

14. The main portion of an iglu (Inuit spelling of the English word igloo) is approximately hemispherical in shape.

- a) For an iglu with diameter 3.6 m, determine a function that gives the vertical height,  $v$ , in metres, in terms of the horizontal distance,  $h$ , in metres, from the centre.
- b) What are the domain and range of this function, and how are they related to the situation?
- c) What is the height of this iglu at a point 1 m in from the bottom edge of the wall?



Pythag

$$a^2 + b^2 = c^2$$

$$h^2 + v^2 = (1.8)^2$$

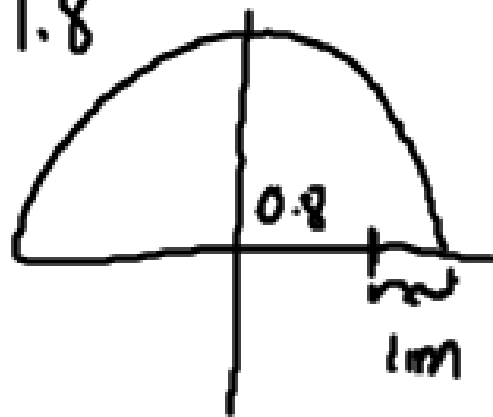
$$v^2 = 3.24 - h^2$$

$$v = \sqrt{3.24 - h^2}$$

$$\rightarrow h = 0.8$$

$$0 \leq v \leq 1.8$$

$$0 \leq h \leq 1.8$$



## 2.3

# Solving Radical Equations Graphically

Focus on...

- relating the roots of radical equations and the x-intercepts of the graphs of radical functions
- determining approximate solutions of radical equations graphically

