

Math 105 TOPICS IN MATHEMATICS
SOLUTION FOR QUIZ – VII (03/04)

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[I] (9pts) Below a and b are positive real numbers.

(1) True or false : $\sqrt{a} \sqrt{b} = \sqrt{ab}$.

[Answer]: True.

(2) True or false : $\left(\sqrt[5]{a}\right)^4 = \sqrt[5]{a^4}$.

[Answer]: True.

(3) True or false : $\sqrt[3]{\sqrt[4]{a}} = \sqrt[7]{a}$.

[Answer]: False.

[II] (8pts) Simplify:

(1) $\sqrt{5} \cdot \sqrt{13} = \sqrt{65}$. (2) $\sqrt[3]{4} \cdot \sqrt[3]{7} = \sqrt[3]{28}$.

(3) $4^{\frac{6}{5}} \cdot \left(\frac{9}{4}\right)^{\frac{6}{5}} = 9^{\frac{6}{5}}$. (4) $8^{\frac{1}{3}} \cdot 8^{\frac{5}{3}} = 8^2 = 64$.

(As for part (4), both 8^2 and 64 are acceptable.)

[III] (3pts) Use

$$1 + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \frac{1}{5} + \frac{1}{6} = \frac{49}{20}$$

to do

$$1 + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \frac{1}{5} + \frac{1}{6} + \frac{1}{7}.$$

★ Show work or no credit.

[Answer]:

$$1 + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \frac{1}{5} + \frac{1}{6} + \frac{1}{7} = \frac{363}{140}.$$

[Work]:

$$\begin{aligned} 1 + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \frac{1}{5} + \frac{1}{6} + \frac{1}{7} &= \frac{49}{20} + \frac{1}{7} \\ &= \frac{49 \cdot 7}{20 \cdot 7} + \frac{1 \cdot 20}{7 \cdot 20} \\ &= \frac{343}{140} + \frac{20}{140} \\ &= \frac{363}{140}. \end{aligned}$$