MTH 06, Test 4, V. 4, 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 using rational exponents: $\sqrt[3]{x^{10}}$

2. Write the expression

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

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

3. Write the expression

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

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

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

5. Simplify each of the following:

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

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

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

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

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

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

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

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) $2\sqrt{3}$

(b) $4\sqrt{3}$

(c) $\sqrt{12}$

(d) $3\sqrt{2}$

10. Multiply and simplify

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

Circle the answer.

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

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

(c) 56

(d) 72

11. Simplify.

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

Circle the answer.

(a) $-30\sqrt{9}$

(b) $-8\sqrt{3}$

(c) $-8\sqrt{27}$

(d) $-30\sqrt{3}$

12. Multiply and simplify

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

Circle the answer.

(a) 35

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

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

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

13. Subtract and simplify

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

14. Simplify the expression

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

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

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

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

16. Solve the equation

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

17. Solve the equation

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

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

Circle the answer.

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

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

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

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

19. Solve the equation

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

20. Evaluate the expression

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

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

21. Evaluate the expression

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

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.