

# MTH 06, Test 4, V. 3, 12/07/21

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

There are 25 questions. Some are multiple choice and some are free response. Each question is worth 4 points over 100, except question 2 which is worth 12 points (so 8 points are extra credit).

For multiple-choice questions, just circle your answer.

For free-response questions, **SHOW ALL WORK** to receive credit.

1. Write the expression  $\sqrt[3]{-72}$  in simplest radical form.

2. Simplify each of the following:

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

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

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

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

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

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

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

4. Write the expression

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

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

5. Write the expression

$$\left(\frac{a^{-3}}{3b^{-1/6}}\right)^{-1}$$

in the form  $\frac{n \cdot a^r}{b^t}$ .

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

7. Write the expression

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

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

8. Find the product

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

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

9. Simplify completely

$$\frac{\sqrt{2}\sqrt{30}}{\sqrt{5}}$$

Circle the answer.

- (a)  $4\sqrt{3}$
- (b)  $\sqrt{12}$
- (c)  $2\sqrt{3}$
- (d)  $3\sqrt{2}$

10. Multiply and simplify

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

Circle the answer.

- (a)  $37 + 12\sqrt{7}$
- (b)  $23 + 12\sqrt{7}$
- (c) 35
- (d)  $37 - 12\sqrt{7}$

11. Simplify.

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

Circle the answer.

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

12. Multiply and simplify

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

Circle the answer.

- (a)  $72 - 32\sqrt{2}$
- (b) 56
- (c)  $72 + 32\sqrt{2}$
- (d) 72

13. Subtract and simplify

$$7\sqrt{8} - 9\sqrt{18}$$

**14.** Simplify the expression

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

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

**15.** Solve the equation

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

**16.** Solve the equation

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

**17.** Evaluate the expression

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

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

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

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

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

**Circle the answer.**

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

20. Evaluate the expression

$$(7 + 2i) + (-5 + 7i)$$

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

21. Solve the equation

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

**22.** Multiply

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

**23.** Evaluate the expression

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

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

**24.** Solve the quadratic equation

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

and write the solutions in simplified form.

**25.** Solve the quadratic equation

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

and write the solutions in simplified form.