MTH 06, Test 4, V. 1, 12/07/21 Prof. Luis Fernández

NAME: SOLUTION

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.

Solution: $-2\sqrt[3]{9}$

2. Simplify each of the following: Solution:

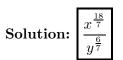
- (a) $\sqrt{32} = 4\sqrt{2}$
- (b) $\sqrt{27} = 3\sqrt{3}$
- (c) $\sqrt{18} = 3\sqrt{2}$
- (d) $\sqrt{50} = 5\sqrt{2}$
- (e) $\sqrt{72} = 6\sqrt{2}$

(f)
$$\sqrt{300} = 10\sqrt{3}$$

- **3.** Evaluate the expression: $125^{-\frac{2}{3}}$
 - Solution: $\frac{1}{25}$

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

Solution:
$$\frac{3a^3}{b^{\frac{1}{6}}}$$

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

Solution:
$$x^{\frac{10}{3}}$$

7. Write the expression

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

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

Solution: $2\sqrt{3}$

8. Find the product

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

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

Solution: $-20\sqrt{15}$

9. Multiply and simplify

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

Circle the answer.

Solution:

- (a) 72 (b) $72 + 32\sqrt{2}$
- (c) $72 32\sqrt{2}$
- ((d)) 56
- **11.** Multiply and simplify

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

Circle the answer. Solution:

- (a) $37 12\sqrt{7}$
- (b) 35

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

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

10. Simplify.

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

Circle the answer. Solution:

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

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

12. Simplify completely

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

Circle the answer. Solution:

(a)
$$3\sqrt{2}$$

(b) $2\sqrt{3}$
(c) $4\sqrt{3}$

(d) $\sqrt{12}$

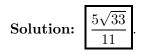
13. Subtract and simplify

 $7\sqrt{8} - 9\sqrt{18}$ Solution: $-13\sqrt{2}$

14. Simplify the expression

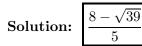


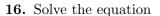
and write it in the form $\frac{A\sqrt{B}}{C}$.



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

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





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

Solution: x = 13

17. Solve the equation

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

Solution: $x = \frac{10}{7}$

18. Solve the equation

 $\sqrt{4x} = x - 3.$ Solution: x = 9

(Note that there is another "solution", x = 1, but it does not work.)

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

Circle the answer.

Solution:

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

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

20. Evaluate the expression

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

and write the result in the form a + bi.

Solution: 2+9i

21. Evaluate the expression

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

and write the result in the form a + bi.

Solution: -8 + 6i

22. Multiply

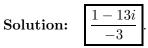
(-11 - 6i)(-8 - 9i)

Solution: 34 + 147 i

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.

Solution:

$$x = -3$$
 and $x = \frac{1}{3}$.

25. Solve the quadratic equation

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

and write the solutions in simplified form.

Solution:
$$x = \frac{5+3\sqrt{5}}{2}$$
 and $x = \frac{5-3\sqrt{5}}{2}$