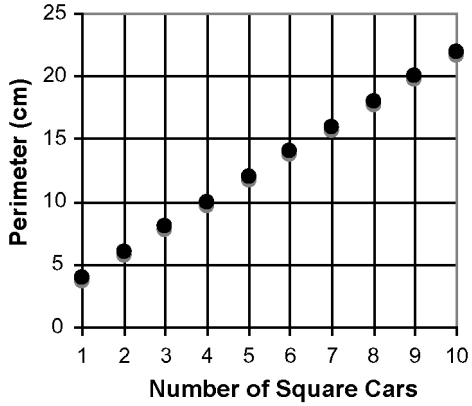
3. a) 49, 64, 81, 100, 121, 144, 169, 196, 225, 256, 289, 324, 361, 400, 441; These values represent the square of each natural number, in order.
b) 13, 21, 34, 55, 89, 144, 233, 377, 610, 987, 1597, 2584, 4181, 6765, 10946; Each number is the sum of the previous two numbers (Fibonacci sequence).
c) 28, 36, 45, 55, 66, 78, 91, 105, 120, 136, 153, 171, 190, 210, 231; Each number is the sum of all preceding natural numbers (triangular numbers).

4. 36

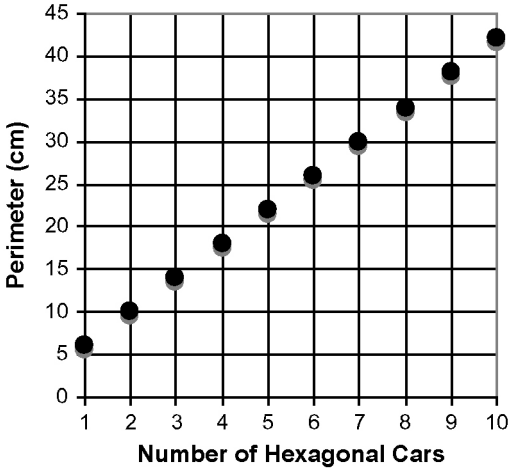
5. a) 1 car = 3 cm; 2 cars = 4 cm;
3 cars = 5 cm; 4 cars = 6 cm;
5 cars = 7 cm; 6 cars = 8 cm;
7 cars = 9 cm; 8 cars = 10 cm;
9 cars = 11 cm; 10 cars = 12 cm;
$p = n + 2$



b) 1 car = 4 cm; 2 cars = 6 cm;
3 cars = 8 cm; 4 cars = 10 cm;
5 cars = 12 cm; 6 cars = 14 cm;
7 cars = 16 cm; 8 cars = 18 cm;
9 cars = 20 cm; 10 cars = 22 cm;
$p = 2n + 2$



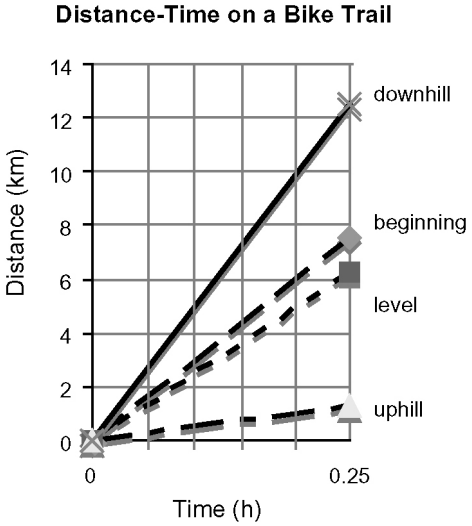
c) 1 car = 6 cm; 2 cars = 10 cm;
3 cars = 14 cm; 4 cars = 18 cm;
5 cars = 22 cm; 6 cars = 26 cm;
7 cars = 30 cm; 8 cars = 34 cm;
9 cars = 38 cm; 10 cars = 42 cm;
$p = 4n + 2$



6. a) $s \times 0.25$, where s is average speed and 0.25 is $\frac{1}{4}$ hour

b) beginning = 7.5 km; level = 6.25 km; uphill = 1.25 km; downhill = 12.5 km; The course is 27.5 km long.

c) Graphs may vary. Example:



The uphill section (3) is the hardest because a biker travels the least distance in the given time. The downhill section (4) is the easiest because a biker travels the greatest distance in the given time.