

Solving Radical Word Problems

- 1) The number of people, P , attending a party increases steadily from 6 pm to 1 am following the equation:

$$P = 12\sqrt[4]{t-6}, \text{ where } t \text{ is the time}$$

- graph the equation
- How many people are there at 7 pm?
- At what time are there 18 people in attendance?

a)

x	14
6	0
7	12
22	24



b) $p = 12\sqrt[4]{7-6} = 12$

c) $\frac{18}{12} = \frac{12\sqrt[4]{t-6}}{12}$

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

$$\frac{81}{16} = t-6$$

$$t = 6 + \frac{81}{16} = 11.0625$$

= just after 11 pm

- 2) The length, l (in inches), of a standard nail can be modeled by $l = 54d^{\frac{3}{2}}$ where d is the diameter (in inches) of the nail. What is the diameter of a standard nail that is 3 inches long?

$$l = 54d^{\frac{3}{2}}$$

$$3 = 54d^{\frac{3}{2}}$$

$$\left(\frac{3}{54}\right)^{\frac{2}{3}} = \left(d^{\frac{3}{2}}\right)^{\frac{2}{3}}$$

$$d = .146 \text{ inches}$$

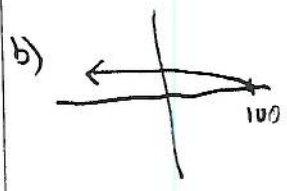
Use calc

3. A stone is dropped from a height of 100 feet. The time it takes the stone to reach a height h feet is given by the function $t = \frac{1}{4}\sqrt{100-h}$ where t is the time in seconds.

- a • identify the domain and range of the function
- b • sketch the graph of the function
- c • What is the height of the stone after 2 seconds?

$$\frac{-h+100}{4} = \frac{1}{4}\sqrt{100-h}$$

a) D: $(-\infty, 100]$ - don't know if ground level is lowest pt.
 R: $[0, \infty)$



k	t
100	0
99 1/4	1/4

c)

$$(2) = \left(\frac{1}{4}\sqrt{100-h}\right)$$

$$(8)^2 = (\sqrt{100-h})^2$$

$$64 = 100-h$$

$$-36 = -h$$

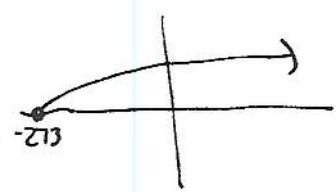
$$h = 36$$

4. The speed of sound in feet per second through air of any temperature can be measured in Celsius is given by:

$$V = \frac{1087\sqrt{273+t}}{16.52}$$

Where t is the temperature.

- identify the domain and the range of the function
- sketch the graph of the function
- What is the temperature of the air if the speed of sound is 1110 feet per second?



x	y
-273	0

D: $[-273, \infty)$
 R: $(0, \infty)$

$$1110 = \frac{1087\sqrt{273+t}}{16.52}$$

$$(16.870)^2 = (\sqrt{273+t})^2$$

$$x = 11.581$$