

Show all work. All answers must be in reduced Radical/Exponential Form.

You may use a 4 fun chkn calculator.

Simplify.

1. $\sqrt{75} = \sqrt{25 \cdot 3} = 5\sqrt{3}$

$$5\sqrt{3}$$

2. $4\sqrt{12}$

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

$$8\sqrt{3}$$

3. $\sqrt[3]{81}$

$$3\sqrt[3]{3}$$

4. $6\sqrt{60x^9y^8}$

$$6 \cdot 2x^4y^4\sqrt{15x}$$

$$12x^4y^4\sqrt{15x}$$

5. $4\sqrt[3]{32} + \sqrt[3]{500}$

$$8\sqrt[3]{4} + 5\sqrt[3]{4}$$

$$13\sqrt[3]{4}$$

6. $3\sqrt{20} - \sqrt{45} + 4\sqrt{80}$

$$4 \cdot 5 \quad 9 \cdot 5 \quad 16 \cdot 5$$

$$2\sqrt{5} \quad 3\sqrt{5} \quad 4\sqrt{5}$$

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

$$6\sqrt{5} - 3\sqrt{5} + 16\sqrt{5}$$

$$19\sqrt{5}$$

7. $\sqrt{3}(5\sqrt{2} + 4\sqrt{3})$

$$5\sqrt{6} + 4\sqrt{9}$$

$$5\sqrt{6} + 12$$

8. $\sqrt{\frac{3m^3}{24n^5}} = \sqrt{\frac{m^3}{8n^5}}$

$$= \frac{m\sqrt{m}}{2n^2\sqrt{2n}}$$

$$= \frac{m\sqrt{m}}{n^2\sqrt{2n}} \cdot \frac{\sqrt{2n}}{\sqrt{2n}}$$

$$= \frac{m\sqrt{2mn}}{4n^3}$$

9. $\frac{5}{3-\sqrt{10}} \cdot \frac{3+\sqrt{10}}{3+\sqrt{10}}$

$$\frac{15+5\sqrt{10}}{9-3\sqrt{10}+3\sqrt{10}-\sqrt{100}}$$

$$\frac{15+5\sqrt{10}}{9-10} = \frac{15+5\sqrt{10}}{-1}$$

$$= -15 - 5\sqrt{10}$$

$$10. (2+5\sqrt{3})(3+5\sqrt{3})$$

$$6 + 10\sqrt{3} + 15\sqrt{3} + 25 \cdot 9$$

$$6 + 25\sqrt{3} + 75$$

$$\boxed{81 + 25\sqrt{3}}$$

$$11. (5-\sqrt{3})^2$$

$$(5-\sqrt{3})(5-\sqrt{3})$$

$$25 - 5\sqrt{3} - 5\sqrt{3} + \sqrt{9}$$

$$25 - 10\sqrt{3} + 3$$

$$\boxed{28 - 10\sqrt{3}}$$

$$12. \frac{m^2 \cdot m}{\sqrt{2n^2 p}} \cdot \frac{m\sqrt{m}}{n\sqrt{2p}}$$

$$\frac{m\sqrt{m}}{n\sqrt{2p}} \cdot \frac{\sqrt{2p}}{\sqrt{2p}} =$$

$$\boxed{\frac{m\sqrt{2mp}}{2pn}}$$

$$13. 27^{\frac{4}{3}}$$

$$(\sqrt[3]{27})^4$$

$$3^4 = \boxed{81}$$

$$14. (-32)^{\frac{2}{5}}$$

$$(\sqrt[5]{-32})^2$$

$$(-2)^2 = \boxed{4}$$

$$15. 7^{\frac{5}{2}} \cdot 7^{\frac{1}{2}}$$

$$7^{6/2} = 7^3$$

$$\boxed{343}$$

$$16. \frac{w^{10}}{w^3} \cdot \frac{w^5}{w^5}$$

$$\frac{9}{10} - \frac{3}{5} = \frac{9}{10} - \frac{6}{10}$$

$$\boxed{w^{3/10}}$$

$$17. \frac{2-\sqrt{3}}{4-\sqrt{3}} \cdot \frac{4+\sqrt{3}}{4+\sqrt{3}}$$

$$\frac{8+2\sqrt{3}-4\sqrt{3}-19}{16-4\sqrt{3}+4\sqrt{3}-19}$$

$$\frac{8-2\sqrt{3}-3}{16-3}$$

$$\boxed{\frac{5-2\sqrt{3}}{13}}$$

$$18. \frac{x^{\frac{5}{2}} \cdot x^{\frac{1}{2}}}{x^2} \cdot \frac{x^{\frac{4}{2}}}{x^{\frac{1}{2}}} = \frac{x^2}{x^{\frac{1}{2}}}$$

