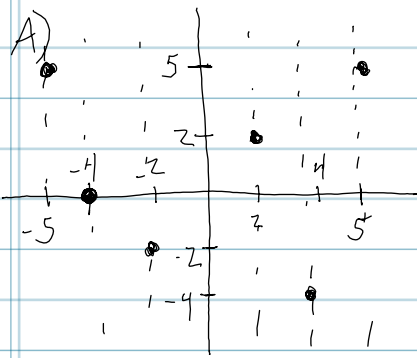


A) $f(2) = 0$

B) $f(x) = 1$ $x = 3$ or $x = -1.5$

C) DOMAIN: $[-4, 3]$

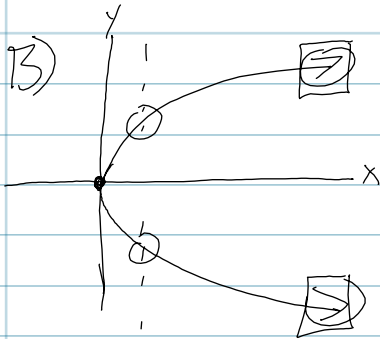
D) RANGE: $[-2, 4]$



DOMAIN: $\{-5, -4, -2, 2, 4, 5\}$

RANGE: $\{-4, -2, 2, 5\}$

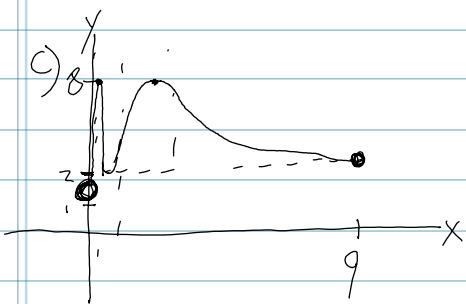
Is a function



DOMAIN: $[0, \infty)$

RANGE: $(-\infty, \infty)$

NOT A FUNCTION



DOMAIN: $(0, 9]$

RANGE: $(1.5, 8]$

IS A FUNCTION

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

$$g(x) = \sqrt{x-8}$$

$$h(x) = \frac{1}{3x+7}$$

$$A) f(4) = (4)^3$$

$$\boxed{f(4) = 64}$$

$$B) g(33) = \sqrt{33-8}$$

$$= \sqrt{25}$$

$$\boxed{g(33) = 5}$$

$$C) h(-6) = \frac{1}{3(-6)+7}$$

$$= \frac{1}{-18+7}$$

$$= \boxed{-\frac{1}{11}}$$

$$D) \boxed{g(3m) = \sqrt{3m-8}}$$

$$E) f(-5a^2) = (-5a^2)^3$$

$$= \boxed{-125a^6}$$

$$F) (f-g)(9) = f(9) - g(9)$$

$$= (9)^3 - \sqrt{9-8}$$

$$= 729 - \sqrt{1}$$

$$= 729 - 1$$

$$= \boxed{728}$$

$$G) (g \cdot h)(17) = g(17) \cdot h(17)$$

$$= \sqrt{17-8} \cdot \frac{1}{3(17)+7}$$

$$= \sqrt{9} \cdot \frac{1}{51+7}$$

$$= 3 \cdot \frac{1}{58}$$

$$= \boxed{\frac{3}{58}}$$

$$H) \left(\frac{f}{h}\right)(-7) = \frac{f(-7)}{h(-7)}$$

$$= \frac{(-7)^3}{\frac{1}{3(-7)+7}}$$

$$= \frac{-343}{\frac{1}{-21+7}}$$

$$= \frac{-343}{\frac{1}{-14}}$$

$$= -343 \cdot -14$$

$$= \boxed{4802}$$

$$I) (g \circ f)(x) = g(f(x))$$

$$g(x^3) = \boxed{\sqrt{x^3-8}}$$

$$J) (h \circ f)(-2) = h(f(-2))$$

$$= h((-2)^3)$$

$$= h(-8)$$

$$= \frac{1}{3(-8)+7}$$

$$= \frac{1}{-24+7}$$

$$= \boxed{-\frac{1}{17}}$$

$$A) \sqrt[5]{4^3} \cdot \sqrt[5]{4^2}$$

$$\sqrt[5]{4^3 \cdot 4^2}$$

$$\sqrt[5]{4^5}$$

$$\textcircled{4}$$

$$B) \sqrt{18} + \sqrt{2}$$

$$\sqrt{9 \cdot 2} + \sqrt{2}$$

$$\sqrt{9}\sqrt{2} + \sqrt{2}$$

$$3\sqrt{2} + 1\sqrt{2}$$

$$\textcircled{4\sqrt{2}}$$

$$C) \frac{10\sqrt{5}}{\sqrt{5}\sqrt{5}}$$

$$\frac{10\sqrt{5}}{\sqrt{25}}$$

$$\frac{10\sqrt{5}}{5}$$

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

$$D) 7\sqrt{x^3y} - x\sqrt{49xy}$$

$$7\sqrt{x^3}\sqrt{y} - x(\sqrt{49})\sqrt{x}\sqrt{y}$$

$$\sqrt{x \cdot x} \downarrow - (x \cdot 7)\sqrt{x}\sqrt{y}$$

$$7(\sqrt{x^2})\sqrt{x}\sqrt{y} - 7x\sqrt{x}\sqrt{y}$$

$$\frac{7x\sqrt{xy} - 7x\sqrt{xy}}{\boxed{0}}$$

$$E) \frac{15(9+\sqrt{6})}{(9-\sqrt{6})(9+\sqrt{6})}$$

$$\frac{15(9+\sqrt{6})}{81+9\sqrt{6}-9\sqrt{6}-\sqrt{36}}$$

