Discrete Homework 3

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- Section 1.7: 10, 18, 24, 28, 38
- Section 1.8: 4, 6, 12, 16, 20, 30
- Section 5.1: 6, 12, 14, 32, 20, 58
- Section 5.2: 2, 12

1.7.10

The product of two rational numbers is rational.
Definition: c is rational if it can be written as a as a quotient of two integers.
Let a and b be rational numbers. We're trying to prove that their product,

$$ab = c$$

c is rational.
if a and b are rational, they can be written as:

$$a = \frac{p}{q}$$

$$b = \frac{s}{t}$$

respectively.

$$ab = \frac{pq}{st}$$

Since p, q, s, t are all integers, and integers are closed under multiplication, pq and st are integers. Therefore, pq is a rational number.

1.7.18

Prove that if n is an integer and $3n + 2$ is even, then n is even.

Contraposition

$$3n + 2 is even \rightarrow n is even$$