STATION 1

NO CALCULATOR!!!!!!

Evaluate the following:

1. $9^{\frac{3}{2}}$

2. $\sqrt[3]{-8}$

3. $2^{\frac{1}{5}} \bullet 2^{\frac{1}{4}}$

4. $\sqrt[3]{16} + 5\sqrt[3]{2}$

5. $\sqrt[3]{\frac{a^5}{b^2}}$

6. $8^{\frac{4}{3}}$

7. $\sqrt[3]{\frac{16a^3b^7}{4a^2b^2}}$

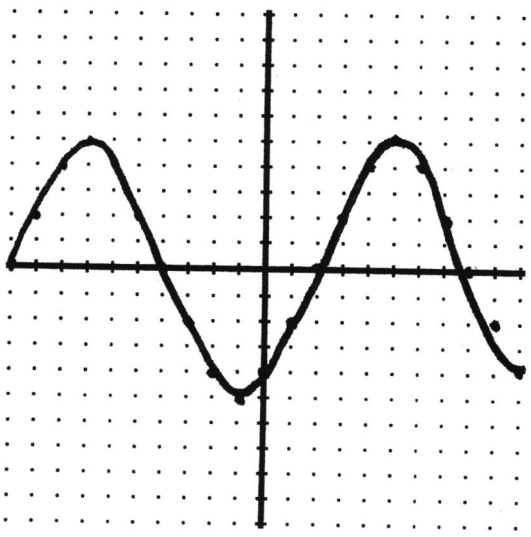
8. Graph $y = 2\sqrt[3]{x-4} + 2$

(sketch)

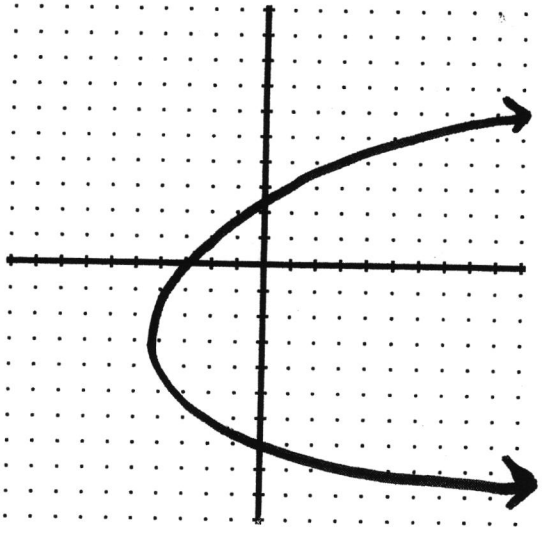
STATION 2

Calculator OK

9. Sketch the inverse of



$f(x)$:



10. Is $f(x)$ a function?

11. Is $f^{-1}(x)$ a function?

$$f(x) = 3x^3 + 2$$

12. $g(x) = \sqrt[3]{\dfrac{x-2}{3}}$

Show that $f(x)$ and $g(x)$ are inverses.

STATION 3

Calculator OK

13. Simplify the following:

$$\sqrt[5]{32x^9y^{12}z^{31}}$$

Solve for x:

14. $-15 = 3\sqrt{2x+1}$

15. $\sqrt[4]{16x} = 6$

16. $\sqrt{4x} - 2\sqrt{x} = 0$

17. $3(2x+1)^{\frac{3}{2}} = 81$

STATION 4

NO CALCULATOR!

18. $8^{\frac{2}{3}}$

19. $\sqrt[3]{-64}$

20. $7^{\frac{3}{8}} \bullet 7^{\frac{1}{2}}$

21. $2\sqrt{3}+\sqrt{75}$

22. $\sqrt[3]{\frac{a^5}{b^2}}$

23. $8^{\frac{4}{3}}$

24. $\sqrt{\frac{18r^5s^9}{2r^6s^2}}$

25. Graph $y=4\sqrt{x+1}-3$

STATION 5

Calculator OK

Identify the DOMAIN:

26. $y = 2\sqrt{x}$

27. $y = 2x + 1$

28. $y = \dfrac{8}{x+2}$

29. $y = \sqrt{x-7}$

30. $y = 2\sqrt[3]{x-5}$

31. $y = x^{\frac{5}{3}}$

32. $y = x^{\frac{3}{8}}$

Identify the RANGE:

33. $y = \sqrt{x-4}+3$

34. $y = \sqrt[3]{x+8}-2$

35. $y = -\sqrt{x+1}-4$

STATION 6 — Calculator OK

$f(x) = 8x^{-3}$ $\quad g(x) = 4x^{\frac{1}{3}}$

36. $(f \times g)(x) =$

37. $\dfrac{g(x)}{f(x)} =$

38. $f(g(x)) =$

39. $g(f(x)) =$

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40. Find the inverse of $y = 2\sqrt{3x+1} - 8$

