UNIT 5 – WORKSHEET 1

ALG 2 HONORS

Name Key

Per ___ Date ___

A. SIMPLIFY EACH COMPLETELY – SHOW WORK

① $-5^{-4} = -\frac{1}{5^4} = \left(\frac{-1}{625}\right)$

② $\left(\frac{4}{9}\right)^{-2}\left(\frac{9}{4}\right)^2 = \left(\frac{81}{16}\right)$

③ $\left(16^{-5}\right)^{1/20} = 16^{-\frac{1}{4}} = \frac{1}{16^{\frac{1}{4}}} = \left(\frac{1}{2}\right)$

④ $4^{3/2} = \sqrt{4}^3 = (8)$

⑤ $\left(16^{-2/3}\right)^3 = 16^{-2} = \left(\frac{1}{256}\right)$

⑥ $\left(-\frac{1}{2}\right)^{-4}\left(-\frac{2}{1}\right)^4 = (16)$

⑦ $-9^{5/2} = -3^5 = (-243)$

⑧ $\left(27^{1/3}\right)^{-2} = 27^{-\frac{2}{3}} = \frac{1}{27^{\frac{2}{3}}} = \left(\frac{1}{9}\right)$

⑨ $\frac{-36A^3x^3}{6A^5x^{-1}} = -6A^{-2}x^4 = \left(\frac{-6x^4}{A^2}\right)$

⑩ $\frac{\left(A^2B^3\right)^4}{\left(AB^2\right)^{-3}} = \frac{A^8B^{12}}{A^{-3}B^{-6}} = (A^{11}B^{18})$

⑪ $\frac{C^{3A}D^{B}}{\left(C^AD\right)^3} = \frac{C^{3A}D^{B}}{C^{3A}D^3} = (D^{B-3})$

⑫ $\left(\frac{R^{-1}}{P}\right)^3\left(\frac{3R}{2P^{-2}}\right)^2 = \frac{R^{-3}}{P^3}\cdot\frac{9R^2}{4P^{-4}} = \frac{9R^{-1}}{4P^{-1}} = \left(\frac{9P}{4R}\right)$

⑬ $\frac{4A^0B^{-2}}{2^{-1}B^{-4}}\cdot(2AB)^{-2}\,8B^2\cdot\frac{1}{4A^2B^2} = \left(\frac{2}{A^4}\right)$

⑭ $\left(\frac{A^4}{B^3}\right)^N\left(\frac{B}{A^2}\right)^N\frac{A^{4N}}{B^{3N}}\cdot\frac{B^N}{A^{2N}} = \left(\frac{A^{2N}}{B^{2N}}\right)$

B. SOLVE FOR x – SHOW WORK

⑮ $\frac{m^{x-1}}{m^5} = m^7$ $\quad m^{x-1} = m^{12}$ $\quad x-1=12$ $\quad (x=13)$

⑯ $\frac{A^{2x}}{A^{x-4}} = A^2\cdot A^5$ $\quad A^{2x-(x-4)} = A^7$ $\quad 2x-x+4=7$ $\quad x+4=7$ $\quad (x=3)$

⑰ $\frac{3x^{-3}}{12x^{-4}} = 8$ $\quad \frac{1x}{4} = 8$ $\quad (x=32)$

⑱ $27^{2x} = 3^{x+10}$ $\quad \left(3^3\right)^{2x} = 3^{x+10}$ $\quad 6x = x+10$ $\quad 5x=10$ $\quad (x=2)$

⑲ $9^{3x} = 27^{x-2}$ $\quad \left(3^2\right)^{3x} = \left(3^3\right)^{x-2}$ $\quad 6x = 3x-6$ $\quad (x=-2)$

⑳ $4^{1-x} = 8$ $\quad \left(2^2\right)^{1-x} = 2^3$ $\quad 2-2x=3$ $\quad -2x=1$ $\quad \left(x=\frac{-1}{2}\right)$

