1. $\boxed{163}$

2. The midpoint is $\left(\frac{2+-5}{2}, \frac{5+3}{2}\right) = \left(-\frac{3}{2}, 4\right)$.

   The sum of the coordinates of our midpoint is $-\frac{3}{2} + 4 = \boxed{\frac{5}{2}}$.

3. We can plug in two sets of coordinates from the table to yield the following system:

   $$\begin{cases} 8 = B + D \\ 11 = 2B + D \end{cases}$$

   Solving gives us $B = 3, D = 5$ so that our equation is now $a = 3c + 5$. When $c = 19$, $a = 3(19) + 5 = \boxed{62}$.

c	1	2	3	...	19
a	8	11	14	...	?

4. $\boxed{5}$

5.

$$\begin{aligned} 2 + 4 + 6 + \cdots + 100 &= 2(1) + 2(2) + 2(3) + \cdots + 2(50) \\ &= 2(1 + 2 + 3 + \cdots + 50) \\ &= 2\left(\frac{(50)(51)}{2}\right) \\ &= 2(1275) = \boxed{2550} \end{aligned}$$

   Find the sum of the even integers from 2 to 100 inclusive. $\boxed{2550}$

6. The two-digit multiples of 14 are 14, 28, 42, 56, 70, 84, and 98. There are $99 - 10 + 1 = 90$ two-digit numbers. The probability of randomly selecting one of our multiples of 14 is $\boxed{\frac{7}{90}}$.

7. Let's count the numbers with exactly two factors first; these are prime numbers:

   There are **15** of them: 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47

   Next let's do odd factors. The rule is if our number N is represented by a prime factorization $N = p^i \times q^j \times r^k \cdots$ then the number of factors we have is equal to $(i+1) \times (j+1) \times (k+1) \cdots$. If the number of factors is odd then this means the exponents of our prime factorizations must be even. Then this means each of our numbers is a perfect square. For example, $36 = 2^2 \times 3^2 = (2 \times 3)^2$ has $(2+1) \times (2+1) = 9$ factors.

   There are **6** of these: 4, 9, 16, 25, 36, 49

   $15 + 6 = \boxed{21}$

8. The ratio of dogs to squirrels is $5 : 12$. The ratio of squirrels to opossums is $10 : 6 = 1 : 2$. Let d, s, p be the number of dogs, squirrels, and opossums respectively. Then $\frac{d}{s} = \frac{5}{12}$ and $\frac{s}{p} = \frac{5}{3}$. Solving for s gives us $\frac{12d}{5} = s$ and $s = \frac{5p}{3}$. Transitive property gives us $\frac{12d}{5} = \frac{5p}{3}$. Solving, we get $\frac{d}{p} = \frac{25}{36}$. THIS FRACTION DOES NOT SIMPLIFY TO $\frac{5}{6}$! $\boxed{25 : 36}$

9. Since they meet again at the starting place, this means that they complete whole miles when they are again together. This is simply a matter of finding the lowest common multiple of 6 and 9, $\boxed{18 \text{ min}}$. Notice that at this time, the first jogger has done 3 miles and the second has done 2 miles.

10. Our linear function looks like $t = mh + b$ where m is the slope and b is the y-intercept. Choosing two points on the table, $(2, 1), (7, 2)$, we can find m, b.
$m = \frac{2-1}{7-2} = \frac{1}{5}$
We plug in $(1, 2)$ to find b:

$$\begin{aligned} 1 &= \frac{1}{5}(2) + b \\ 1 &= \frac{2}{5} + b \\ b &= \frac{3}{5} \end{aligned}$$

So now our linear function is $t = \frac{1}{5}h + \frac{3}{5}$. We can plug in $h = 157$ to get $t = \frac{1}{5}(157) + \frac{3}{5} = \boxed{32}$.

t	1	2	3
h	2	7	12