Name: _____   Date: _____

Example <u>Athletes do not compete in both the Summer and Winter Olympics.</u> Clara Hughes has won
two bronze medals in cycling in the Summer Olympics. Therefore, Clara has not participated in the
Winter Olympics.

Is there an error in this statement?

She is an Olympic speed skater as well (6-ish medals @
2010 Olympics)

What do we need to watch for with proofs?

We need to make sure the original assumption is correct.

Example The following is a proof that 1=2:

$$^{x^a}a = b^{x^a} \leftarrow \text{assumption}$$
$$a^2 + a^2 = ab \checkmark + a^2$$

Collect like terms $\begin{cases} a^2 + a^2 = a^2 + ab \checkmark \\ 2a^2 = a^2 + ab \quad -2ab \end{cases}$ $-2ab$

$$2a^2 - 2ab = a^2 + ab - 2ab$$

factor $\begin{cases} 2(a^2 - ab) = 1(a^2 - ab) \\ 2 = 1 \end{cases}$ $a^2-ab \quad a^2-ab$ collect like terms

$$a = b$$
$$a^2 - ab$$
$$= a^2 - a(a)$$
$$= a^2 - a^2$$
$$= 0$$

Can you find the error in the proof?

When they divided by a^2-ab
  - because $a^2-ab = 0$ by the original
                                                    assumption.

What do we need to watch for with proofs?

Never divide by zero
  - if a variable <u>can</u> be equal to zero,
    don't divide by it !!

Assignment   Pg. 42 #2, 4, 6-8, 12, 14, 17

Example Liz claims she has proved that -5 =5.

Liz's proof:
I assumed that: -5=5
Then I squared both sides: $(-5)^2=(5)^2$
I found that: 25=25 which is true

Therefore, -5=5

What is the error in Liz's proof?

The original assumption is wrong.
-5 is never equal to 5

What do we need to watch for in proofs?

Make sure the original assumption
is correct.

Assignment   Pg. 42 #2, 4, 6-8, 12, 14, 17