㉑ $\left(\frac{1}{3}\right)^{2x} = 9^{x-4}$ $\quad \left(3^{-1}\right)^{2x} = \left(3^2\right)^{x-4}$ $\quad -2x = 2x-8$ $\quad 1/x = -8$ $\quad (x=2)$

㉒ $125^{2x-1} = \left(\frac{1}{25}\right)^{x-3}$ $\quad \left(5^3\right)^{2x-1} = \left(5^{-2}\right)^{x-3}$ $\quad 6x-3 = -2x+6$ $\quad 8x=9$ $\quad \left(x=\frac{9}{8}\right)$

UNIT 5 WORKSHEET 2

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SIMPLIFY EACH COMPLETELY - SHOW NECESSARY WORK

① $\sqrt{\frac{144}{49}}$ $\frac{12}{7}$

② $\sqrt{50}$ $5\sqrt{2}$

③ $\sqrt[3]{.027}$ .3

④ $3\sqrt{98}$ $21\sqrt{2}$

⑤ $\sqrt{24A^5}$ $2a^2\sqrt{6a}$

⑥ $\sqrt[3]{24A^5}$ $2a\sqrt[3]{3a^2}$

⑦ $\sqrt[4]{32x^5y^{10}}$ $2x^2y^2\sqrt[4]{2y^2}$

⑧ $\sqrt[3]{64m^6n^{14}}$ $2mn^2\sqrt[3]{2mn^4}$

$= 4m^2n^4\sqrt[3]{n^2}$

⑨ $\frac{1}{3}\sqrt[3]{54A^3}$ $A\sqrt[3]{2}$

⑩ $\sqrt{40A^6B^{12}}$ $2|A^3|B^6\sqrt{10}$

⑪ $\sqrt[4]{81x^{13}}$ $3|x^3|\sqrt[4]{x}$

⑫ $\sqrt[5]{64y^{10}}$ $2y^2\sqrt[5]{2}$

⑬ $\sqrt[3]{\frac{54}{16}}$ $\sqrt[3]{\frac{27}{8}} = \frac{\sqrt[3]{27}}{\sqrt[3]{8}} = \frac{3}{2}$

⑭ $\frac{1}{2}\sqrt{108}$ $3\sqrt{3}$

54 | 2
27 | 2
9 | 3

⑮ $\sqrt[3]{7} + \sqrt[3]{56} - 5\sqrt[3]{7}$ $\sqrt[3]{7} + 2\sqrt[3]{7} - 5\sqrt[3]{7} = \boxed{-2\sqrt[3]{7}}$

8 · 7

⑯ $3\sqrt{24} - 5\sqrt{54} + \sqrt{96}$ $\boxed{-5\sqrt{6}}$

$6\sqrt{6} - 15\sqrt{6} + 4\sqrt{6}$

⑰ $\frac{1}{2}\sqrt{32} - \frac{1}{3}\sqrt{18} - \frac{1}{5}\sqrt{125}$ $\boxed{\sqrt{2} - \sqrt{5}}$

16 · 2

$2\sqrt{2} - \sqrt{2} - \sqrt{5}$

⑱ $5\sqrt[3]{81} + 3\sqrt[3]{24} + \sqrt[3]{375}$ $\boxed{26\sqrt[3]{3}}$

27 · 3

125 | 3

$15\sqrt[3]{3} + 6\sqrt[3]{3} + 5\sqrt[3]{3}$

⑲ $\sqrt[3]{16} - 2\sqrt{50} + \sqrt{72} - \sqrt[3]{250}$ $\boxed{-3\sqrt[3]{2} - 4\sqrt{2}}$

$2\sqrt[3]{2} - 10\sqrt{2} + 6\sqrt{2} - 5\sqrt[3]{2}$

⑳ $3\sqrt[4]{16} + 2\sqrt[4]{162} + 4\sqrt[3]{216}$ $\boxed{30 + 6\sqrt[4]{2}}$

81 · 2

2 | 108
2 | 54
2 | 27

$6 + 6\sqrt[4]{2} + 24$

UNIT 5 WORKSHEET 3

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SIMPLIFY EACH COMPLETELY:

(1) $2\sqrt{7} \cdot 3\sqrt{7}$ (42)

(2) $4\sqrt{2} \cdot \sqrt{5}$ $4\sqrt{10}$

(3) $\sqrt[3]{10} \cdot \sqrt[3]{4}$ $\sqrt[3]{40}$ $\sqrt[3]{8} \cdot \sqrt[3]{5}$ $= 2\sqrt[3]{5}$

(4) $\sqrt{35} \cdot \sqrt{21}$ $7\sqrt{15}$

(5) $(4\sqrt{3})^2$ 48

(6) $\sqrt[3]{18} \cdot \sqrt[3]{30}$ $\sqrt[3]{540}$ $\sqrt[3]{27} \cdot \sqrt[3]{20}$ $3\sqrt[3]{20}$

(7) $\sqrt[4]{8} \cdot \sqrt[4]{6}$ $\sqrt[4]{48}$ $\sqrt[4]{3}$ $\sqrt[4]{16}$ $2\sqrt[4]{3}$

(8) $\sqrt{2}(\sqrt{8} + \sqrt{10})$ $4 + 2\sqrt{5}$

(9) $2\sqrt{3}(\sqrt{12} - \sqrt{24})$ $12 - 12\sqrt{2}$

(10) $\sqrt[3]{4}(\sqrt[3]{6} + 2\sqrt[3]{10})$

$2\sqrt[3]{3} + 4\sqrt[3]{5}$

(11) $(3+\sqrt{7})(3-\sqrt{7})$

$9 - 7$

(2)

(12) $(\sqrt{6}+2)^2$

$\sqrt{36} + 4\sqrt{6} + 4$

$10 + 4\sqrt{6}$

(13) $(\sqrt{5}+2)(3\sqrt{5}-4)$

$3\sqrt{25} - 4\sqrt{5} + 6\sqrt{5} - 8$

15

$7 + 2\sqrt{5}$

(14) $(\sqrt[3]{6}+2)(\sqrt[3]{36}-2)$

$2 - 2\sqrt[3]{6} + 2\sqrt[3]{36}$

(15) $(4+2\sqrt{10})(2+3\sqrt{10})$

$68 + 16\sqrt{10}$

(16) $\frac{4}{\sqrt{2}} \cdot \frac{4\sqrt{2}}{2} = 2\sqrt{2}$

(17) $\frac{\sqrt{3}}{\sqrt{5}}$ $\frac{\sqrt{15}}{5}$

(18) $\frac{8}{\sqrt{10}}$ $\frac{8\sqrt{10}}{10} = \frac{4\sqrt{10}}{5}$

(19) $\sqrt{\frac{9}{5}} = \frac{3}{\sqrt{5}} = \frac{3\sqrt{5}}{5}$

(20) $\frac{6\sqrt{2}}{3\sqrt{11}} = \frac{2\sqrt{2}}{\sqrt{11}} = \frac{2\sqrt{22}}{11}$

(21) $\sqrt{\frac{7}{8}}$ $\frac{\sqrt{56}}{8} = \frac{\sqrt{14}}{4}$

UNIT 5 WORKSHEET 4
ALG 2 HONORS

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SIMPLIFY EACH COMPLETELY - SHOW WORK

(1) $\sqrt{\frac{9}{5}}\ \frac{3\sqrt{5}}{5}$

(2) $\frac{4}{\sqrt{2}}\ \frac{4\sqrt{2}}{2} = 2\sqrt{2}$

(3) $\frac{\sqrt{3}}{\sqrt{8}}\ \frac{\sqrt{24}}{8} = \frac{2\sqrt{6}}{8} = \frac{\sqrt{6}}{4}$

