KEY

Quiz Review 6.4 – 6.7

Learning Target 6D

Simplify.

1. $\sqrt[3]{27b^{18}c^{12}}$

$\sqrt[3]{27} \cdot \sqrt[3]{b^{18}} \cdot \sqrt[3]{c^{12}}$

$3 \cdot b^6 \cdot c^4$

$3b^6c^4$

2. $\sqrt{x^2+6x+9}$

$\sqrt{(x+3)(x+3)}$

$\sqrt{(x+3)^2}$

$x+3$

3. $-\sqrt{(x-1)^6}$

$-(x-1)^3$

4. $\sqrt[4]{-16}$

Does Not Exist
Can't take "even" root of "-".

Simplify.

5. $\sqrt{16a^4b^3}$

$\sqrt{16} \sqrt{a^4} \sqrt{b^3}$

$4 \cdot a^2 \cdot b\sqrt{b}$

$4a^2b\sqrt{b}$

6. $\sqrt{32cd^8}$

$\sqrt{32} \cdot \sqrt{c} \cdot \sqrt{d^8}$

$\sqrt{16 \cdot 2} \cdot \sqrt{c} \cdot d^4$

$4\sqrt{2} \cdot \sqrt{c} \cdot d^4$

$4d^4\sqrt{2c}$

7. $4\sqrt{5x^3} * \sqrt{125x^5}$

$4\sqrt{5x^3 \cdot 125x^5}$

$4\sqrt{5 \cdot 5 \cdot 5 \cdot 5 x^8}$

$4 \cdot 5 \cdot 5\sqrt{x^8} = 100x^4$

8. $3\sqrt{5y} * 8\sqrt{10yz}$

$24\sqrt{50y^2z}$

$24 \sqrt{25} \sqrt{2} y^2 z = 120y\sqrt{2z}$

9. $5\sqrt{32} + \sqrt{27} + 2\sqrt{75}$

$5\sqrt{16 \cdot 2} + \sqrt{9 \cdot 3} + 2\sqrt{25 \cdot 3}$

$5 \cdot 4\sqrt{2} + 3\sqrt{3} + 2 \cdot 5\sqrt{3}$

$20\sqrt{2} + 3\sqrt{3} + 10\sqrt{3} = 20\sqrt{2} + 13\sqrt{3}$

10. $5\sqrt{12} + 2\sqrt{48} - \sqrt{128}$

$5\sqrt{4 \cdot 3} + 2\sqrt{16 \cdot 3} - \sqrt{64 \cdot 2}$

$10\sqrt{3} + 8\sqrt{3} - 8\sqrt{2}$

$18\sqrt{3} - 8\sqrt{2}$

11. $(8\sqrt{5} - 6\sqrt{3})(8\sqrt{5} + 6\sqrt{3})$

$64 \cdot 5 + 48\sqrt{15} - 48\sqrt{15} - 36 \cdot 3$

$320 + -108$

212

12. $-6\sqrt{3ab} * 4\sqrt{24ab^3}$

$-24\sqrt{72a^2b^4}$

$36 \cdot 2$

$-24 \cdot 6ab^2\sqrt{2}$

$-144ab^2\sqrt{2}$

13. $\sqrt[3]{\frac{x^6}{4}}$

$\frac{\sqrt[3]{x^6}}{\sqrt[3]{4}} = \frac{x^2}{\sqrt[3]{2 \cdot 2}} \left(\frac{\sqrt[3]{2}}{\sqrt[3]{2}}\right) = \frac{x^2\sqrt[3]{2}}{2}$

14. $\frac{\sqrt{27}}{\sqrt{3x^5}} = \frac{3\sqrt{3}}{\sqrt{3}x^5} = \frac{3}{x^5}$

Learning Target 6E

Write each rational expression in radical form, and each radical expression in rational form.

15. $x^{\frac{3}{5}}$ $\sqrt[5]{x^3}$

16. $4^{\frac{2}{7}}$ $\sqrt[7]{4^2}$

17. $\sqrt[5]{x}$ $x^{1/5}$

18. $\sqrt[3]{y^2}$ $y^{2/3}$

Evaluate each expression. You must show your work – you may only check with calculator.

19. $125^{\frac{2}{3}}$ $\left(\sqrt[3]{125}\right)^2$ $5^2 = \boxed{25}$

20. $81^{-\frac{1}{4}}$ $\frac{1}{81^{1/4}} = \frac{1}{\sqrt[4]{81}} = \boxed{\frac{1}{3}}$

21. $27^{\frac{1}{3}} * 27^{\frac{2}{3}} = 27^{3/3}$ $= 27^1$ $= \boxed{27}$

22. $16^{-\frac{3}{2}}$ $\frac{1}{16^{3/2}} = \frac{1}{\left(\sqrt{16}\right)^3} = \frac{1}{4^3} = \boxed{\frac{1}{64}}$

Simplify each expression. You must show your work!

23. $x^{\frac{1}{3}} * x^{\frac{2}{5}}$ $x^{1/3+2/5}$ $x^{5/15+6/15}$ $\boxed{x^{11/15}}$

24. $\left(y^{-\frac{1}{5}}\right)^5$ $y^{-5/3}$ $\frac{1}{y^{5/3}}\left(\frac{y^{1/3}}{y^{1/3}}\right)$ $\boxed{\frac{y^{1/3}}{y^2}}$

25. $\frac{\sqrt[4]{27}}{\sqrt[4]{3}} = \sqrt[4]{\frac{27}{3}}$ $= \sqrt[4]{9}$ $= 9^{1/4}$ $= (3^2)^{1/4}$ $= 3^{2/4}$ $= 3^{1/2} = \boxed{\sqrt{3}}$

26. $\frac{\sqrt[8]{81}}{\sqrt[6]{3}}$ $\frac{81^{1/8}}{3^{1/6}} = \frac{(3^4)^{1/8}}{3^{1/6}} = \frac{3^{1/2}}{3^{1/6}}$ $= 3^{1/2-1/6}$ $= 3^{3/6-1/6}$ $= 3^{2/6}$ $= 3^{1/3}$ $= \sqrt[3]{3}$

Learning Target 6F
Solve.

27. $2\sqrt{x+3} - 11 = -5$

$2\sqrt{x+3} = 6$

$\left(\sqrt{x+3}\right)^2 = (3)^2$

$x + 3 = 9$

$\boxed{x = 6}$ ✓

28. $\left(2\sqrt{x-9}\right)^2 = \left(\sqrt{x+15}\right)^2$

$4(x-9) = x+15$

$4x - 36 = x + 15$

$3x = 51$

$\boxed{x = 17}$ ✓

29. $5\sqrt{2x-7} \le 25$

$\left(\sqrt{2x-7}\right)^2 \le (5)^2$

$2x - 7 \le 25$

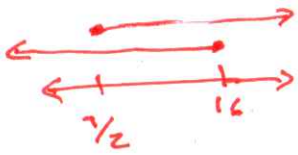
$2x \le 32$

$x \le 16$

$2x - 7 \ge 0$

$2x \ge 7$

$x \ge 7/2$



$\boxed{[7/2, 16]}$ ✓

30. $\sqrt{2y+6} + 3 > 9$

$\left(\sqrt{2y+6}\right)^2 > (6)^2$

$2y + 6 > 36$

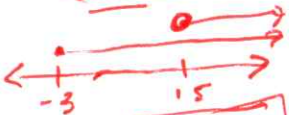
$2y > 30$

$y > 15$

$2y + 6 \ge 0$

$2y \ge -6$

$y \ge -3$



$\boxed{(15, \infty)}$