IPC → Algebraical

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

$$\sqrt{x+2} = \sqrt{3x-2}$$

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

Always had  
to look for  
extraneous  
sol'n

Solve  $3 - \sqrt{x+1} = 1$  Graphically

Break up eqn at equal sign

$$y_1 = 1$$

$$y_2 = 3 - \sqrt{x+1}$$

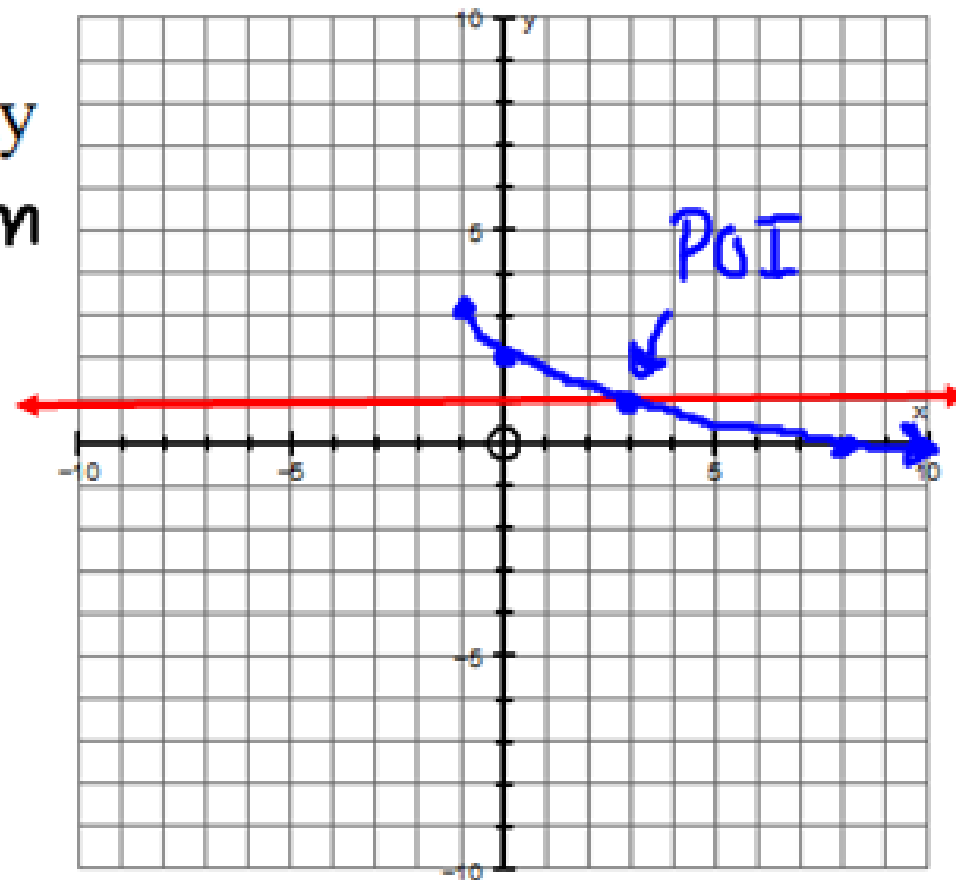
VS 1 HS 1

VT 3 HT -1

Rx Yes Ry No

$$(x, y) \rightarrow (x-1, -y+3)$$

$$\begin{array}{r|l} 0 & 0 \\ 1 & 1 \\ 4 & 2 \\ 9 & 3 \\ 16 & 4 \\ \hline & \\ & \\ & \\ & \\ & \end{array} \quad \begin{array}{r|l} 1 & 3 \\ 0 & 2 \\ 3 & 1 \\ 8 & 0 \\ 15 & -1 \\ \hline & \\ & \\ & \\ & \\ & \end{array}$$



- Point of intersection (3, 1)

- The solution to the eq<sup>n</sup>s is  $x=3$

Solve  $3 - \sqrt{x+1} = 1$  Graphically

$$3 - 1 = \sqrt{x+1} \quad \text{or} \quad 2 = \sqrt{x+1}$$

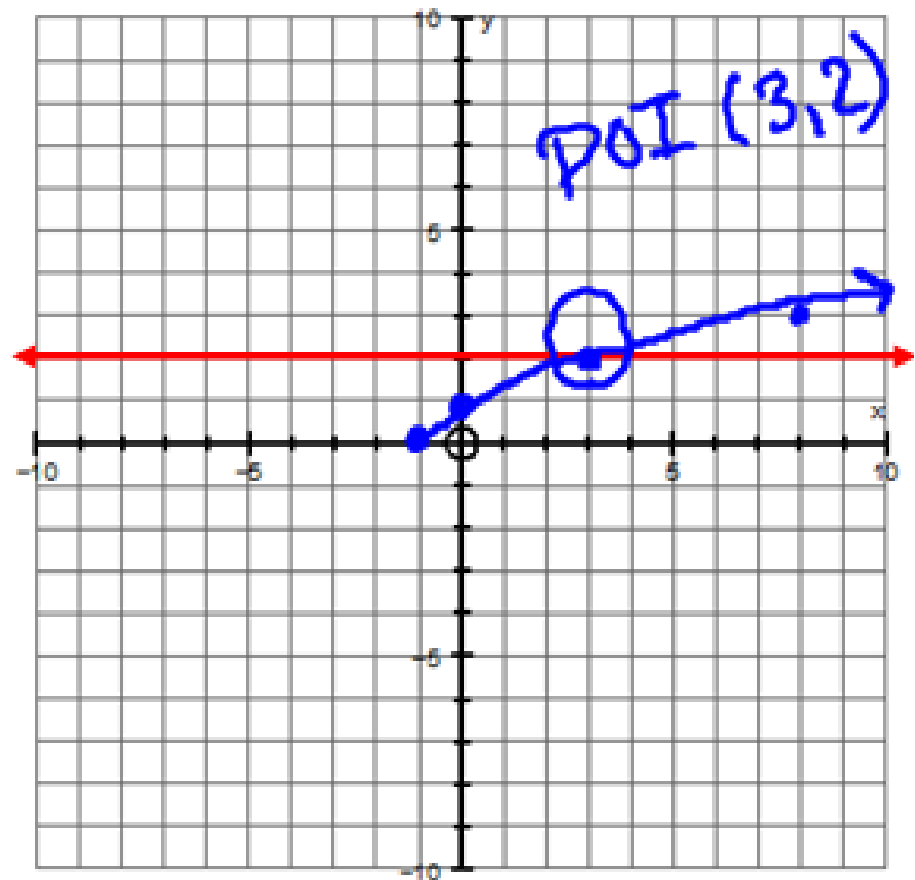
$$y_1 = 2$$

$$y_2 = \sqrt{x+1}$$

HT - 1

$$(x, y) \rightarrow (x-1, y)$$

|    |  |   |    |  |   |
|----|--|---|----|--|---|
| 0  |  | 0 | -1 |  | 0 |
| 1  |  | 1 | 0  |  | 1 |
| 4  |  | 2 | 3  |  | 2 |
| 9  |  | 3 | 8  |  | 3 |
| 16 |  | 4 | 15 |  | 4 |



