

10 Quiz 10 MAT 1275 Professor Chiu

Name: _____

- This quiz consists of 2 questions, each worth 5 points for a total of 10 points.
- You have 15 minutes to complete the quiz.
- Show all work and justify your answers.
- Scientific calculators are allowed.
- Wishing you success.

1. Divide and simplify:

① Rationalization of the denominator $\frac{7\sqrt{3} + 2\sqrt{5}}{\sqrt{3} - \sqrt{5}}$

$(\sqrt{3} - \sqrt{5})$ $\xrightarrow{\text{conjugate}}$ $(\sqrt{3} + \sqrt{5})$
 With "makes" denominator rational:

② denominator numerator

$\sqrt{3}$	$\sqrt{5}$
3	$-\sqrt{15}$
$+\sqrt{5}$	$+\sqrt{3}$
$\sqrt{15}$	-5

$\sqrt{3}$	$7\sqrt{3}$	$+2\sqrt{5}$
7	3	$2\sqrt{15}$
$+\sqrt{5}$	$7\sqrt{15}$	$2 \cdot 5$

$$= \frac{(7\sqrt{3} + 2\sqrt{5})(\sqrt{3} + \sqrt{5})}{(\sqrt{3} - \sqrt{5})(\sqrt{3} + \sqrt{5})}$$

$$= \frac{21 + 2\sqrt{15} + 7\sqrt{15} + 10}{3 - \sqrt{15} + \sqrt{15} - 5}$$

$$= \frac{(21+10) + 2\sqrt{15} + 7\sqrt{15}}{3-5} = \frac{31 + 9\sqrt{15}}{-2}$$

2. Simplify assuming that each variable is positive:

① Reveal the "pairs"

$48 = 6 \times 8 = 2 \times 3 \times 2 \times 2 \times 2$

② Separate the "pairs" and "non-pair" term in their individual " $\sqrt{\quad}$ "

③ $\sqrt{2 \cdot 2} = 2$, $\sqrt{z \cdot z} = z$
 $\sqrt{x \cdot x} = x$,
 $\sqrt{y \cdot y} = y$,

④ Simplify

$$\begin{aligned} & \textcircled{1} \sqrt[3]{48x^9y^8z^3} \\ &= 3 \sqrt[3]{2 \cdot 2 \cdot 2 \cdot 2 \cdot 3 \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x \cdot y \cdot y \cdot y \cdot y \cdot y \cdot y \cdot y \cdot z \cdot z \cdot z} \\ & \textcircled{2} = 3 \sqrt[3]{\underbrace{2 \cdot 2}_{\downarrow} \cdot \underbrace{2 \cdot 2}_{\downarrow} \cdot \underbrace{x \cdot x}_{\downarrow} \cdot \underbrace{x \cdot x}_{\downarrow} \cdot \underbrace{x \cdot x}_{\downarrow} \cdot \underbrace{x \cdot x}_{\downarrow} \cdot \underbrace{y \cdot y}_{\downarrow} \cdot \underbrace{y \cdot y}_{\downarrow} \cdot \underbrace{y \cdot y}_{\downarrow} \cdot \underbrace{y \cdot y}_{\downarrow} \cdot \underbrace{z \cdot z}_{\downarrow} \cdot \underbrace{3 \cdot x \cdot z}_{\downarrow}} \\ & \textcircled{3} = 3 \cdot 2 \cdot 2 \cdot x \cdot x \cdot x \cdot x \cdot y \cdot y \cdot y \cdot y \cdot z \cdot \sqrt{3xz} \\ & \textcircled{4} = 12x^4y^4z\sqrt{3xz} \end{aligned}$$