Factorials Worksheet

1. Can a factorial be defined for a negative number?

2. Express in factorial form:

   a) 6x5x4x3x2x1
   b) 8x7x6x5x4x3x2x1
   c) 3x2x1
   d) 9x8x7x6x5x4x3x2x1

3. Match each expression on the left with an equivalent expression on the right.

A	$\frac{14!}{13!}$
B	$\frac{52!}{51!}$
C	$\frac{101!}{99!}$
D	$20 \times 19!$
E	$90 \times 8!$
F	$30 \times 4!$

Letter		
	1	10100
	2	6!
	3	52
	4	10!
	5	14
	6	20!

4. Determine the value for each expression. Simplify fully before using a calculator.

a) $\frac{8!}{5!}$ b) $\frac{19!}{13!}$ c) $\frac{21!}{17!4!}$ d) $\frac{9!}{7!2!}$ e) $\frac{155!}{152!}$ f) $\frac{93!}{89!4!}$

5. Determine the value for each expression. Simplify fully before using a calculator.

a) $\frac{10!}{5!}$ b) $\frac{21!}{14!}$ c) $\frac{9!}{3!6!}$ d) $\frac{12!}{8!4!}$ e) $\frac{7!}{2!5!} + \frac{7!}{4!3!}$

f) $\frac{15!}{9!6!} + \frac{15!}{10!5!}$ g) $2 \times \frac{5!}{2!3!}$ h) $3 \times \frac{11!}{7!4!}$

6. Simplify fully where $n \in W$

a) $12 \times 11 \times 10 \times 9!$ b) $72 \times 7!$ c) $n(n-1)!$

d) $n!(n+1)$ e) $(n-1)!(n^2+n)$ f) (n+4)(n+5)(n+3)!

g) $n!(n^2+3n+2)$ h) $\frac{n!}{(n-2)!}$ i) $\frac{(n+2)!}{(n-1)!}$

Answers

1) No

2)
a) 6!
b) 8!
c) 1!
d) 9!

3) (A,5) , (B,3) , (C,1) , (D,6) , (E,4) , (F,2)

4)
a) 336
b) 19535040
c) 5985
d) 36
e) 3652110
f) 2919735

5)
a) 30240
b) 586051200
c) 84
d) 495
e) 56
f) 8008
g) 20
h) 990

6)
a) 12!
b) 9!
c) n!
d) (n+1)!
e) (n+1)!
f) (n+5)!
g) (n+2)!
h) n(n-1)
i) (n+2)(n+1)(n)