41. Find the inverse of $y = 2(x+5)^{\frac{3}{5}}$

① $9^{\frac{3}{2}} = \sqrt{9}^{3} = 3^3 = \boxed{27}$

② $\sqrt[3]{-8} = \boxed{-2}$

③ $2^{1/5} \cdot 2^{1/4} = 2^{1/5 + 1/4} = 2^{4/20 + 5/20} = \boxed{2^{9/20}}$

④ $\sqrt[3]{16} + 5\sqrt[3]{2}$

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

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

$\boxed{7\sqrt[3]{2}}$

simplify & add like terms

⑤ $\sqrt[3]{\frac{a^5}{b^2}} = \sqrt[3]{\frac{aaaaa}{bb}} = a\sqrt[3]{\frac{aa}{bb}} = \boxed{a\sqrt[3]{\frac{a^2}{b^2}}}$

⑥ $8^{4/3} = \sqrt[3]{8}^{4} = 2^4 = 16$

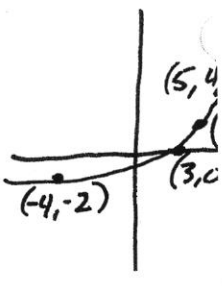
⑦ $\sqrt[3]{\frac{16a^5b^7}{4a^2b2}} = \sqrt[3]{4ab^5} = \boxed{b\sqrt[3]{4ab^2}}$

⑧ $y = 2\sqrt[3]{x-4} + 2 \longrightarrow y = 2\sqrt[3]{x}$

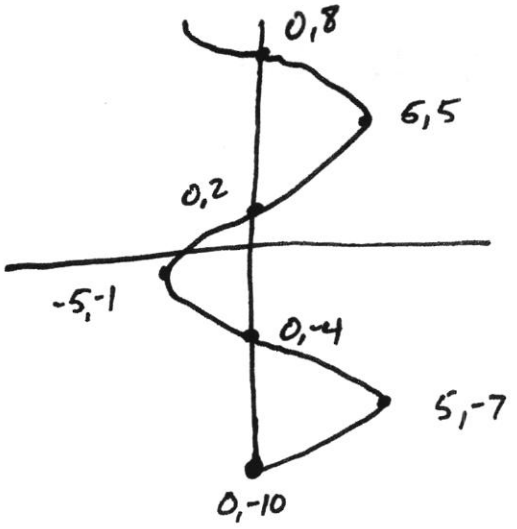
x	y
-8	-4
-1	-2
0	0
1	2

right 4, up 2 →

x	y
-4	-2
3	0
4	2
5	4
12	10



(9)



10. No, fails vertical line test

11. yes, passes horizontal line test.

12. $f(g(x)) =$

$= 3\left(\sqrt[3]{\frac{x-2}{3}}\right)^3 + 2$

$= 3\left(\frac{x-2}{3}\right) + 2$

$= (x-2) + 2$

$= x$

$g(f(x))$

$= \sqrt[3]{\frac{(3x^3+2)-2}{3}}$

$= \sqrt[3]{\frac{3x^3+2-2}{3}}$

$= \sqrt[3]{\frac{3x^3}{3}}$

$= \sqrt[3]{x^3}$

$= x$

(13) $\sqrt[5]{2^5 x^9 y^{12} z^{31}} = \boxed{2xy^2z^6\sqrt[5]{x^4y^2z}}$

(14) $-15 = 3\sqrt{2x+1}$

$-5 = \sqrt{2x+1}$

$25 = 2x+1$

$24 = 2x$

$\boxed{12 = x}$ ☹

but when you plug 12 in it doesn't work!

$\boxed{\text{No solution}}$

(15) $\sqrt[4]{16x} = 6$

$16x = 1296$

$\boxed{x = 81}$

(16) $\sqrt{4x} - 2\sqrt{x} = 0$

$\sqrt{4x} = 2\sqrt{x}$

$4x = 4x$

$x = x$

$\boxed{\text{all } \mathbb{R}}$

(17) $3(2x+1)^{3/2} = 81$

$(2x+1)^{3/2} = 27$

$2x+1 = 27^{2/3}$

$2x+1 = 9$

$2x = 8$

$\boxed{x = 4}$

(18) $8^{2/3} = \sqrt[3]{8}^{2} = 2^2 = 4$

(19) $\sqrt[3]{-64} = \boxed{-4}$

(20) $7^{3/8} \cdot 7^{1/2} = 7^{3/8 + 1/2} = 7^{3/8 + 4/8} = \boxed{7^{7/8}}$

(21) $2\sqrt{3} + \sqrt{75}$

$2\sqrt{3} + \sqrt{25}\sqrt{3}$

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

$\boxed{7\sqrt{3}}$

(22) $\sqrt[3]{\frac{a^5}{b^2}} = a\sqrt[3]{\frac{a^2}{b^2}}$

but... $= a\frac{a^{2/3}}{b^{2/3}}$ can't leave $b^{2/3}$ on bottom!

