

# MTH 28, Midterm 3, V. 2, 05/07/26

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NAME: \_\_\_\_\_

There are 22 questions. Some are multiple choice and some are free response.  
Each question is worth 5 points over 100, so 10 points are extra credit.  
You can use a 4-function calculator. No scientific calculators or notes are permitted.  
For multiple-choice questions, just circle your answer.  
For free-response questions, SHOW ALL WORK to receive credit.

1. Simplify each of the following:

(a)  $\sqrt{32} =$  \_\_\_\_\_

(b)  $\sqrt{27} =$  \_\_\_\_\_

(c)  $\sqrt{18} =$  \_\_\_\_\_

(d)  $\sqrt{50} =$  \_\_\_\_\_

(e)  $\sqrt{72} =$  \_\_\_\_\_

(f)  $\sqrt{300} =$  \_\_\_\_\_

2. Find the product

$$(-5\sqrt{3})(4\sqrt{5})$$

and write it in simplest radical form  $A\sqrt{C}$ .

3. Evaluate the expression:  $125^{-\frac{2}{3}}$

4. Multiply and simplify

$$(8 + 2\sqrt{2})(8 - 2\sqrt{2})$$

**Circle the answer.**

(a) 56

(b)  $72 - 32\sqrt{2}$

(c)  $72 + 32\sqrt{2}$

(d) 72

5. Write the expression

$$\sqrt{108} - \sqrt{48}$$

in the form  $A\sqrt{C}$ .

6. Write the expression

$$\left(\frac{x^3y}{y^2}\right)^{6/7}$$

in the form  $\frac{x^r}{y^t}$ .

7. Write using rational exponents:  $\sqrt[3]{x^{10}}$

8. Write  $\sqrt{-32}$   
as the product of a real number and  $i$ .

**Circle the answer.**

(a)  $-4\sqrt{2}$

(b)  $-2\sqrt{4}i$

(c)  $4\sqrt{2}i$

(d)  $2\sqrt{4}i$

9. Evaluate the expression

$$(-1 + 3i) - (7 - 3i)$$

and write the result in the form  $a + bi$ .

10. Multiply and simplify

$$(3 + 2\sqrt{7})^2$$

**Circle the answer.**

(a)  $23 + 12\sqrt{7}$

(b)  $37 + 12\sqrt{7}$

(c) 35

(d)  $37 - 12\sqrt{7}$

11. Multiply

$$(-11 - 6i)(-8 - 9i)$$

12. Simplify the expression

$$\sqrt{\frac{75}{11}},$$

and write it in the form  $\frac{A\sqrt{B}}{C}$ .

13. Rationalize (that is, write without radicals in the denominator):

$$\frac{\sqrt{13} - \sqrt{3}}{\sqrt{13} + \sqrt{3}}$$

14. Simplify.

$$-4\sqrt{27} - 2\sqrt{12} - 2\sqrt{147}$$

Circle the answer.

- (a)  $-8\sqrt{27}$
- (b)  $-8\sqrt{3}$
- (c)  $-30\sqrt{9}$
- (d)  $-30\sqrt{3}$

15. Evaluate the expression

$$\frac{-3 + i}{1 + 4i}$$

and write the result in the form  $a + bi$ .

**16.** Solve the radical equation

$$\sqrt{2x + 1} = 3\sqrt{x - 1}$$

**17.** Solve the radical equation

$$\sqrt{4x} = x - 3.$$

**18.** Solve the radical equation

$$\sqrt{2x - 1} - 5 = 0$$

**19.** Solve the quadratic equation

$$3x^2 + 8x - 3 = 0$$

and write the solutions in simplified form.

**20.** Solve the quadratic equation

$$(x - 2)^2 - 3 = 2$$

**21.** Solve the quadratic equation

$$x^2 - 5x - 5 = 0$$

and write the solutions in simplified form.

**22.** Complete the square for the polynomial

$$x^2 + 10x + 27$$

(That is, write it in the form  $(x + h)^2 + k$ )