$$\frac{15(9+\sqrt{6})}{81-6}$$

$$\frac{15(9+\sqrt{6})}{75}$$

$$\frac{15(9+\sqrt{6})}{75}$$

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

$$F) (\sqrt[3]{-4v})(\sqrt[3]{2v^2})$$

$$\sqrt[3]{-8v^3}$$

$$\sqrt[3]{-8} \sqrt[3]{v^3}$$

$$\boxed{-2v}$$

$$A) i^{-63} \quad \begin{array}{r} 15 \\ 4 \overline{) 63} \\ \underline{-4} \\ 23 \\ \underline{-20} \\ 3 \end{array} \quad i^3 = (-i)$$

$$B) i^{114} \quad \begin{array}{r} 28 \\ 4 \overline{) 114} \\ \underline{-8} \\ 34 \\ \underline{-32} \\ 2 \end{array} \quad i^2 = (-1)$$

$$C) i^{2680} \quad \begin{array}{r} 670 \\ 4 \overline{) 2680} \\ \underline{-24} \\ 28 \\ \underline{-28} \\ 00 \end{array} \quad i^4 = (1)$$

$$\begin{aligned} \text{A) } & (4)(3-2i) - i(5+3i) \\ & 12 - 8i - 5i - 3i^2 \\ & 12 - 8i - 5i - 3(-1) \\ & 12 - 8i - 5i + 3 \\ & \boxed{15 - 13i} \end{aligned}$$

$$\begin{aligned} \text{B) } & (11+3i)(2+5i) \\ & 22 + 55i - 6i - 15i^2 \quad (-1) \\ & 22 + 55i - 6i + 15 \\ & \boxed{37 + 49i} \end{aligned}$$

$$\begin{aligned} \text{C) } & \frac{(5-2i)(4-3i)}{(4+3i)(4-3i)} = \frac{20 - 15i - 8i + 6i^2 \rightarrow (-1)}{16 - 12i + 12i - 9i^2 \rightarrow (-1)} \\ & = \frac{20 - 15i - 8i - 6}{16 - 7i^2 + 9} \\ & = \frac{14 - 23i}{25} \\ & = \boxed{\frac{14}{25} - \frac{23}{25}i} \end{aligned}$$

$$A) g(x) = \sqrt{3(x-11)} \quad -\infty \leftarrow \begin{array}{c} \text{-----} \\ | \\ 11 \end{array} \rightarrow \infty$$

$$3(x-11) \geq 0$$

$$D: [11, \infty)$$

$$3x - 33 \geq 0$$

$$\frac{3x}{3} \geq \frac{33}{3}$$

$$x \geq 11$$

$$B) j(x) = \sqrt{3-2x} \quad -\infty \leftarrow \begin{array}{c} \text{-----} \\ | \\ \frac{3}{2} \end{array} \rightarrow \infty$$

$$3-2x \geq 0$$

$$3 \geq \frac{2x}{2}$$

$$\frac{3}{2} \geq x$$

$$D: \left(-\infty, \frac{3}{2}\right]$$

$$C) k(x) = \sqrt[3]{x} - 7$$

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

A) $(4^{1/5} \cdot 4^{2/5})^{5/2}$
 $(4^{3/5})^{5/2}$
 $4^{15/10}$
 $4^{3/2}$
 $(\sqrt{4})^3$
 2^3
 8

B) $\frac{y^{1/4}}{y^{1/5}} = y^{1.5/4.5 - 1.4/5.4}$
 $= y^{5/20 - 4/20}$
 $= y^{1/20}$

C) $\frac{w^{3/4}}{w^{-3/8}}$
 $w^{3/4 + (+3/8)}$
 $w^{3 \cdot 2/4 + 3/8}$
 $w^{6/8 + 3/8}$
 $w^{9/8}$

$5^{1/3} \cdot (5^{2/3}) = 5^{1/3 + 2/3} = 5^{3/3} = 5$

D) $(25 \cdot v^{-4/9})^{3/2}$
 $25^{3/2} \cdot v^{-2}$
 $\frac{25^{3/2}}{v^2}$
 $\frac{(\sqrt{25})^3}{v^2}$
 $\frac{5^3}{v^2}$
 $\frac{125}{v^2}$

