

Student: _____
Date: _____

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Course: Math1111-Summer2018

Assignment: Section P.3 Homework

1. Evaluate the expression, or state that the expression is not a real number.

$$\sqrt{169 - 144} = \sqrt{25} = 5$$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A. The expression is a real number. $\sqrt{169 - 144} =$ 5 (Type an integer or a decimal.)
 B. The expression is not a real number.

2. Evaluate the square roots first, then subtract the result. Do not use a calculator or a square root table.

$$\sqrt{225} - \sqrt{100} = 15 - 10 = 5$$

Select the correct choice below and fill in any answer boxes to complete your choice.

- A. The expression is a real number. $\sqrt{225} - \sqrt{100} =$ 5 (Simplify your answer.)
 B. The expression is not a real number.

3. Simplify the expression.

$$\sqrt{40} = \sqrt{4 \cdot 10} = \sqrt{4} \cdot \sqrt{10} = 2\sqrt{10}$$

$$\sqrt{40} = \underline{2\sqrt{10}}$$

(Type an exact answer, using radicals as needed.)

4. Use the product rule to simplify the following expression. Assume that variables represent nonnegative real numbers.

$$\sqrt{5x} \cdot \sqrt{25x} = \sqrt{5x \cdot 25x} = \sqrt{25x^2 \cdot 5} = 5x\sqrt{5}$$

$$\sqrt{5x} \cdot \sqrt{25x} = \underline{5x\sqrt{5}}$$

(Type an exact answer using radicals as needed.)

5. Use the quotient rule to simplify the expression.

$$\sqrt{\frac{81}{16}} = \frac{\sqrt{81}}{\sqrt{16}} = \frac{9}{4}$$

$$\sqrt{\frac{81}{16}} = \underline{\frac{9}{4}}$$

6. Simplify using the quotient rule for square roots. Assume that $x > 0$.

$$\frac{\sqrt{120x^4}}{\sqrt{3x}} = \sqrt{\frac{120x^4}{3x}} = \sqrt{40x^3} = \sqrt{4x^2 \cdot 10x} = 2x\sqrt{10x}$$

$$\frac{\sqrt{120x^4}}{\sqrt{3x}} = \underline{2x\sqrt{10x}}$$

7. Subtract the following terms, if possible.

$$3\sqrt{17x} - 9\sqrt{17x} = -6\sqrt{17x}$$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A. $3\sqrt{17x} - 9\sqrt{17x} = -6\sqrt{17x}$ (Type an exact answer, using radicals as needed.)
- B. The radicals cannot be combined.

8. Add the following terms if possible.

$$4\sqrt{48} + 2\sqrt{75} = 4\sqrt{16 \cdot 3} + 2\sqrt{25 \cdot 3} = 4(4)\sqrt{3} + 2(5)\sqrt{3} = 16\sqrt{3} + 10\sqrt{3} = 26\sqrt{3}$$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A. $4\sqrt{48} + 2\sqrt{75} = 26\sqrt{3}$ (Type an exact answer, using radicals as needed.)
- B. The radicals cannot be combined.

9. Rationalize the denominator. Simplify the answer.

$$\frac{\sqrt{2}}{\sqrt{7}} \cdot \frac{\sqrt{7}}{\sqrt{7}} = \frac{\sqrt{2} \cdot \sqrt{7}}{7} = \frac{\sqrt{2(7)}}{7} = \frac{\sqrt{14}}{7}$$

$$\frac{\sqrt{2}}{\sqrt{7}} = \frac{\sqrt{14}}{7}$$

(Type an exact answer using radicals as needed.)

10. Rationalize the denominator.

$$\frac{13}{3 + \sqrt{19}} \cdot \frac{3 - \sqrt{19}}{3 - \sqrt{19}} = \frac{13(3 - \sqrt{19})}{3^2 - (\sqrt{19})^2} = \frac{39 - 13\sqrt{19}}{9 - 19} = -\frac{39 - 13\sqrt{19}}{10}$$

$$\frac{13}{3 + \sqrt{19}} = -\frac{39 - 13\sqrt{19}}{10}$$

(Simplify your answer. Type an exact answer, using radicals as needed.)

11. Rationalize the denominator.

$$\frac{2}{\sqrt{10} - 3} \cdot \frac{\sqrt{10} + 3}{\sqrt{10} + 3} = \frac{2\sqrt{10} + 6}{(\sqrt{10})^2 - (3)^2} = \frac{2\sqrt{10} + 6}{10 - 9} = \frac{2\sqrt{10} + 6}{1} = 2\sqrt{10} + 6$$

$$\frac{2}{\sqrt{10} - 3} = 2\sqrt{10} + 6$$

(Simplify your answer. Type an exact answer, using radicals as needed.)

12. Evaluate the following expression, or indicate that the expression is not a real number.

$$\sqrt[4]{(-6)^4} = ((-6)^4)^{1/4} = 6 \quad \text{Positive since } (-6)^4, \text{ the power is even}$$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A. The expression is a real number. $\sqrt[4]{(-6)^4} = 6$
- B. The expression is not a real number.

