CW 02A solutions

1. Since m is even, $m = 2k$ for some $k \in \mathbb{Z}$.

$$\begin{aligned} 3m + 4 &= 3(2k) + 4 \\ &= 6k + 4 \\ &= 2(3k + 2) \end{aligned}$$

Since $3k + 2 \in \mathbb{Z}$, by def, $3m + 4$ is even.

2. Case 1: If $x > 3$, then $x^2 > 9$.

Case 2: If $x < -3$, then $x^2 > 9$.

3. Contrapositive:

if $x^2 \leq 9$ then $x \leq 3$ and $x \geq -3$.

4. Assume a is a non-zero rational, b is irrational and ab is rational.

CW 02B solutions

1. Since m is even, $m = 2k$ for some $k \in \mathbb{Z}$.

$$\begin{aligned} 7m+2 &= 7(2k)+2 \\ &= 14k+2 \\ &= 2(7k+1) \end{aligned}$$

Since $7k+1 \in \mathbb{Z}$, by def, $7m+2$ is even.

2. Case 1: If $x \geq 5$, then $x^2 \geq 25$.

Case 2: If $x \leq -5$, then $x^2 \geq 25$.

3. Contrapositive:

if $x^2 < 25$ then $x < 5$ and $x > -5$.

4. Assume a is a non-zero rational, b is irrational and a/b is rational.