$$2^{-1/2} = x$$

$$\boxed{x^{3/2}}$$

$$19. \frac{x^{\frac{2}{3}} y^{\frac{1}{5}}}{x^{\frac{1}{6}} y^{\frac{2}{3}}}$$

$$\frac{\frac{2}{3} - \frac{1}{6}}{\frac{1}{5} - \frac{2}{3}} = \frac{\frac{3}{6} - \frac{1}{6}}{\frac{1}{5} - \frac{2}{3}}$$

$$\boxed{x^{1/2} y^{13/15}}$$

$$\frac{\frac{2}{3} + \frac{10}{15}}{\frac{3}{15}}$$

$$20. \sqrt{\frac{4}{5}} = \frac{2}{\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}}$$

$$= \boxed{\frac{2\sqrt{5}}{5}}$$

$$21. \sqrt{6} \cdot \sqrt{32} \cdot \sqrt{18}$$

$$2 \cdot 3 \cdot 16 \cdot 2 \cdot 9 \cdot 2$$

$$2 \cdot 4 \cdot 3 \sqrt{6}$$

$$\boxed{24\sqrt{6}}$$

Solve. Show that you have checked your work.

$$22. (\sqrt{x+5})^2 = (8)^2$$

$$x+5 = 64$$

-5 -5

$$\boxed{x = 59}$$

Check ✓

$$\sqrt{59+5} = 8$$

$$\sqrt{64} = 8$$

$$8 = 8$$

$$23. (\sqrt[3]{x-6})^3 = (4)^3$$

$$x-6 = 64$$

+6 +6

$$\boxed{x = 70}$$

Check ✓

$$\sqrt[3]{70-6} = 4$$

$$\sqrt[3]{64} = 4$$

$$4 = 4$$

$$24. 2 = -10 + \sqrt{3x-1}$$

$$\frac{+10 \quad +10}{12} = \sqrt{3x-1}$$

$$144 = 3x-1$$

$$145 = 3x$$

$$\boxed{48\frac{1}{3} = x \quad \text{or} \quad \frac{145}{3} = x}$$

$$2 = -10 + \sqrt{3(\frac{145}{3})-1}$$

$$2 = -10 + \sqrt{144}$$

$$2 = -10 + 12$$

$$2 = 2 \quad \checkmark$$

$$25. (\sqrt{x+15})^2 = (3+\sqrt{x})^2$$

