

## Special functions. Problems for seminar 8

1. Using integral presentation for Gauss hypergeometric function, derive Pfaff and Euler identities

$$F_{2,1}(a, b; c; z) = (1 - z)^{-a} F_{2,1}\left(a, c - b; c; \frac{z}{1 - z}\right),$$

$$F_{2,1}(a, b; c; z) = (1 - z)^{c-a-b} F_{2,1}(c - a, c - b; c; z),$$

2. a) The function  $(1 - x)^{-a}$  coincides with hypergeometric function  $F_{1,0}(c; x)$  so that Euler integral presentation of Gauss hypergeometric function  $F_{2,1}(a, b; c; z)$  can be regarded as recursive integral presentation of  $F_{2,1}$  hypergeometric function via  $F_{1,0}$  hypergeometric function. Write down analogous integral formula presenting  $F_{3,2}(a, b, c; d, e; x)$  via  $F_{2,1}$  hypergeometric function.

- b) Derive as a corollary the double integral, presenting  $F_{3,2}(a, b, c; d, e; x)$ .