E) $(27n^{3/5})^{-2/3}$
 $(27n^{3/5})^{-2/3}$
 $(27n^{6/5})^{-2/3}$
 $27^{-2/3} n^{-12/15}$
 $27^{-2/3} n^{-4/5}$
 $\frac{1}{27^{2/3} n^{4/5}}$
 $\frac{1}{(\sqrt[3]{27})^2 n^{4/5}}$
 $\frac{1}{9n^{4/5}}$

F) $\frac{(5xy^2z)^{1/3} (25x^2yz)^{2/3}}{3x^2y^{-1/3}z^{-2}}$
 $\frac{5^{1/3} x^{1/3} y^{2/3} z^{2/3} \cdot 25^{2/3} x^{4/3} y^{2/3} z^{4/3}}{3x^2y^{-1/3}z^{-2}}$
 $\frac{5^{1/3} \cdot 5^{4/3} x^{1/3+4/3} y^{2/3+2/3} z^{2/3+4/3}}{3x^2y^{-1/3}z^{-2}}$
 $\frac{5^{5/3} x^{5/3} y^{4/3} z^{2}$
 $\frac{5xy^2z}{3x^2}$

$$A) \quad 3n^2 - 150 = 0$$

$$\begin{array}{ccc} +150 & +150 & \\ \hline 3n^2 & = & 150 \\ \hline \frac{3n^2}{3} & & \frac{150}{3} \end{array}$$

$$n = 5\sqrt{2} \quad \text{or} \quad n = -5\sqrt{2}$$

$$\sqrt{n^2} = \sqrt{50}$$

$$\begin{aligned} n &= \pm \sqrt{50} \\ &= \pm \sqrt{25 \cdot 2} \\ n &= \pm 5\sqrt{2} \end{aligned}$$

$$B) \quad 70m^2 - 110 = 0$$

$$\begin{array}{ccc} \cancel{70}m^2 & = & \cancel{110} \\ \cancel{70} & & \cancel{70} \end{array}$$

$$\sqrt{m^2} = \sqrt{\frac{11}{7}}$$

$$\begin{aligned} m &= \pm \sqrt{\frac{11}{7}} \\ &= \pm \frac{\sqrt{11} \sqrt{7}}{\sqrt{7} \sqrt{7}} \end{aligned}$$

$$m = \pm \frac{\sqrt{77}}{7}$$

$$C) \quad \sqrt{(2x-3)^2} = \sqrt{169}$$

$$\begin{array}{ccc} 2x-3 & = & \pm 13 \\ +3 & +3 & \end{array}$$

$$2x = 3 \pm 13$$

$$2x = 3 + 13 \quad \text{or} \quad 2x = 3 - 13$$

$$\begin{array}{ccc} \cancel{2}x & = & \cancel{16} \\ \cancel{2} & & \cancel{2} \end{array}$$

$$x = 8$$

$$\begin{array}{ccc} \cancel{2}x & = & \cancel{-10} \\ \cancel{2} & & \cancel{2} \end{array}$$

$$\text{or} \quad x = -5$$

$$A) \frac{p^2}{5} + \frac{30p}{5} + \frac{20}{5} = \frac{0}{5}$$

$$p^2 + 6p + 4 = 0$$

$$p^2 + 6p + 9 = -4 + 9$$

$$\left(\frac{6}{2}\right)^2 = (-4+9)$$

$$p^2 + 6p + 9 = 5$$

$$\sqrt{(p+3)^2} = \sqrt{5}$$

$$p+3 = \pm\sqrt{5}$$

$$p = -3 \pm \sqrt{5}$$

$$p = -3 + \sqrt{5} \text{ or } p = -3 - \sqrt{5}$$

$$B) (w-1)(w+4) = 7$$

$$w^2 + 4w - w - 4 = 7$$

$$w^2 + 3w - 4 = 7$$

$$w^2 + 3w + \frac{9}{4} = 11 + \frac{9}{4}$$

$$\left(\frac{3}{2}\right)^2 = \frac{9}{4}$$

$$11 = \frac{44}{4}$$

$$= \frac{44}{4} + \frac{9}{4}$$

$$\sqrt{\left(w + \frac{3}{2}\right)^2} = \sqrt{\frac{53}{4}}$$

$$w + \frac{3}{2} = \pm \frac{\sqrt{53}}{2}$$

$$w + \frac{3}{2} = \pm \frac{\sqrt{53}}{2}$$

$$w = -\frac{3}{2} \pm \frac{\sqrt{53}}{2}$$

$$w = -\frac{3}{2} + \frac{\sqrt{53}}{2}$$

$$\text{or } w = -\frac{3}{2} - \frac{\sqrt{53}}{2}$$