(4) $\frac{\sqrt{5}}{\sqrt{7}}\ \frac{\sqrt{35}}{7}$

(5) $\frac{8}{\sqrt{10}} = \frac{8\sqrt{10}}{10} = \frac{4\sqrt{10}}{5}$

(6) $\frac{6\sqrt{2}}{3\sqrt{11}}\ \frac{2\sqrt{22}}{11}$

(7) $\frac{\sqrt{5x}}{\sqrt{6y}}\ \frac{\sqrt{30xy}}{6y}$

(8) $\sqrt[3]{\frac{2}{9}}\ \sqrt[3]{3} = \frac{\sqrt[3]{6}}{3}$

(9) $\frac{\sqrt[3]{5}\ \sqrt[3]{2}}{\sqrt[3]{4}\ \sqrt[3]{2}} = \frac{\sqrt[3]{10}}{2}$

(10) $\sqrt[3]{\frac{3}{8}} = \frac{\sqrt[3]{3}}{2}$

(11) $\sqrt[4]{\frac{3}{8}}\ \sqrt[4]{2} = \frac{\sqrt[4]{6}}{2}$

(12) $\frac{2\ \sqrt[3]{25}}{\sqrt[3]{5}\ \sqrt[3]{25}} = \frac{2\sqrt[3]{25}}{5}$

(13) $\frac{\sqrt[3]{7}\ \sqrt[3]{100w^2}}{\sqrt[3]{10w}\ \sqrt[3]{100w^2}} = \frac{\sqrt[3]{700w^2}}{10w}$ or $\frac{\sqrt[3]{7}}{10}$

(14) $\frac{\sqrt[4]{6}\ \sqrt[4]{25}}{\sqrt[4]{25}\ \sqrt[4]{25}} = \frac{\sqrt[4]{150}}{5}$

(15) $\frac{1}{4-\sqrt{3}}\cdot\frac{(4+\sqrt{3})}{(4+\sqrt{3})} = \frac{4+\sqrt{3}}{16-3} = \boxed{\frac{4+\sqrt{3}}{13}}$

(16) $\frac{10}{(2\sqrt{3}+\sqrt{7})}\cdot\frac{(2\sqrt{3}-\sqrt{7})}{(2\sqrt{3}-\sqrt{7})} = \frac{20\sqrt{3}-10\sqrt{7}}{5} = \boxed{4\sqrt{3}-2\sqrt{7}}$

$4\cdot 3 = 12 - 7$

(17) $\frac{\sqrt{6}}{\sqrt{2}+\sqrt{3}}\cdot\frac{(\sqrt{2}-\sqrt{3})}{(\sqrt{2}-\sqrt{3})} = \frac{\sqrt{12}-\sqrt{18}}{2-3} = \frac{2\sqrt{3}-3\sqrt{2}}{-1} = \boxed{2\sqrt{3}+3\sqrt{2}}$

(18) $\frac{\sqrt{5}+1}{\sqrt{5}-3}\cdot\frac{(\sqrt{5}+3)}{(\sqrt{5}+3)} = \frac{5+3\sqrt{5}+\sqrt{5}+3}{5-9} = \frac{8+4\sqrt{5}}{-4} = \boxed{-2-\sqrt{5}}$

(19) $\frac{2\sqrt{7}-\sqrt{3}}{\sqrt{7}+\sqrt{3}}\cdot\frac{(\sqrt{7}-\sqrt{3})}{(\sqrt{7}-\sqrt{3})} = \frac{14-2\sqrt{21}-\sqrt{21}+3}{7-3} = \boxed{\frac{17-3\sqrt{21}}{4}}$

(20) $\frac{5+\sqrt{2}}{2-\sqrt{5}}\cdot\frac{(2+\sqrt{5})}{(2+\sqrt{5})} = \frac{10+5\sqrt{5}+2\sqrt{2}+\sqrt{10}}{4-5} = -1$

$\boxed{-10-5\sqrt{5}-2\sqrt{2}-\sqrt{10}}$

UNIT 5 WORKSHEET 5

ALG 2 HONORS

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SIMPLIFY COMPLETELY - SHOW WORK

