#6: The desired identity is
\[
\frac{1}{1 \cdot 2} + \cdots + \frac{1}{n(n+1)} = \frac{n}{n+1}.
\]
Proof by induction on \( n \). Basis step is \( n = 1 \), where both sides reduce to 1/2. For the induction step, assume
\[
\frac{1}{1 \cdot 2} + \cdots + \frac{1}{n(n+1)} = \frac{n}{n+1}.
\]
Add \( 1/(n+1)(n+2) \) to both sides to get
\[
\frac{1}{1 \cdot 2} + \cdots + \frac{1}{n(n+1)} + \frac{1}{(n+1)(n+2)} = \frac{n}{n+1} + \frac{1}{(n+1)(n+2)}
\]
\[
= \frac{n(n+2) + 1}{(n+1)(n+2)}
\]
\[
= \frac{(n+1)^2}{(n+1)(n+2)}
\]
\[
= \frac{n+1}{n+2}.
\]

#34 uses strong induction and is one of the problems deferred to next week, while #43 was supposed to be for this week. My apologies for not correcting the web page earlier.

#52: The inductive step doesn’t follow because \( x - 1 \) and \( y - 1 \) are not necessarily positive integers.