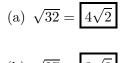
MTH 28, Test 3, V. 1, 25/11/24 Prof. Luis Fernández

NAME: SOLUTION

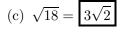
There are 22 questions. Some are multiple choice and some are free response. Each question is worth 5 points over 100 (so 10 points are extra credit). For multiple-choice questions, just circle your answer. For free-response questions, SHOW ALL WORK to receive credit.

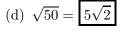
1. Simplify each of the following:

Solution:

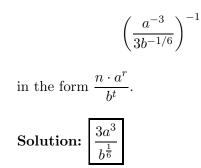


(b) $\sqrt{27} = 3\sqrt{3}$



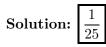


- (e) $\sqrt{72} = 6\sqrt{2}$
- (f) $\sqrt{300} = 10\sqrt{3}$
- **3.** Write the expression



- 4. Write using rational exponents: $\sqrt[3]{x^{10}}$
 - Solution: $x^{\frac{10}{3}}$

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



5. Write the expression

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

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

Solution: $2\sqrt{3}$

6. Find the product

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

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

Solution: $-20\sqrt{15}$

7. 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

8. 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) $-8\sqrt{27}$

9. 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 completely

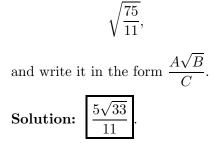
$$\frac{\sqrt{2}\sqrt{30}}{\sqrt{5}}$$

Circle the answer. Solution:

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

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

11. Simplify the expression



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

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

Solution:
$$\frac{8-\sqrt{39}}{5}$$

13. Solve the equation

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

Solution:
$$x = 13$$

14. Solve the equation

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

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

15. Solve the equation

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

Solution: x = 9

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

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

Solution:

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

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

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17. Evaluate the expression

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

and write the result in the form a + bi.

Solution: 2+9i

18. Multiply

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

Solution:

$$34 + 147 i$$
.

19. Evaluate the expression

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

and write the result in the form a + bi.

Solution:
$$\frac{1+13i}{17}$$

20. Solve the quadratic equation

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

and write the solutions in simplified form.

Solution:
$$x = -3$$
 and $x = \frac{1}{3}$

21. 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 $x = \frac{5-3\sqrt{5}}{2}$.

22. Solve the equation

$$2x^2 - 14 = 0$$

Solution:

$$x = \pm \sqrt{7}$$
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