1. Recall $d(n)$ is the divisor function. Then use the formula discussed in class to compute

(a) $d(72)$

Solution.

$$72 = 2^3 \times 3^2$$

so

$$d(72) = (3 + 1) \times (2 + 1) = 12$$

(b) $d(2310)$

Solution.

$$2310 = 2 \times 3 \times 5 \times 7 \times 11$$

so

$$d(2310) = 2 \times 2 \times 2 \times 2 \times 2 = 32$$

2. Show that 496 is a perfect number.

Proof.

$$496 = 16 \times 31$$

So all the divisors of 496 are 1, 2, 4, 8, 16, 31, 62, 124, 248, 496. Now we may check that

$$\sigma(496) = 1 + 2 + 4 + 8 + 16 + 31 + 62 + 124 + 248 + 496 = 992 = 2 \times 496.$$ 

Hence 496 is a perfect number.