Name _Alice Zhao_

Date _____

1. $(\sqrt{81})^2 = \boxed{81}$

2. Write $5\sqrt{2}$ as a complete radical.

$\boxed{\sqrt{50}}$

3. Which whole number is closest to $\sqrt[3]{75}$?

     (a) 4   b) 5   c) 7   d) 8   e) 9

4. $\sqrt{6^2 \times 2^2 \times 7^2} = 6 \times 2 \times 7 = \boxed{84}$

5. If $\sqrt[A]{X^B} = 11^{4/5}$ then what is the value of X? $X^{\frac{B}{A}} = 11^{\frac{4}{5}}$

     a) $\frac{4}{5}$ b) $\frac{5}{4}$ c) 4   d) 5   (e) 11

6. Write $7^{5/9}$ in radical form. $\boxed{\sqrt[9]{7^5}}$

7. Simplify: $(7 + \sqrt{5})(7 - \sqrt{5}) = 7^2 - \sqrt{5}^2 = 49 - 5 = \boxed{44}$

8. Simplify: $(3\sqrt{5} + \sqrt{3})^2$ $(3\sqrt{5})^2 + 2 \cdot 3\sqrt{5} \cdot \sqrt{3} + (\sqrt{3})^2 = 45 + 6\sqrt{15} + 3 = \boxed{48 + 6\sqrt{15}}$

9. Simplify: $\dfrac{2 + 4\sqrt{7}}{2} = \dfrac{2(1 + 2\sqrt{7})}{2} = \boxed{1 + 2\sqrt{7}}$

10. Rationalize the denominator: $\dfrac{\sqrt{5} - \sqrt{7}}{\sqrt{7} + \sqrt{5}} \times \dfrac{\sqrt{7} - \sqrt{5}}{\sqrt{7} - \sqrt{5}} = \dfrac{(\sqrt{5} - \sqrt{7})(\sqrt{7} - \sqrt{5})}{7 - 5} = \dfrac{\sqrt{35} - 5 - 7 + \sqrt{35}}{2} = \dfrac{2\sqrt{35} - 12}{2} = \dfrac{2(\sqrt{35} - 6)}{2}$

$= \boxed{\sqrt{35} - 6}$

11. When the denominator of $\dfrac{4 + \sqrt{7}}{8 + \sqrt{7}}$ is rationalized and reduced, the expression can be written in the form

$\dfrac{A + B\sqrt{C}}{D}$. What is the value of D? $\dfrac{(4 + \sqrt{7})(8 - \sqrt{7})}{8^2 - 7} = \dfrac{32 - 4\sqrt{7} + 8\sqrt{7} - 7}{64 - 7} = \dfrac{25 + 4\sqrt{7}}{57}$ $\boxed{D = 57}$

12. The diameter of a wire when a heavy object is suspended satisfies the following relationship:

$$d = 2\sqrt{\dfrac{w\ell}{\pi E S}}$$

where S is the amount of stretch, w is the weight of the object, ℓ is the original length of the wire, and E is the coefficient that is specific to the type of metal.

Solve the equation for S. $d^2 = \dfrac{4w\ell}{\pi E S}$ $\pi E S = \dfrac{4w\ell}{d^2}$ $\boxed{S = \dfrac{4w\ell}{d^2 \pi E}}$

13. Find the value of C: $\dfrac{8^8 \times 15^3}{6^4 \times 30^8} = \dfrac{2^A}{3^B \times 5^C}$

$\dfrac{2^{24} \times 3^3 \times 5^3}{2^4 \times 3^4 \times 3^8 \times 2^8 \times 5^8} = \dfrac{2^{12}}{3^9 \, 5^5}$ $\boxed{C = 5}$

14. Simplify: $\sqrt{3\sqrt{3\sqrt{3}}} = \left(3\left(3^{\frac{1}{2}} \times 3^{\frac{1}{2}}\right)^{\frac{1}{2}}\right)^{\frac{1}{2}} = \left(3\left(3^{\frac{3}{2}}\right)^{\frac{1}{2}}\right)^{\frac{1}{2}} = \left(3^{\frac{4}{4}} \cdot 3^{\frac{3}{4}}\right)^{\frac{1}{2}} = \left(3^{\frac{7}{4}}\right)^{\frac{1}{2}} = 3^{\frac{7}{8}}$

$= \sqrt[8]{3^7}$

15. $3^7 - 3^6 = N \cdot 3^6$. Find N. $3^6(3-1) = N \cdot 3^6$ $N = 3-1 = \boxed{2}$

16. Simplify: $\left(\dfrac{\sqrt{36} + \sqrt{64}}{\sqrt{36 + 64}}\right)^2$ $\left(\dfrac{6+8}{10}\right)^2 = \left(\dfrac{14}{10}\right)^2 = \dfrac{196}{100} = \boxed{1.96}$

Express as a decimal.

