

Desmos

I. Graph each of the following:

Go to $y' =$ or in calc

1. Graph: $y = \sqrt{x+4}$ Left 4

Vertex: $(-4, 0)$
Domain: $[-4, \infty)$
Range: $[0, \infty)$

2. Graph: $y = \sqrt{x+3} - 6$ Left 3 Down 6

Vertex: $(-3, -6)$
Domain: $[-3, \infty)$
Range: $[-6, \infty)$

3. Graph: $y = \sqrt[3]{x} + 2$ up 2

Vertex: $(0, 2)$
Domain: $(-\infty, \infty)$
Range: $(-\infty, \infty)$

4. Graph: $y = \sqrt[3]{x-1} - 3$ Right 1 Down 3

Vertex: $(1, -3)$
Domain: \mathbb{R}
Range: $(-\infty, \infty)$

5. Graph: $y = \frac{1}{x} + 2$ up 2

Vertex: $(0, 2)$
Domain: $(-\infty, 0) \cup (0, \infty)$
Range: $(-\infty, 2) \cup (2, \infty)$

6. Graph: $y = \frac{4}{x-1} - 3$ 5 by 4 Right Down 3

Vertex: $(1, -3)$
Domain: $(-\infty, 1) \cup (1, \infty)$
Range: $(-\infty, -3) \cup (-3, \infty)$

D.I.N.E.

Denominator Index Numerator Exponent

$$5 \cdot x^{3/2}$$

$$\frac{1}{125}$$

II. Write the equivalent expression for each:

1. $x^{2/5}$ $\sqrt[5]{x^2}$	2. $5x^{3/2}$ $5 \cdot \sqrt[2]{x^3}$	3. $25^{-3/2}$ $\frac{1}{25^3}$	4. $(\sqrt[3]{x})^7$ $x^{7/3}$	5. $\sqrt{5x}$ $(5x)^{1/2}$	6. $6^5 \sqrt{x^3}$ $6 \cdot x^{3/5} = 6x^{3/5}$
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III. Solve each of the following square root equations:

1. $(\sqrt{x}) = (10)^2$ $x = 100$ $x = 100$	2. $(\sqrt{3x+1}) = (2)^2$ $3x+1 = 4$ $3x = 3$ $x = 1$ $x = 1$	3. $(\sqrt{2x-6}) = (\sqrt{x+5})^2$ $2x-6 = x+5$ $x-6 = 5$ $x = 11$ $x = 11$
4. $5\sqrt{x} = 45$ $(\sqrt{x}) = (9)^2$ $x = 81$ $x = 81$	5. $\sqrt{x} + 4 = 6$ $(\sqrt{x}) = (2)^2$ $x = 4$ $x = 4$	6. $-4\sqrt{5x} + 1 = -7$ $(\sqrt{5x}) = (2)^2$ $5x = 4$ $x = 4/5$ $x = 4/5$

IV. Solve each of the following rational equations:

7. $\frac{3}{3} \cdot \frac{(x+5)}{2} = \frac{x}{3} \cdot \frac{2}{2}$ $3x+15 = 2x$ $15 = -1x$ $x = -15$ $x = -15$	8. $\frac{(x-5)}{(x-5)(3)} = \frac{3}{x-5} \cdot \frac{3}{3}$ $\frac{x-5}{(x-5)(3)} = \frac{9}{(x-5)(3)}$ $x-5 = 9$ $x = 14$ $x = 14$
9. $\frac{3}{3} \cdot \frac{x+5}{2} - \frac{x}{3} = \frac{4}{1} \cdot \frac{6}{6}$ $\frac{3x+15}{6} - \frac{2x}{6} = \frac{24}{6}$ $3x+15-2x = 24$ $x+15 = 24$ $x = 9$ $x = 9$	10. $\frac{(x+1)}{(x+1)^3} + \frac{2x}{x+1} = \frac{2}{1} \cdot \frac{(x)(x+1)}{(x)(x+1)}$ $\frac{3x+3}{2x^2} = \frac{2x^2+2x}{-2x^2}$ $3x+3 = 2x$ $x+3 = 0$ $x = -3$ $x = -3$

IV. Solve each variation problem:

11. Your distance from lightning varies directly with the time it takes you to hear thunder. If you hear thunder 10 sec. after you hear lightning, you are about 2 miles from the lightning. About how many seconds would it take for thunder to travel a distance of 4 miles? $d = kt$ $2 = \frac{k \cdot 10}{10}$ $k = .2$ $4 = .2t$ $t = 20$ 20 seconds	12. The drama club is planning a bus trip to NYC. The cost per person varies inversely as the number of people going on the trip. It will cost \$30 per person if 44 people go on the bus. How much will it cost per person if 60 people go on the bus? $y = \frac{k}{x}$ $C = \frac{k}{p}$ $30 = \frac{k}{44}$ $1320 = k$ $C = \frac{1320}{60}$ $C = 22$
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13) Express using exponents: $-\sqrt{x} = x^{1/2}$

14) Express using exponents: $4\sqrt[3]{y^2} = 4y^{2/3}$

15) Express using exponents: $\frac{1}{\sqrt[4]{8x^2y^3}} = 8^{-1/4}x^{-2/4}y^{-3/4}$
 $= 8^{-1/4}x^{-1/2}y^{-3/4}$

16) Express using radicals: $x^{-1/2} = \frac{1}{\sqrt{x}}$

17) Express using radicals: $(4x)^{4/9} = \sqrt[9]{(4x)^4} = \sqrt[9]{256x^4}$

18) Express using radicals: $3x^{2/3} = 3\sqrt[3]{x^2}$

19) Given $-\frac{4}{x-3} + 4$ identify the following

Transformations: Reflect x-axis, Right 3, Up 4, Stretch by 4

Horizontal Asymptote: $y = 4$

Vertical Asymptote: $x = 3$