13. Simplify.

$$\sqrt[3]{24} = \sqrt[3]{8 \cdot 3} = \sqrt[3]{8} \cdot \sqrt[3]{3} = 2\sqrt[3]{3}$$

$$\sqrt[3]{24} = 2\sqrt[3]{3}$$

(Type an exact answer, using radicals as needed. Simplify your answer.)

14. Simplify the radical expression.

$$\sqrt[3]{9} \cdot \sqrt[3]{12} = \sqrt[3]{9(12)} = \sqrt[3]{108} = \sqrt[3]{27 \cdot 4} = \sqrt[3]{27} \sqrt[3]{4} = 3\sqrt[3]{4}$$

$$\sqrt[3]{9} \cdot \sqrt[3]{12} = 3\sqrt[3]{4}$$

15. Simplify the radical expression.

$$\frac{\sqrt[7]{256x^8}}{\sqrt[7]{2x}} = \sqrt[7]{\frac{256x^8}{2x}} = \sqrt[7]{128x^7} = \sqrt[7]{2^7x^7} = 2x$$

$$\frac{\sqrt[7]{256x^8}}{\sqrt[7]{2x}} = 2x$$

16. Add or subtract terms whenever possible.

$$2\sqrt[3]{16} + \sqrt[3]{128} = 2\sqrt[3]{8 \cdot 2} + \sqrt[3]{64 \cdot 2} = 2\sqrt[3]{8} \cdot \sqrt[3]{2} + \sqrt[3]{64} \cdot \sqrt[3]{2} = 2(2)\sqrt[3]{2} + 4\sqrt[3]{2} = 8\sqrt[3]{2}$$

$$2\sqrt[3]{16} + \sqrt[3]{128} = 8\sqrt[3]{2}$$

(Type an exact answer, using radicals as needed.)

17. Use radical notation to rewrite the expression. Then simplify, if possible.

$$225^{1/2} = \sqrt{225} = 15$$

$$225^{1/2} = 15$$

(Simplify your answer.)

18. Use radical notation to rewrite the expression. Simplify, if possible.

$$343^{2/3} = (\sqrt[3]{343})^2 = (\sqrt[3]{7^3})^2 = (7)^2 = 49.$$

$$343^{2/3} = 49$$

19. Evaluate the expression without using a calculator.

$$27^{-2/3} = \frac{1}{27^{2/3}} = \frac{1}{(\sqrt[3]{27})^2} = \frac{1}{(3)^2} = \frac{1}{9}$$

$$27^{-2/3} = \frac{1}{9}$$

20. Simplify using properties of exponents.

$$(6x^{1/4})(4x^{1/3}) = 24x^{\frac{1}{4} + \frac{1}{3}} = 24x^{\frac{3}{12} + \frac{4}{12}} = 24x^{\frac{7}{12}}$$

$$(6x^{1/4})(4x^{1/3}) = 24x^{7/12} \text{ (Use fractional exponents only.)}$$

21. Simplify using properties of exponents.

$$\frac{18x^{1/4}}{3x^{1/6}} = 6x^{\frac{1}{4} - \frac{1}{6}} = 6x^{\frac{3}{12} - \frac{2}{12}} = 6x^{1/12}$$

$$\frac{18x^{1/4}}{3x^{1/6}} = 6x^{1/12} \text{ (Use fractional exponents only.)}$$

22. Simplify by reducing the index of the radical.

$$\sqrt[10]{x^8} = x^{\frac{8}{10}} = x^{\frac{4}{5}} = \sqrt[5]{x^4}$$

$$\sqrt[10]{x^8} = \sqrt[5]{x^4} \text{ (Simplify your answer. Type an exact answer, using radicals as needed.)}$$

1. A. The expression is a real number. $\sqrt{169 - 144} =$ 5 (Type an integer or a decimal.)

2. A. The expression is a real number. $\sqrt{225} - \sqrt{100} =$ 5 (Simplify your answer.)

3. $2\sqrt{10}$

4. $5x\sqrt{5}$

5. $\frac{9}{4}$

6. $2x\sqrt{10x}$

7. A. $3\sqrt{17x} - 9\sqrt{17x} =$ $-6\sqrt{17x}$ (Type an exact answer, using radicals as needed.)

8. A. $4\sqrt{48} + 2\sqrt{75} =$ $26\sqrt{3}$ (Type an exact answer, using radicals as needed.)

9. $\frac{\sqrt{14}}{7}$

10. $\frac{39 - 13\sqrt{19}}{10}$

11. $2\sqrt{10} + 6$

12. A. The expression is a real number. $\sqrt[4]{(-6)^4} =$ 6

13. $2^3\sqrt{3}$

14. $3^3\sqrt{4}$

15. $2x$

16. $8^3\sqrt{2}$

17. 15

18. 49

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

20. $24x^{7/12}$

21. $6x^{1/12}$

22. $5\sqrt[4]{x}$
