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 x 11 x 10 x 9!

b) 72 x 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)