Test: Unit7
Radicals

Practice

There are <u>20 questions</u> in this quiz, each of equal value.
Standard time for the quiz is <u>40 minutes</u> .

Four operations calculator is allowed.

'Calculator' replacement:

$2^0 = 1$; $2^1 = 2$; $2^2 = 4$; $2^3 = 8$; $2^4 = 16$; $2^5 = 32$; $2^6 = 64$;
$\qquad\qquad 2^7 = 128$; $2^8 = 256$; $2^9 = 512$; $2^{10} = 1024$

$3^0 = 1$; $3^1 = 3$; $3^2 = 9$; $3^3 = 27$; $3^4 = 81$; $3^5 = 243$

$4^0 = 1$; $4^1 = 4$; $4^2 = 16$; $4^3 = 64$; $4^4 = 256$; $4^5 = 1024$

$5^0 = 1$; $5^1 = 5$; $5^2 = 25$; $5^3 = 125$; $5^4 = 625$

$6^0 = 1$; $6^1 = 6$; $6^2 = 36$; $6^3 = 216$

$7^0 = 1$; $7^1 = 7$; $7^2 = 49$; $7^3 = 343$

$8^0 = 1$; $8^1 = 8$; $8^2 = 64$; $8^3 = 512$

$9^0 = 1$; $9^1 = 9$; $9^2 = 81$; $9^3 = 729$

Simplify:

1. $$\sqrt{128r^2x^3n^8}$$ $64 \swarrow \searrow 2$ $\boxed{8|r| \, x \, n^4 \sqrt{2x}}$	**2.** $$\sqrt[4]{128x^7y^8w^4}$$ $128 = 2^7$ $\sqrt[4]{2^7} = 2^1\sqrt[4]{2^3}$ $\boxed{2x y^2 |w| \sqrt[4]{8x^3}}$
3. $$\sqrt{12y} \cdot 2\sqrt{24y}$$ $\boxed{24 \cdot y \cdot \sqrt{2}}$	**4.** $$(-7 + \sqrt{3x}) \cdot (4 + \sqrt{3x})$$ $\boxed{-28 - 3\sqrt{3x} + 3x}$
5. $$(\sqrt{3} + \sqrt{5x})(\sqrt{3} - 5\sqrt{5x})$$ $3 - \sqrt{3} \cdot 5\sqrt{5x} + \sqrt{5x} \cdot \sqrt{3} - 5 \cdot 5x$ $= 3 - 5\sqrt{15x} + \sqrt{15x} - 25x =$ $= \boxed{3 - 4\sqrt{15x} - 25x}$	**6.** $$(7 + \sqrt{6})(1 + \sqrt{6})$$ $7 + 8\sqrt{6} + 6 = \boxed{13 + 8\sqrt{6}}$
7. $$-\sqrt[3]{320} - 4\sqrt[3]{5} + 2\sqrt[3]{135} + 2\sqrt[3]{16}$$ $4^3 = 64 \nearrow 5 \quad 3^3 = 27 \nearrow 5$ $-\sqrt[3]{4^3 \cdot 5} - 4\sqrt[3]{5} + 2\sqrt[3]{3^3 \cdot 5} + 2\sqrt[3]{2^3 \cdot 2}$ $= \sqrt[3]{5} \cdot (-4 - 4 + 6) + 4\sqrt[3]{2} = \boxed{-2\sqrt[3]{5} + 4\sqrt[3]{2}}$	**8.** $$-2\sqrt{45} - 3\sqrt{20} - 2\sqrt{6}$$ $9 \nearrow 5 \quad 4 \nearrow 5$ $= -2\sqrt{3^2 \cdot 5} - 3\sqrt{2^2 \cdot 5} - 2\sqrt{6}$ $= -6\sqrt{5} - 6\sqrt{5} - 2\sqrt{6} = \boxed{-12\sqrt{5} - 2\sqrt{6}}$
9. $$\sqrt[6]{(-2)^6}$$ $\boxed{2}$	**10.** $$\sqrt[5]{(-7)^5}$$ $\boxed{-7}$

Simplify:

11. $\sqrt[8]{64}$	12. $\dfrac{\sqrt{15}}{\sqrt{12}}$
$\boxed{\sqrt[8]{64}}$	$\sqrt{\dfrac{15}{12}} = \sqrt{\dfrac{5}{4}} = \boxed{\dfrac{\sqrt{5}}{2}}$