17. What is the positive value of x, correct to the nearest hundredth, such that $x^8 = 35.72$?

$x = \sqrt[8]{35.72} =$

18. Which of the following is the greatest?

   (a) $\left(\dfrac{1}{8}\right)^{-3} = \dfrac{1}{\left(\frac{1}{8}\right)^3} = \dfrac{1}{\frac{1}{8^3}} = 8^3 = 512$

   b) $((-2)^2)^3 = (4)^3 = 64$

   c) $\left(-\dfrac{1}{2}\right)^{-2}(-2)^{-3}$ $\dfrac{1}{\left(-\frac{1}{2}\right)^2} = \dfrac{1}{\frac{1}{4}} = 4$

   $\dfrac{1}{(-2)^3} = \dfrac{1}{-8}$ $\Big\}\, 4 - \dfrac{1}{8} = 3\dfrac{7}{8}$

19. What is the result when $\dfrac{\sqrt[7]{x^3}}{\sqrt[4]{x^3}}$ is simplified?

$x^{\frac{3}{7}} \div x^{\frac{3}{4}} = x^{\frac{3}{7} - \frac{3}{4}} = x^{\frac{12}{28} - \frac{21}{28}} = x^{-\frac{9}{28}} = \dfrac{1}{\sqrt[28]{x^9}}$

20. If p and q are positive numbers, which of the following is *not* always true?
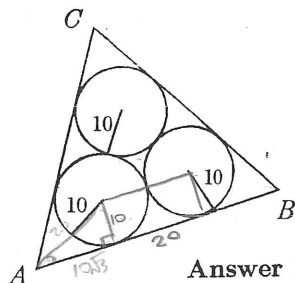
   a) $\dfrac{1}{\sqrt{p}} = \dfrac{q}{\sqrt{pq^2}}$ b) $\sqrt{(p+q)^2} = p + q$ c) $\left(\sqrt{p}\right)^q = \sqrt{p^q}$

   (d) $\sqrt{p+q} = \sqrt{p} + \sqrt{q}$ e) $\sqrt{p}\,\sqrt{q} = \sqrt{pq}$

21. Three metal disks with radii of 10 cm are tangent to each other. The disks are enclosed by an equilateral triangle metal frame. What is the length of one side of the frame?

$\boxed{(20\sqrt{3} + 20)\,\text{cm}}$

Answer List

1. 81	2. $\sqrt{50}$	3. a
4. 84	5. e	6. $\sqrt[9]{7^5}$
7. 44	8. $48 + 6\sqrt{15}$	9. $1 + 2\sqrt{7}$
10. $-6 + \sqrt{35}$	11. 57	12. $S = \dfrac{4w\ell}{\pi d^2 E}$
13. 5	14. $\sqrt[8]{3^7}$	15. 2
16. 1.96	17. 1.56	18. a
19. $\dfrac{1}{\sqrt[28]{x^9}}$	20. d	21. $(20 + 20\sqrt{3})\,\text{cm}$

Name __Oliver__

Date __Nov 24__

1. $\left(\sqrt{81}\right)^2 = $ __81__

2. Write $5\sqrt{2}$ as a complete radical.

    $= \sqrt{50}$

    $\sqrt[3]{64} \rightarrow \sqrt[3]{75} \rightarrow \sqrt[3]{125}$

3. Which whole number is closest to $\sqrt[3]{75}$?

    (a) 4   b) 5   c) 7   d) 8   e) 9

4. $\sqrt{6^2 \times 2^2 \times 7^2} = $ $6 \times 2 \times 7 = 84$

5. If $\sqrt[A]{X^B} = 11^{4/5}$ then what is the value of X?

    a) $\frac{4}{5}$ b) $\frac{5}{4}$ c) 4   d) 5   (e) 11

6. Write $7^{5/9}$ in radical form. $\left(\sqrt[9]{7}\right)^5$

7. Simplify: $(7+\sqrt{5})(7-\sqrt{5})$

    $= 49 - 5 = 44$

8. Simplify: $(3\sqrt{5}+\sqrt{3})^2 = 45 + 6\sqrt{15} + 9 = 54 + 6\sqrt{15}$

9. Simplify: $\dfrac{2+4\sqrt{7}}{2}$ $1 + 2\sqrt{7}$

10. Rationalize the denominator: $\dfrac{(\sqrt{5}-\sqrt{7})}{(\sqrt{7}+\sqrt{5})} \cdot \dfrac{(\sqrt{7}-\sqrt{5})}{(\sqrt{7}-\sqrt{5})} = \dfrac{\sqrt{35}-5-7+\sqrt{35}}{7-5} = \dfrac{2\sqrt{35}-12}{2} = \sqrt{35}-6$