$$x+15 = (3+\sqrt{x})(3+\sqrt{x})$$

$$x+15 = 9 + 3\sqrt{x} + 3\sqrt{x} + \sqrt{x}^2$$

$$x+15 = 9 + 6\sqrt{x} + x$$

-x -9 -x

$$\frac{6}{6} = \frac{6\sqrt{x}}{6}$$

$$(1)^2 = (\sqrt{x})^2$$

$$\boxed{1 = x}$$

Check ✓

$$\sqrt{1+15} = 3+\sqrt{1}$$

$$\sqrt{16} = 3+1$$

$$4 = 4$$

$$26. 2 + \sqrt{x+7} = -6$$

$$\sqrt{x+7} = -8$$

$$x+7 = 64$$

$$x = \cancel{57}$$

$$2 + \sqrt{57+7} = -6$$

$$2 + \sqrt{64} = -6$$

$$2 + 8 \neq -6$$

no solution

$$27. \frac{1}{3}x^4 + 12 = 39$$

$$\frac{1}{3}x^4 = 27$$

$$x^4 = 81$$

$$x = \pm\sqrt[4]{81}$$

$$\boxed{x = \pm 3}$$

$$\frac{1}{3}(3)^4 + 12 = 39$$

$$\frac{1}{3}(81) + 12 = 39$$

$$27 + 12 = 39$$

$$\frac{1}{3}(-3)^4 + 12 = 39$$

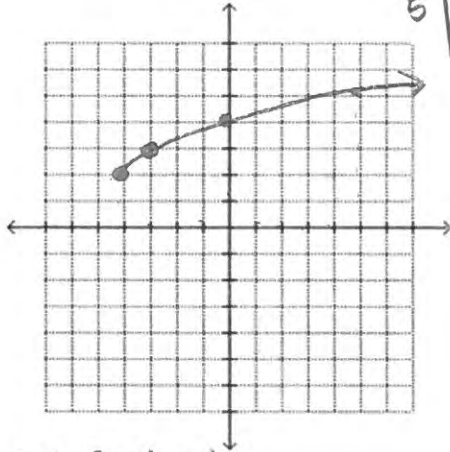
$$\frac{1}{3}(81) + 12 = 39 \quad \checkmark$$

Graph.

28. $y = \sqrt{x+4} + 2$

left 4 up 2

x	y
-4	2
-3	3
0	4
5	5

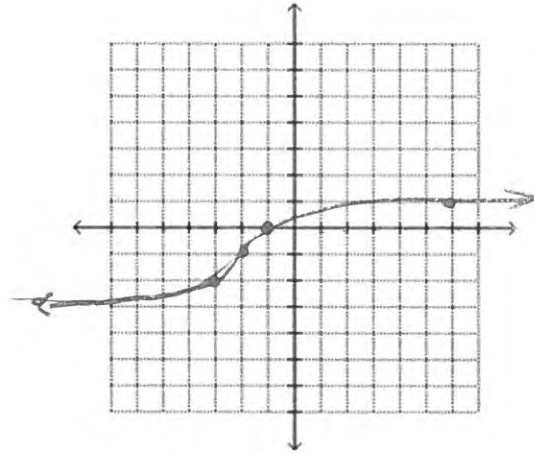


D: $[-4, \infty)$
R: $[2, \infty)$

29. $y = \sqrt[3]{x+2} - 1$

left 2 down 1

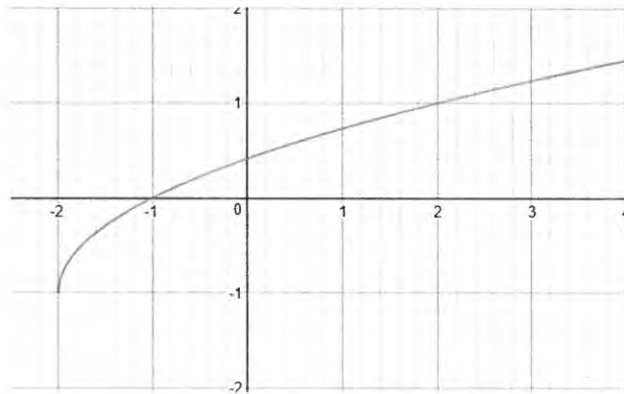
x	y
-2	-1
-1	0
-3	-2
6	1



D: $(-\infty, \infty)$
R: $(-\infty, \infty)$

Write an equation for the graph.

30.

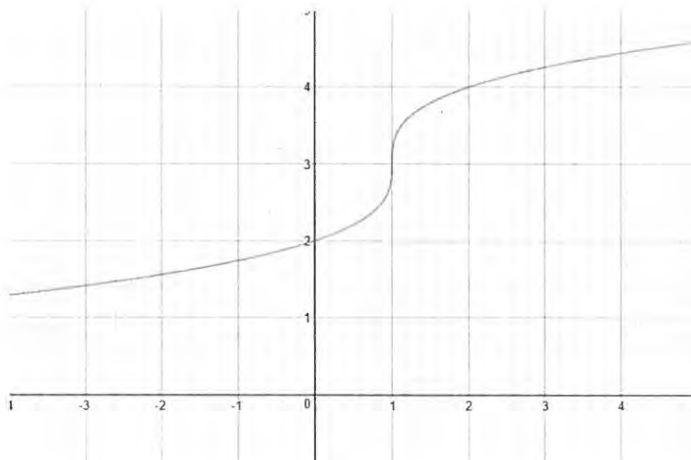


left 2 down 1

point (-1, 0)

$y = 1\sqrt{x+2} - 1$

31.



right 1 up 3
pt. (2, 4)

$y = 1\sqrt[3]{x-1} + 3$