

MTH 95 - Chapters 8 & 10 Review

Note: On the test, you will be allowed to use your calculators but no notes. You will be expected to show all of your work clearly and simplify all answers. When simplifying radical expressions, you may assume all variables are positive.

- Solve the inequalities and state your answer in interval notation.
 - $5x - 3 \leq 7x$
 - $2 \leq 3x - 4$ and $3x - 4 < 11$
 - $4x + 3 < 2x - 7$ or $3x + 4 \geq x + 7$
- Solve the following compound inequalities. Write your answer in set builder or interval notation.
 - $3x + 2 < 2$ and $3 - x < 1$
 - $5 - 3a \leq 8$ or $2a + 1 > 7$
- Evaluate, or state that it is not a real number:
 - $\sqrt{64}$
 - $-\sqrt{64}$
 - $\sqrt{-64}$
 - $\sqrt[3]{-64}$
- Find the domain of the following functions. Write your answer in interval notation.
 - $f(x) = \sqrt{x+4}$
 - $g(x) = 3 + \sqrt{6-7x}$
 - $h(x) = \sqrt[3]{1-x}$
- Write in radical form, and simplify, if possible.
 - $16^{1/2}$
 - $27^{1/3}$
 - $8^{2/3}$
 - $(x+1)^{3/4}$
- Use properties of exponents to simplify.
 - $(x^{-2/3})^{3/4}$
 - $a^{2/3} \cdot a^{5/4}$
 - $\left(\frac{81x^{16}}{y^8}\right)^{-1/2}$
- Simplify:
 - $\sqrt{49x^{12}y^4}$
 - $(\sqrt[5]{a^2b^4})^{15}$
 - $\sqrt{x^2 - 12x + 36}$
 - $\sqrt[3]{4} \sqrt[3]{2}$
 - $\sqrt[3]{4} + \sqrt[3]{2}$
 - $\frac{\sqrt[3]{4}}{\sqrt[3]{2}}$

g. $\sqrt{48a^6b^5}$ h. $\sqrt[3]{48a^6b^5}$ i. $3\sqrt{2x^5} \cdot 4\sqrt{10x^2}$

j. $\frac{\sqrt{40xy^3}}{\sqrt{8x}}$ k. $3\sqrt{45} - 8\sqrt{20} + \sqrt{405}$

l. $x\sqrt[3]{54x} - \sqrt[3]{2x^4}$ m. $(\sqrt{3} - \sqrt{2})^2$ n. $(3\sqrt{7} + 2\sqrt{5})(2\sqrt{7} - 4\sqrt{5})$

8. Rationalize the denominator and simplify.

a. $\frac{3}{\sqrt{5}}$ b. $\frac{\sqrt{7}}{\sqrt{12}}$ c. $\frac{3}{4 - \sqrt{7}}$

9. Solve the radical equation:

a. $\sqrt{8-x} + 7 = 4$ b. $3\sqrt{x+1} = 6$ c. $x = \sqrt{x-1} + 3$

d. $\sqrt{4x-3} = 2 + \sqrt{2x-5}$

10. When a TV is described as 28 inches, the measure of its diagonal is 28. If the width is 21 inches, what is the height? Round to the nearest tenth.

11. A boat is 300 meters south and 220 meters east of an island. How far is the boat from the island? Round to the nearest whole number.

12. Find the distance between the points $(8, -2)$ and $(-3, 4)$

13. Find the midpoint of the line segment with endpoints $(8, -2)$ and $(-3, 4)$

14. Simplify. Write your answer in terms of i .

a. $\sqrt{-64}$ b. $\sqrt{-72}$

15. Perform the indicated operation and simplify. Write your answer in standard form $a+bi$.

a. $(5-9i) + (-4+2i)$ b. $(5-9i) - (-4+2i)$

c. $(5-9i)(-4+2i)$ d. $\frac{5-9i}{-4+2i}$

Answers

1. a. $[-\frac{3}{2}, \infty)$ b. $[2, 5)$ c. $(-\infty, -5) \cup [\frac{3}{2}, \infty)$
2. a. \emptyset b. $[-1, \infty)$ or $\{a \mid a \geq -1\}$
3. a. 8 b. -8 c. not real d. -4
4. a. $[-4, \infty)$ b. $(-\infty, 6/7]$ c. $(-\infty, \infty)$
5. a. $\sqrt{16} = 4$ b. $\sqrt[3]{27} = 3$ c. $\sqrt[3]{8^2} = 4$ d. $\sqrt[4]{(x+1)^3}$
6. a. $x^{-1/2}$ or $\frac{1}{\sqrt{x}}$ b. $a^{23/12}$ c. $\frac{y^4}{9x^8}$
7. a. $7x^6y^2$ b. a^6b^{12} c. $x-6$
- d. 2 e. cannot simplify f. $\sqrt[3]{2}$
- g. $4a^3b^2\sqrt{3b}$ h. $2a^2b\sqrt[3]{6b^2}$ i. $24x^3\sqrt{5x}$
- j. $y\sqrt{5y}$ k. $2\sqrt{5}$
- l. $2x\sqrt[3]{2x}$ m. $11-2\sqrt{6}$ n. $2-8\sqrt{35}$
8. a. $\frac{3\sqrt{5}}{5}$ b. $\frac{\sqrt{21}}{6}$ c. $\frac{4+\sqrt{7}}{3}$
9. a. \emptyset b. $x = \frac{25}{9}$ c. $x = 5$ d. $x = 3, x = 7$
10. 18.5 inches
11. 372 meters
12. $\sqrt{157} \approx 12.53$
13. $(\frac{5}{2}, 1)$
14. a. $8i$ b. $6i\sqrt{2}$
15. a. $1-7i$ b. $9-11i$
- c. $-2+46i$ d. $-\frac{19}{10} + \frac{13}{10}i$