11. When the denominator of $\dfrac{4+\sqrt{7}}{8+\sqrt{7}} \dfrac{(8-\sqrt{7})}{(8-\sqrt{7})}$ is rationalized and reduced, the expression can be written in the form

    $\dfrac{A+B\sqrt{C}}{D}$. What is the value of D? $= 64 - 7 = \boxed{57}$

12. The diameter of a wire when a heavy object is suspended satisfies the following relationship:

    $\left(d = 2\sqrt{\dfrac{w\ell}{\pi ES}} \right)^2$ $d^2 = 4\dfrac{w\ell}{\pi ES}$ $\pi ES \, d^2 = 4w\ell$ $S = \dfrac{4w\ell}{\pi E d^2}$

    where S is the amount of stretch, w is the weight of the object, ℓ is the original length of the wire, and E is the coefficient that is specific to the type of metal.

    Solve the equation for S.

13. Find the value of C: $\dfrac{8^8 \times 15^3}{6^4 \times 30^8} = \dfrac{2^A}{3^B \times 5^C}$ $\dfrac{(2^{24} \times 3^3 \times 5^3)}{2^{12} \cdot 3^{10} \times 5^8} = \dfrac{2^A}{3^B \times 5^C}$

    $\dfrac{2^{12}}{3^7 \cdot 5^5}$ $C = 5$

14. Simplify: $\sqrt{3\sqrt{3\sqrt{3}}}$ $= \sqrt{3\sqrt{3\cdot 3^{\frac{1}{2}}}} = \sqrt{3\cdot 3^{\frac{3}{4}}} = 3^{\frac{7}{8}}$

15. $3^7 - 3^6 = N \cdot 3^6$. Find N.

$3^6(3-1) = N\cdot 3^6 \quad N = 2$

16. Simplify: $\left(\dfrac{\sqrt{36}+\sqrt{64}}{\sqrt{36+64}}\right)^2$ $= \left(\dfrac{6+8}{\sqrt{10}}\right)^2 = \dfrac{196}{100} = 1.96$

Express as a decimal.

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18. Which of the following is the greatest?

   (a) $\left(\dfrac{1}{8}\right)^{-3}$ $= \dfrac{1}{\left(\frac{1}{8}\right)^3} = \dfrac{1}{\frac{1}{512}} = 512$

   b) $\left((-2)^2\right)^3$ $= (4)^3 = 64$

   c) $\left(-\dfrac{1}{2}\right)^{-2}(-2)^{-3}$ $= \dfrac{1}{(-2)^3} = \dfrac{1}{-8}$

19. What is the result when $\dfrac{\sqrt[7]{x^3}}{\sqrt[4]{x^3}}$ is simplified?

$\dfrac{x^{\frac{3}{7}}}{x^{\frac{3}{4}}} \qquad \dfrac{3}{7}-\dfrac{3}{4} = \dfrac{12}{28}-\dfrac{21}{28} = \dfrac{9}{28}$

$= x^{-\frac{9}{28}} = \dfrac{1}{x^{\frac{9}{28}}}$

20. If p and q are positive numbers, which of the following is *not* always true?

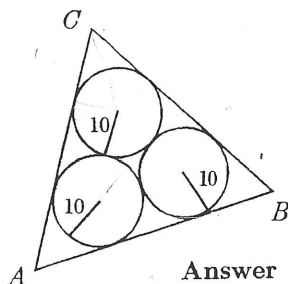   a) $\dfrac{1}{\sqrt{p}} = \dfrac{q}{\sqrt{pq^2}}$

   b) $\sqrt{(p+q)^2} = p+q$

   c) $\left(\sqrt{p}\right)^q = \sqrt{p^q}$

   (d) $\sqrt{p+q} = \sqrt{p}+\sqrt{q}$

   e) $\sqrt{p}\,\sqrt{q} = \sqrt{pq}$

21. Three metal disks with radii of $10\,\text{cm}$ are tangent to each other. The disks are enclosed by an equilateral triangle metal frame. What is the length of one side of the frame?

$= 20 + 20\sqrt{3}$

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