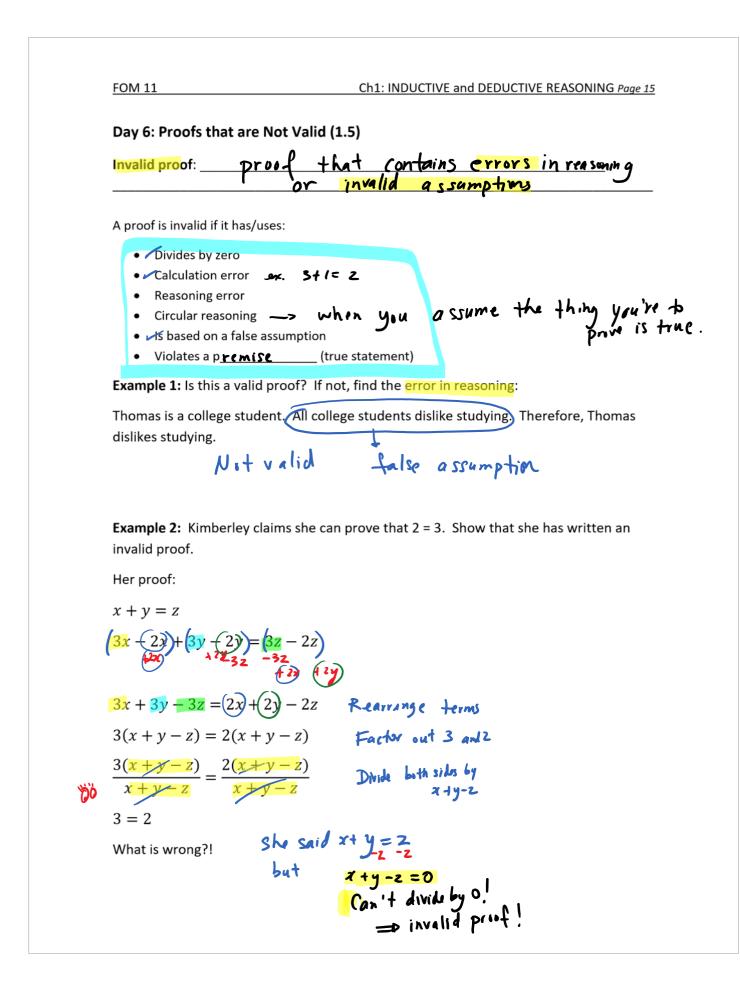
6 Proofs that are Not Valid (1.5)

January 3, 2020 5:58 PM



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Example 3: Is this a valid proof? If not, find the error in reasoning:

Kurt claims to have proven that 2 = 1. For each statement in his proof, determine if it is valid.

Statement	Reason	Valid?
$x = y$, where $x, y \neq 0$	Given	\checkmark
$x^2 = xy$	Multiply both sides by <i>x</i>	~
$x^2 - y^2 = xy - y^2$	Subtract y² from both sides	~
(x-y)(x+y)	Factor out (x-y)	
= y(x - y)		V
$\frac{(x-y)(x+y)}{x-y} = \frac{y(x-y)}{x-y}$	Divide both sides by $(x-y)$ but $x = g$ so $x - y = 0$	No! Canit divide by
x + y = y		zero!
y + y = y	Substitute y for x since x = y	V
2y = y	Simplify	~
2 = 1	Dyr dy both sides by y	~

Example 4: What error, if any, occurs in the following proof?

$$2 = 2$$

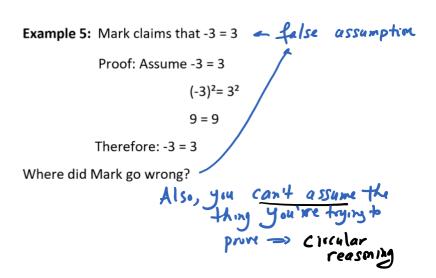
$$4(2) = 4(1 + 1)$$

$$4(2) + 3 = 4(1 + 1) + 3$$

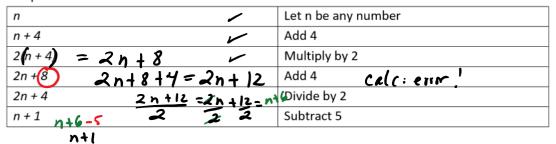
$$8 + 3 = 6 + 3$$

$$4(2) = 8$$

$$4(2) = 10$$



Example 6: Evan created a number trick in which he always ended with the original number. When he tried to prove the trick, it did not work. Where did the error occur in the proof?!



Example 7: Prove this number trick by deduction:

1. Pick a 3-digit number with <u>all three digits being the same</u> (ex., 333, 444, etc.)

2. Add the 3 digits together
3. Divide your three-digit number by the sum you found
4. Your answer is 37.
3 digit #:
$$\underline{x} \times \underline{x} = 100 \times + 10x + \overline{z}$$

 $x + x + x = 3\underline{x}$
 $100x + 10x + \underline{x} = \frac{x(100 + 10 + 1)}{3\underline{x}} = \frac{111}{3\underline{x}} = 37$
 $yalidade
yalidade$

Assignment: Sec 1.5, p. 42# 1 (like Ex 1 above), 2, 3, 5, 7, 10 (a classic!)

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