Algebra 2H: Powers, Roots, and Complex Numbers
Practice test

1. There are 40 multiple choice questions in this test. Each question is worth 1-point.
2. Extra-credit: There is one extra-credit question, worth 1pt as well. It is a harder question.
3. You have 50 minutes (one block) to complete the test (more if you have accommodations).
    a. If you are taking the test in two sittings (b/c of accommodations and time constraints), the test is divided into two equal parts.
    b. Solutions will be released on Wednesday noon. You will therefore need to finish the test (both parts) BEFORE Wednesday noon (Jan-25). You are welcome to get a head start early Tuesday (before school, lunch, etc), or anytime following that (lunch, after school, open blocks).
4. NOTE: On some of the questions, it is explicitly noted "Show your work". You have to show how you got to the answer on these items in order to get full credit.

Calculators are NOT allowed in this test.

Good luck!!
-Zachi

'Calculator' replacement:

$2^0 = 1\,;\ 2^1 = 2\,;\ 2^2 = 4\ \ ;\ 2^3 = 8\ \ ;\ 2^4 = 16\ \ ;\ 2^5 = 32\,;\ 2^6 = 64;$
$2^7 = 128;\ 2^8 = 256;\ 2^9 = 512;\ 2^{10} = 1024$
$3^0 = 1\,;\ 3^1 = 3\,;\ 3^2 = 9\ \ ;\ 3^3 = 27\ ;\ 3^4 = 81\ \ ;3^5 = 243$
$4^0 = 1\,;\ 4^1 = 4\,;\ 4^2 = 16\,;\ 4^3 = 64\ ;\ 4^4 = 256\,;4^5 = 1024$
$5^0 = 1\,;\ 5^1 = 5\,;\ 5^2 = 25\,;\ 5^3 = 125\,;5^4 = 625$
$6^0 = 1\,;\ 6^1 = 6\,;\ 6^2 = 36\,;\ 6^3 = 216$
$7^0 = 1\,;\ 7^1 = 7\,;\ 7^2 = 49\,;\ 7^3 = \ 343$
$8^0 = 1\,;\ 8^1 = 8\,;\ 8^2 = 64\,;\ 8^3 = 512$
$9^0 = 1\,;\ 9^1 = 9\,;\ 9^2 = 81\,;9^3 = 729$

=== Start of test

NOTE: In the practice test I did NOT include plausible multiple choice answers. You need to solve it, and can compare to the solution key.

1. Simplify: $\sqrt{128r^2x^3n^8}$

(A) $Answer1$ (B) $Answer2$ (C) $Answer3$ (D) $Answer4$

(E) Other

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2. Simplify: $\sqrt[4]{128x^7y^8w^4}$

(A) $Answer1$ (B) $Answer2$ (C) $Answer3$ (D) $Answer4$

(E) Other

==========

3. Simplify: $\sqrt{12y} \cdot 2\sqrt{24y}$

(A) $Answer1$ (B) $Answer2$ (C) $Answer3$ (D) $Answer4$ (E) Other

==========

4. Simplify: $\left(-7+\sqrt{3x}\right)\cdot\left(4+\sqrt{3x}\right)$

(A) $Answer1$ (B) $Answer2$ (C) $Answer3$ (D) $Answer4$ (E) Other

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5. Simplify: $\left(\sqrt{3}+\sqrt{5x}\right)\left(\sqrt{3}-5\sqrt{5x}\right)$

(A) $Answer1$ (B) $Answer2$ (C) $Answer3$ (D) $Answer4$ (E) Other
==========

6. Simplify: $\left(7+\sqrt{6}\right)\left(1+\sqrt{6}\right)$

(A) $Answer1$ (B) $Answer2$ (C) $Answer3$ (D) $Answer4$ (E) Other
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7. Simplify: $-\sqrt[3]{320}-4\sqrt[3]{5}+2\sqrt[3]{135}+2\sqrt[3]{16}$

(A) $Answer1$ (B) $Answer2$ (C) $Answer3$ (D) $Answer4$ (E) Other
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8. Simplify: $-2\sqrt{45}-3\sqrt{20}-2\sqrt{6}$

(A) $Answer1$ (B) $Answer2$ (C) $Answer3$ (D) $Answer4$ (E) Other
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9. Simplify: $\sqrt[6]{(-2)^6}$

(A) $Answer1$ (B) $Answer2$ (C) $Answer3$ (D) $Answer4$ (E) Other
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10. Simplify: $\sqrt[5]{(-7)^5}$

(A) $Answer1$ (B) $Answer2$ (C) $Answer3$ (D) $Answer4$ (E) Other
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11. Simplify: $\sqrt[8]{64}$

