Problem 1

1.

$$0 * 0.15 + 1 * 0.02 + 2 * 0.19 + 3 * 0.3 + 4 * 0.15 + 5 * 0.18 + 6 * 0.01 = 2.86$$

The expected number of vaccines against COVID-19 a Dane would get is 2.86 dosages.

2.

The probability of $P(x > 2) = 0.3 + 0.15 + 0.18 + 0.01 = 0.64$

The probability that a Dane received at least 3 dosages is 64%.

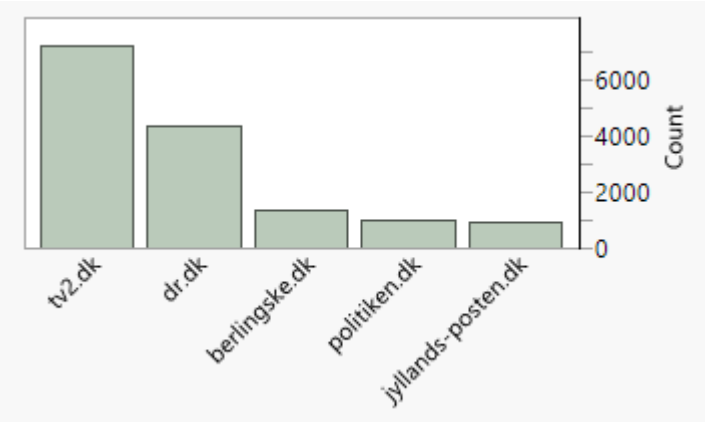
3.

The probability that a Dane has received at least 3 dosages, given the Dane has at least 1 dosage, using Bayes' Theorem:

$$P(3\ or\ more\ dosages \text{ I } at\ least\ 1\ dosage)$$
$$= \frac{P(at\ least\ 1\ dosage \text{ I } 3\ or\ more\ dosages) * P(3\ or\ more\ dosages)}{P(at\ least\ 1\ dosage)}$$
$$= \frac{1 * 0.64}{0.85} = 0.7529412$$

Problem 2

1.



The mode is tv2.dk with a count of 7156, making up 48.957% of the observations.

Problem 3

1.

Using R and a standard normal distribution, the 90%-confidence interval is:

]0.1471963; 0.3495763[

I conclude with 90% confidence that between 14.72 and 34.96 percentage points more men know about ad blockers than women.

Problem 4

1.

I use JMP to do a paired t-test. I get a test statistic of 2.033264. Under the null, it is t-distributed with 54 degrees of freedom and a p-value of 4.7%. I reject the null hypothesis of no difference and conclude that there is a significant difference between aggression 10 days after adoption and 6 months after adoption with a mean increase in aggressive behavior of 0.17882.

Problem 5

1.

Using R and a standard normal distribution, I get a 95%-confidence interval of:

]0.12054098; 0.15461825[

I conclude with 95% confidence that the population proportion believing that disruptive protests help the protester's cause is between 12.05% and 15.46%.

2.

Using JMP, I get a test statistic of 92.056. Under the null, it is approximately chi-squared distributed with 3 degrees of freedom and a p-value under 0.01%. I reject the null hypothesis and conclude that the opinion about whether disruptive protests help or hinder the protester's cause depends on the respondent's age.

Looking at expected counts, we see that young people are much more likely to think it helps, with 48 between 18-24 saying that against the expected 19.4, and 113 between 25-49 against the expected 86.4. On the other hand, this means older people are much more likely to think that it hinders the cause, with only 35 between 50-64 agreeing that the disruptive protests help against the expected 57.78 and 20 over 65 against the expected 52.42.

Problem 6

1.

Fitting a linear regression with fear as the explanatory variable and aggression as the response variable in JMP, I get a regression equation of:

aggression = 0.5191367 + 0.0948846*fear

Meaning that aggression increases by 0.095 every time fear increases by 1.

The 95%-prediction interval for a dog with 0 fear, also given by JMP, is:

]-0.545718; 1.583992[

Meaning that we with 95% confidence can predict that any individual dog with no fear will have an aggression score between 0 and 1.58, as the aggression score cannot be negative.

2.

Using JMP, the estimated effect of fear on aggression, when aggressive behavior the first 10 days is taken into account, is 0.0882427. The 95%-confidence interval for this effect is:

]-0.248773; 0.4252584[

Using JMP with a t-distribution with 52 degrees of freedom.

Since 0 is in the interval, there is no evidence to support a significant effect of fear on aggression when aggression the first 10 days is taken into account. I can say with 95% confidence that the estimate is between -0.25 and 0.43.