13. Rationalize denominator $\dfrac{\sqrt{3}}{-1-\sqrt{5}}$	14. Rationalize denominator $\dfrac{2-\sqrt{3}}{-2-\sqrt{5}}$
$\dfrac{\sqrt{3}}{(-1-\sqrt{5})} \cdot \dfrac{(-1+\sqrt{5})}{(-1+\sqrt{5})} = \dfrac{-\sqrt{3}+\sqrt{15}}{1-5} =$ $= \boxed{\dfrac{\sqrt{3}-\sqrt{15}}{4}}$	$\dfrac{(2-\sqrt{3})}{(-2-\sqrt{5})} \cdot \dfrac{(-2+\sqrt{5})}{(-2+\sqrt{5})} = \dfrac{-4+2\sqrt{3}+2\sqrt{5}-\sqrt{15}}{4-5}$ $= \boxed{4-2\sqrt{3}-2\sqrt{5}+\sqrt{15}}$

15. $(9r^4)^{-0.5}$	16. $36^{\frac{3}{2}}$
$= \dfrac{1}{(9r^4)^{0.5}} = \boxed{\dfrac{1}{3r^2}}$	$\left(36^{\frac{1}{2}}\right)^3 = (6)^3 = \boxed{216}$

17. $(64n^{12})^{-\frac{1}{6}}$	18. $\sqrt[7]{y^5 \cdot 128 \cdot x^{14} \cdot \sqrt[4]{y^8}}$
$= \dfrac{1}{64^{\frac{1}{6}}(n^{12}y^{\frac{1}{6}})} = \boxed{\dfrac{1}{2 \cdot n^2}}$	$2^3 \qquad y^2$ $= 2 \cdot x^2 \sqrt[7]{y^5 \cdot y^2} = \boxed{2x^2y}$

19. Solve: $\sqrt{8k} = k$
(Show your work!)

$(\ )^2 \Rightarrow \quad 8k = k^2$

$k^2 - 8k = 0 \qquad \rightarrow k(k-8) = 0 \begin{bmatrix} \rightarrow k = 0 \\ \text{or} \\ \rightarrow k = 8 \end{bmatrix}$

Check:

$\overset{8}{\cancel{8}} \ \sqrt{8 \cdot 8} \overset{?}{=} 8$

$8 = 8 \ \checkmark$

$\overset{0}{} \sqrt{8 \cdot 0} \overset{?}{=} 0$

$\checkmark$

$\boxed{k = 0 \ \text{or} \ k = 8}$

20. Solve: $\sqrt[3]{16k} = k$
(Show your work!)

$(\ )^3 \Rightarrow \quad 16k = k^3$

$k^3 - 16k = 0 \qquad \rightarrow k(k^2 - 16) = 0$

$k(k+4)(k-4) = 0$

Check:
$\underline{k=0} \qquad \underline{k=4} \qquad \underline{k=-4}$

$0 \overset{?}{=} 0 \ \checkmark \quad \sqrt[3]{64} \overset{?}{=} 4 \quad \sqrt[3]{-64} \overset{?}{=} -4$

$\checkmark \qquad \checkmark$

$\boxed{\begin{array}{c} k = 0 \ \text{or} \ k = 4 \\ \text{or} \ k = -4 \end{array}}$

21. Solve: $\sqrt{3x - 6} + 10 = 4$
(Show your work!)

$\sqrt{3x-6} = -6 \qquad \rightarrow 3x = \cancel{42}$

$(\ )^2 \quad 3x - 6 = 36 \qquad x = \cancel{16} \quad x = 14$

Check: $x = \cancel{16}$

break $\quad \sqrt{3 \cdot \cancel{16} - 6} \ \cancel{+10} \overset{?}{=} 4$

$\sqrt{42 - 6} + 10 \overset{?}{=} 4 \qquad \rightarrow \quad 6 + 10 \overset{?}{=} 4$

$X.$

$\boxed{NO \ solution}$

Simplify:

22. $(\sqrt{-4})(\sqrt{-3})$	23. $\sqrt[3]{-16}$
$2i \cdot i\sqrt{3} = \boxed{-2\sqrt{3}}$	$\sqrt[3]{-8 \cdot 2} = \boxed{-2\sqrt[3]{2}}$

24. $(x + 2i)(5 - i \cdot x)$	25. $5(3 + 2i) - 4i$
$5x - ix^2 + 10i - 2i^2x$ $\qquad + 2x$ $= \boxed{7x + i(10 - x^2)}$	$15 + 10i - 4i$ $= \boxed{15 + 6i}$

26. $\underset{3i}{\sqrt{-3}} \cdot (i \cdot 4 - \underset{3i}{\sqrt{-3}})$	27. $\dfrac{-3 + 10i}{-6i}$
$12 \cdot i^2 - 9i^2 =$ $-12 + 9 =$	

28. $\dfrac{i}{-2 - 8i}$	29. Solve using the quadratic equation: $-2x^2 + 3x + 9 = 0$

=== End of test