Math 102, Ch. 4 Practice Test

Note: No make-up exams will be allowed.
Instead, the lowest score will be dropped.

1. Simplify

(a) $\left(-\frac{1}{7}\right)^3$

(b) $(-0.5)^3$

2. Simplify completely.

(a) $\sqrt[9]{-1}$

(b) $\sqrt[4]{\frac{1}{81}}$

3. Simplify

(a) $\sqrt{160}$

(b) $\sqrt{72}$

4. Simplify.

(a) $\sqrt{40a^7}$

(b) $\sqrt{\frac{48}{x^2}}$

5. Simplify.

(a) $\sqrt[5]{x^{12}}$

(b) $\sqrt[3]{125x^{20}}$

6. Simplify.

$$\sqrt{\frac{600a^6b^3}{121c^2}}$$

7. Simplify.

(a) $\sqrt{70} \cdot \sqrt{5}$

(b) $\dfrac{\sqrt{72}}{\sqrt{12}}$

8. Simplify

$$\frac{\sqrt{90a^2b^5}}{\sqrt{125b}}$$

9. Simplify.

(a) $8\sqrt{10}+\sqrt{10}$

(b) $\sqrt{40}+\sqrt{90}$

10. Simplify.

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

(b) $\dfrac{1}{7+\sqrt{5}}$

11. Simplify.

(a) $100^{\frac{3}{2}}$

(b) $\left(a^{12}\right)^{\frac{1}{2}}$

12. Simplify. Write your answers with rational exponents.

(a) $a^{\frac{3}{8}} \bullet a^{\frac{1}{4}}$

(b) $\dfrac{a^{\frac{4}{9}}}{a^{\frac{1}{4}}}$

13. Simplify using rational exponents.
Write your answer as a radical.

$\sqrt[8]{9}$

14. Simplify using rational exponents.
Then write the expression as a single radical.

$\sqrt{a} \cdot \sqrt[6]{a}$

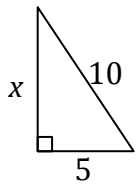
15. Solve.

$\sqrt{8x-1} = 3$

16. Solve.

$\sqrt{x+12} = x$

17. Find the length of the unknown side as a radical in simplest form.



18. Simplify.

(a) $\sqrt{-13}$

(b) $\sqrt{-160}$

19. Simplify. Write your answer in the form $a + bi$.

(a) $(10+4i)-(1+2i)$

(b) $(5+3i)(4-2i)$

20. Simplify. Write your answer in the form $a + bi$.

$$\frac{1}{6+2i}$$

Rules for Exponents	
Product Rule	$a^m \bullet a^n = a^{m+n}$
Quotient Rule	$\frac{a^m}{a^n} = a^{m-n} \quad (a \neq 0)$
Power Rules	$(a^m)^n = a^{mn}$ $(ab)^m = a^m b^m$ $\left(\frac{a}{b}\right)^m = \frac{a^m}{b^m} \quad (b \neq 0)$
Zero Exponent	$a^0 = 1 \quad (a \neq 0)$
Negative Exponent	$a^{-n} = \frac{1}{a^n} \quad (a \neq 0)$
Rational Exponent	($a \geq 0$ when n is even)

Rules for Radicals	
Definition	$\sqrt[n]{a^n} = a$ (for $a \geq 0$ if n is even)
Product Rule	$\sqrt[n]{a} \bullet \sqrt[n]{b} = \sqrt[n]{ab}$
Quotient Rules	$\frac{\sqrt[n]{a}}{\sqrt[n]{b}} = \sqrt[n]{\frac{a}{b}}$
Distributive Property	$a\sqrt{x} + b\sqrt{x} = (a+b)\sqrt{x}$
Definition	$a^{\frac{m}{n}} = \sqrt[n]{a^m}$ (for $a \geq 0$ if n is even)

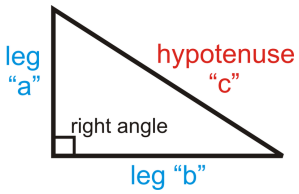
Power Property of Equality

For any real numbers, a, b, and n, such that a^n is a real number,

$$\text{if } a = b, \text{ then } a^n = b^n$$

Complex numbers = $\{a + bi \mid a \in \mathbb{R}, b \in \mathbb{R}, \text{ and } i = \sqrt{-1}\}$. Note that $i^2 = -1$.

Pythagorean Theorem



$$a^2 + b^2 = c^2$$