

Day 3

1 Calculate:

(1) $\frac{1}{2} \times \frac{2}{3} \times \frac{3}{4} \times \cdots \times \frac{19}{20} = \underline{\hspace{2cm}} .$

(2) $\left(1 + \frac{1}{3}\right) \times \left(1 + \frac{1}{4}\right) \times \left(1 + \frac{1}{5}\right) \times \cdots \times \left(1 + \frac{1}{1001}\right) = \underline{\hspace{2cm}} .$

2 If the product $\frac{3}{2} \cdot \frac{4}{3} \cdot \frac{5}{4} \cdot \frac{6}{5} \cdot \cdots \cdot \frac{a}{b} = 9$, what is the sum of a and b ? (1997 AJHSME Problem, Question #19)

A. 11

B. 13

C. 17

D. 35

E. 37

3 The product of the 9 factors $\left(1 - \frac{1}{2}\right) \left(1 - \frac{1}{3}\right) \left(1 - \frac{1}{4}\right) \cdots \left(1 - \frac{1}{10}\right) = \underline{\hspace{1cm}}$. (

1985 AJHSME Problem, Question #9)

A. $\frac{1}{10}$

B. $\frac{1}{9}$

C. $\frac{1}{2}$

D. $\frac{10}{11}$

E. $\frac{11}{2}$

4 Calculate:

$$(1) \left(1 + \frac{1}{2}\right) \times \left(1 - \frac{1}{2}\right) \times \left(1 + \frac{1}{3}\right) \times \left(1 - \frac{1}{3}\right) \times \cdots \times \left(1 + \frac{1}{10}\right) \times \left(1 - \frac{1}{10}\right) =$$

$\underline{\hspace{1cm}}$.

$$(2) \left(1 - \frac{1}{2}\right) \times \left(2 - \frac{2}{3}\right) \times \left(3 - \frac{3}{4}\right) \times \left(4 - \frac{4}{5}\right) \times \left(5 - \frac{5}{6}\right) \times \left(6 - \frac{6}{7}\right) \\ \times \left(7 - \frac{7}{8}\right) \times \left(8 - \frac{8}{9}\right) \times \left(9 - \frac{9}{10}\right) = \text{——} .$$