$= a\frac{a^{2/3}}{b^{2/3}} \cdot \frac{b^{1/3}}{b^{1/3}}$

$= a \cdot \frac{a^{2/3} b^{1/3}}{b}$

or

$a\frac{\sqrt[3]{a^2 b}}{b}$ or $\frac{a}{b}\sqrt[3]{a^2 b}$

(23) $8^{4/3} = 2^4 = \boxed{16}$

(24) $\sqrt{\frac{18 r^5 s^9}{2 r^6 s^2}} = \sqrt{\frac{9 s^7}{r}}$

$= 3 s^3 \sqrt{\frac{s}{r}} \rightarrow \boxed{3 s^3 \cdot \frac{\sqrt{sr}}{r}}$

(25) $4\sqrt{x+1} - 3$

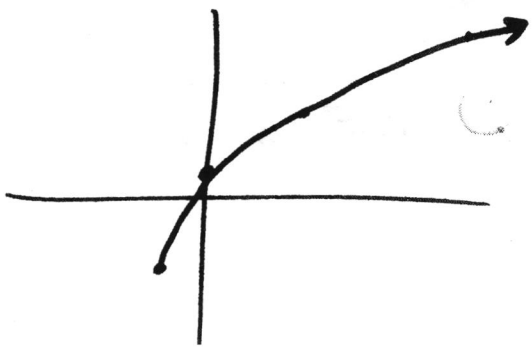
$4\sqrt{x}$

x	y
0	0
1	4
4	8
a	12

Left 1

Down 3

x	y
-1	-3
0	1
3	5
a	9



(26) $y = 2\sqrt{x}$ D: $\mathbb{R}$, $x \geq 0$

(27) $y = 2x+1$ D: $\mathbb{R}$

(28) $y = \frac{8}{x+2}$ D: $\mathbb{R}$ $x \neq -2$

(29) $y = \sqrt{x-7}$ D: $\mathbb{R}$, $x \geq 7$

(30) $y = 2\sqrt[3]{x-5}$ D: $\mathbb{R}$, $x \geq 5$

(31) $y = x^{5/3}$ D: $\mathbb{R}$

(32) $y = x^{3/8}$ D: $\mathbb{R}$ $x \geq 0$

(33) $y = \sqrt{x-4}+3$ R: $\mathbb{R}$, $y \geq 3$

(34) $y = \sqrt[3]{x+8} - 2$ R: $\mathbb{R}$

(35) $y = -\sqrt{x+1} - 4$ R: $\mathbb{R}$ $y \leq -4$

(36) $8x^{-3} \cdot 4x^{1/3}$

$= 32x^{-8/3}$

$= \frac{32}{x^{8/3}} \cdot \frac{x^{1/3}}{x^{1/3}} = \frac{32x^{1/3}}{x^3}$

(37) $\frac{4x^{1/3}}{8x^{-3}} = \frac{4x^{1/3} x^3}{8} = \frac{4x^{10/3}}{8}$

$= \frac{x^{10/3}}{2}$

(38) $8(4x^{1/3})^{-3}$

$= 8(4^{-3}x^{-1})$

$= \frac{8}{4^3 x^1} = \frac{8}{64x}$

$= \frac{1}{8x}$

(39) $4(8x^{-3})^{1/3}$

$4(8^{1/3}x^{-1})$

$4(2x^{-1})$

$\frac{4 \cdot 2}{x} = \frac{8}{x}$

(40) $y = 2\sqrt{3x+1} - 8$

$x = 2\sqrt{3y+1} - 8$

$x + 8 = 2\sqrt{3y+1}$

$\frac{1}{2}x + 4 = \sqrt{3y+1}$

$\left(\frac{1}{2}x+4\right)^2 = 3y+1$

$y = \frac{\left(\frac{1}{2}x+4\right)^2 - 1}{3}$

(41) $x = 2(y+5)^{3/2}$

$\frac{x}{2} = (y+5)^{3/2}$

$\left(\frac{x}{2}\right)^{2/3} = y+5$

$\frac{x}{2}^{2/3} - 5 = y$