(A) $Answer1$ (B) $Answer2$ (C) $Answer3$ (D) $Answer4$ (E) Other
==========

12. Simplify: $\frac{\sqrt{15}}{\sqrt{12}}$

(A) $Answer1$ (B) $Answer2$ (C) $Answer3$ (D) $Answer4$ (E) Other
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13. Rationalize the denominator: $\sqrt{\frac{3}{x+2}}$

(A) $Answer1$ (B) $Answer2$ (C) $Answer3$ (D) $Answer4$ (E) Other
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14. Rationalize the denominator: $\frac{2-\sqrt{3}}{-2-\sqrt{5}}$

(A) $Answer1$ (B) $Answer2$ (C) $Answer3$ (D) $Answer4$ (E) Other
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15. Rationalize the denominator: $\frac{\sqrt{3}}{-1-\sqrt{5}}$

(A) $Answer1$ (B) $Answer2$ (C) $Answer3$ (D) $Answer4$ (E) Other
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16. Find the equal to: $36^{\frac{3}{2}}$

(A) $Answer1$ (B) $Answer2$ (C) $Answer3$ (D) $Answer4$ (E) Other
==========

17. Find the equal to: $(64n^{12})^{-\frac{1}{6}}$

(A) $Answer1$ (B) $Answer2$ (C) $Answer3$ (D) $Answer4$ (E) Other
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18. Find the equal to: $(9r^4)^{-0.5}$

(A) $Answer1$ (B) $Answer2$ (C) $Answer3$ (D) $Answer4$ (E) Other
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19. Find the equal to: $\sqrt[7]{y^5 \cdot 128 \cdot x^{14} \cdot \sqrt[4]{y^8}}$

(A) $Answer1$ (B) $Answer2$ (C) $Answer3$ (D) $Answer4$ (E) Other
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20. Solve: $\sqrt{8k} = k$
(Show your work!)

(A) $Answer1$ (B) $Answer2$ (C) $Answer3$ (D) $Answer4$ (E) Other
==========

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

(A) $Answer1$ (B) $Answer2$ (C) $Answer3$ (D) $Answer4$ (E) Other
==========

22. Solve: $\sqrt{x-7} = \sqrt{x} - 1$
(Show your work!)

(A) $Answer1$ (B) $Answer2$ (C) $Answer3$ (D) $Answer4$ (E) Other
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23. Simplify: $\left(\sqrt{-4}\right)\left(\sqrt{-3}\right)$

(A) $Answer1$ (B) $Answer2$ (C) $Answer3$ (D) $Answer4$ (E) Other
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24. Simplify: $\sqrt[3]{-16}$

(A) $Answer1$ (B) $Answer2$ (C) $Answer3$ (D) $Answer4$ (E) Other
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25. Simplify: $(x + 2i)(5 - i \cdot x)$

(A) $Answer1$ (B) $Answer2$ (C) $Answer3$ (D) $Answer4$ (E) Other
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26. Simplify: $\left(5 + \sqrt{3}i\right)\left(5 - \sqrt{3}i\right)$

(A) $Answer1$ (B) $Answer2$ (C) $Answer3$ (D) $Answer4$ (E) Other
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27. Simplify: $5(3 + 2i) - 4i$

(A) $Answer1$ (B) $Answer2$ (C) $Answer3$ (D) $Answer4$ (E) Other
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28. Simplify: $\sqrt{-3} \cdot \left(i \cdot 4 \ - \ \sqrt{-3}\right)$

(A) $Answer1$ (B) $Answer2$ (C) $Answer3$ (D) $Answer4$ (E) Other
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29. Rationalize denominator: $\frac{-3+10i}{-6i}$

(A) $Answer1$ (B) $Answer2$ (C) $Answer3$ (D) $Answer4$ (E) Other
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30. Rationalize denominator: $\frac{i}{-2-8i}$

(A) $Answer1$ (B) $Answer2$ (C) $Answer3$ (D) $Answer4$ (E) Other
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==== Review questions!!

10-question. Short, simple, just to verify you know the material.
Specifically, this time there will be questions on:
Simplify rational expressions (common denominator): $\frac{1}{x+2} - \frac{2}{2x+3}$
Factor binomial (MATH method or any other)
Solve rational expression: $\frac{6}{x-2} - \frac{4}{x} = \frac{8}{x}$
Sum notation: $\sum_{n=0}^{10}(2n+1) = ?$
Relation, function, 1-1 function
Solve by factoring: $x^2 + 10x = -21$
Function composition : $f\big(g(x)\big)$
Lines, perpendicular lines, slope
System of equations: Solve two equations with two unknowns

Extra-credit
Surprise: Definitely doable. Combines number value-placement and radicals.

=== End of test