(1) $\sqrt[3]{56x^{11}}$ $\quad 2x^3\sqrt[3]{7x^2}$

(2) $(5\sqrt{3})^2$ $\quad 75$

(3) $\sqrt{32} - 4\sqrt{50}$ $\quad -16\sqrt{2}$

$4\sqrt{2} - 20\sqrt{2}$

(4) $\sqrt[3]{81} + 4\sqrt[3]{24}$ $\quad 3\sqrt[3]{3} + 8\sqrt[3]{3} = 11\sqrt[3]{3}$

(5) $\frac{10\sqrt{15}}{\sqrt{15}\sqrt{15}} = \frac{10\sqrt{15}}{15} = \frac{2\sqrt{15}}{3}$

(6) $\frac{\sqrt[3]{21}}{\sqrt[3]{28}} \frac{\sqrt[3]{7}}{\sqrt[3]{7}} \frac{\sqrt[3]{3}}{\sqrt[3]{4}} = \frac{\sqrt[3]{3}}{\sqrt[3]{2^2}}\left(\frac{\sqrt[3]{2}}{\sqrt[3]{2}}\right) = \frac{\sqrt[3]{6}}{2}$

(7) $\sqrt[3]{\frac{3}{7}} \frac{\sqrt[3]{7}}{\sqrt[3]{7}} \frac{\sqrt[3]{49}}{\sqrt[3]{49}} = \frac{\sqrt[3]{147}}{7}$

(8) $(6-2\sqrt{5})^2$ $\quad 36 - 24\sqrt{5} + 20$

$56 - 24\sqrt{5}$

(9) $\frac{2\sqrt{3}(\sqrt{2}+\sqrt{3})}{\sqrt{2}-\sqrt{3}(\sqrt{2}+\sqrt{3})} = \frac{2\sqrt{6}+6}{-1} = -2\sqrt{6}-6$

(10) $\frac{2\sqrt{10}+4\sqrt{2}}{\sqrt{10}+3\sqrt{2}}\left(\sqrt{10}-3\sqrt{2}\right) = \frac{20-2\sqrt{20}-24}{-8} = \frac{-4-4\sqrt{5}}{8}$

$\frac{1+\sqrt{5}}{2}$

(11) $\sqrt[4]{\frac{5}{36}} \frac{\sqrt[4]{5}}{\sqrt[4]{36}} \frac{\sqrt[4]{6^2}}{\sqrt[4]{6^2}} = \frac{\sqrt[4]{180}}{6}$

(12) $\frac{8^{2/3}}{8^{-3/3}}\, 8^{4/3} = 16$

(13) $\sqrt[3]{\frac{57}{100}} \frac{\sqrt[3]{57}}{\sqrt[3]{100}} \cdot \frac{\sqrt[3]{10}}{\sqrt[3]{10}} = \frac{\sqrt[3]{570}}{10}$

(14) $\frac{6}{\sqrt[4]{5}} \frac{\sqrt[4]{5^3}}{\sqrt[4]{5^3}} = \frac{6\sqrt[4]{125}}{5}$

(15) $\sqrt[4]{64A^4B^{12}} = 2|a|b^3\sqrt[4]{4a^2}$

2^6

(16) $(5^{-1/2})(5^{-3/2})\, 5^{-4/2} = 5^{-2} = \frac{1}{25}$

(17) $\frac{8}{3\sqrt{2}+2\sqrt{3}} \frac{(3\sqrt{2}-2\sqrt{3})}{(3\sqrt{2}-2\sqrt{3})} = \frac{24\sqrt{2}-16\sqrt{3}}{12}$

$\frac{12\sqrt{2}-8\sqrt{3}}{3}$

(18) $\frac{3+2\sqrt{5}}{2\sqrt{5}-4}\frac{(2\sqrt{5}+4)}{(2\sqrt{5}+4)} = \frac{6\sqrt{5}+12+20+8\sqrt{5}}{4}$

$\frac{32+14\sqrt{5}}{4}$

$\frac{16+7\sqrt{5}}{2}$