

MTH 06, Test 4, V. 2, 12/07/21

Prof. Luis Fernández

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

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

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

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

4. Write the expression

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

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

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

6. Write the expression

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

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

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. Multiply and simplify

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

Circle the answer.

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

10. Simplify completely

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

Circle the answer.

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

11. 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

12. 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) $-30\sqrt{3}$

13. Subtract and simplify

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

14. Solve the equation

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

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

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

16. Simplify the expression

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

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

17. Evaluate the expression

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

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

18. Solve the equation

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

20. Solve the equation

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

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

Circle the answer.

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

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

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

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

21. Evaluate the expression

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

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

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.