SOLUTIONS FOR HW #1

#1.14) a) \( \frac{4}{3} \frac{2}{1} = 4 \)

\(^{1}\text{st inst}^{2}\text{nd inst}^{3}\text{rd inst}^{4}\text{th inst}\)

b) \( \frac{2}{4} \frac{2}{1} = 4 \)

piano drums cellos inst 4

#1.17) a) 6! b) 2.3! 3! c) 4! 3! d) 2.3.3.2.2.1.1

#1.12) a) 30^5 b) 30.28.26.24.22

#1.15) \( \binom{10}{5} \binom{12}{5} = 1 \)

\#1.16) a) \( \binom{6}{2} + \binom{7}{2} + \binom{4}{2} \)

b) \( \frac{6 \cdot 7}{2} + \frac{6 \cdot 4}{2} + \frac{7 \cdot 4}{2} \)

#1.19) a) \( \binom{7}{3} \binom{4}{3} + \binom{2}{1} \binom{4}{2} \binom{8}{3} \) b) \( \binom{6}{3} + \binom{2}{1} \binom{6}{3} \)

Only one of 2 men served only one of 2 women serves none of 2 men serves none of 2 women serves

#1.21) You have to take 7 steps to reach B from A. These 7 steps consist of 4 right and 3 ups. The different number of paths from A to B is

\( \binom{7}{4, 3} = \frac{7!}{4! \cdot 3!} \)

#1.24) \( (3x^2+y)^5 = \sum_{i=0}^{5} \binom{5}{i} (3x^2)^i y^{5-i} \)

\[ \Rightarrow \binom{5}{0} (3x^2)^0 y^5 + \binom{5}{1} (3x^2)^1 y^4 + \binom{5}{2} (3x^2)^2 y^3 + \binom{5}{3} (3x^2)^3 y^2 + \binom{5}{4} (3x^2)^4 y + \binom{5}{5} (3x^2)^5 y^0 \]
\[(3x^2 + y)^5 = y^5 + 15x^2y^4 + 90x^4y^3 + 270x^6y^2 + 405x^8y + 243x^{10}\]

\[\#1.29\]

a) \[\frac{10}{3, 4, 2} = \frac{10!}{3!4!2!}\]

b) \[3 \cdot \frac{3!}{2!} = \frac{3!}{4!2!}\]

\[\#1.31\]

a) \(\binom{11}{3}\)

b) \(\binom{4}{3}\)