graphical soln is (3,2)  
The answer to the eq'n is  $x=3$

Solve  $x - 3 = 2\sqrt{x+4} + 1$  Graphically

$$y_1 = x - 3$$

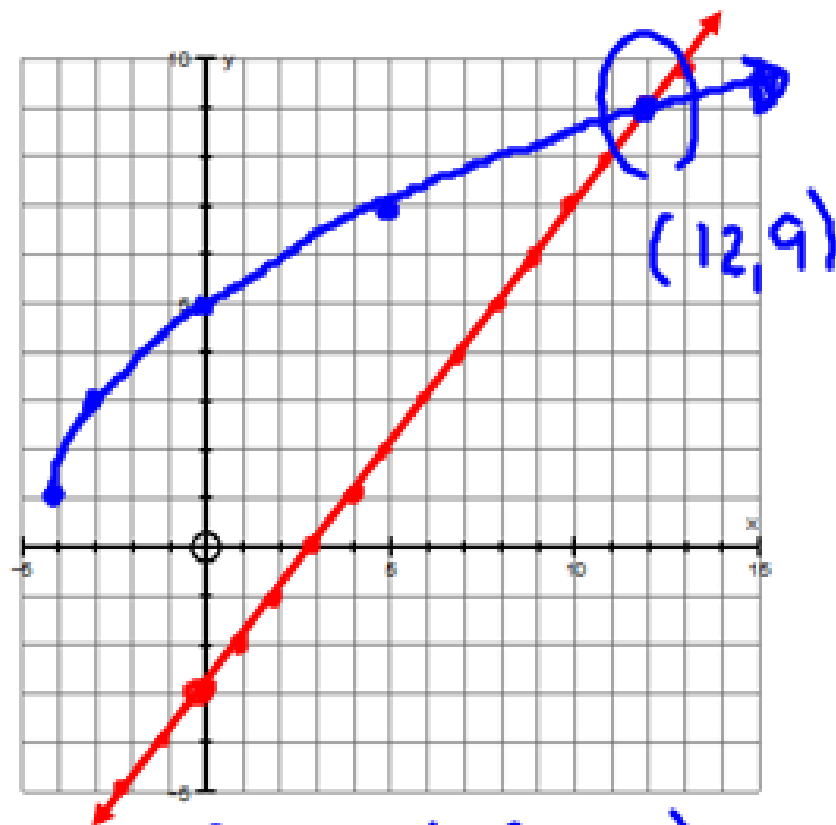
$$y_2 = 2\sqrt{x+4} + 1$$

VS 2 HS 1  
 VT 1 HT -4  
 Rx No Ry No

$$(x, y) \rightarrow (x-4, 2y+1)$$

$$\begin{array}{r|l} 0 & 0 \\ 1 & 1 \\ 4 & 2 \\ 9 & 3 \\ 16 & 4 \end{array}$$

$$\begin{array}{r|l} -4 & \\ -3 & \\ 0 & \\ 5 & \\ 12 & \end{array} \quad \begin{array}{l} - \\ 3 \\ - \\ 1 \\ 3 \end{array}$$



PGI at (12, 9)

answer is  $x=12$

Solve  $x-3=2\sqrt{x+4}+1$  ~~Graphically~~ Algebraically

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

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

$$(x-4)^2=(2\sqrt{x+4})^2$$

$$x^2-8x+16=4(x+4)$$

$$x^2-8x+16=4x+16$$

$$x^2-8x-4x+16-16=0$$

$$x^2-12x=0$$

$$x(x-12)=0$$

$$x=0 \quad x-12=0$$
$$x=12$$

Charged the eq'n and introduced the potential for an extraneous sol'n

Check

$x=0$   
reject  $\rightarrow$

$$0-3 \stackrel{?}{=} 2\sqrt{0+4}+1$$
$$\stackrel{?}{=} 2\sqrt{4}+1$$
$$-3 \neq 5$$

$x=12$

$$12-3 \stackrel{?}{=} 2\sqrt{12+4}+1$$
$$9 \stackrel{?}{=} 2(4)+1$$
$$9=9 \quad \checkmark$$

Solve  $-\frac{1}{2}x + 7 = \sqrt{2x + 4}$  Graphically

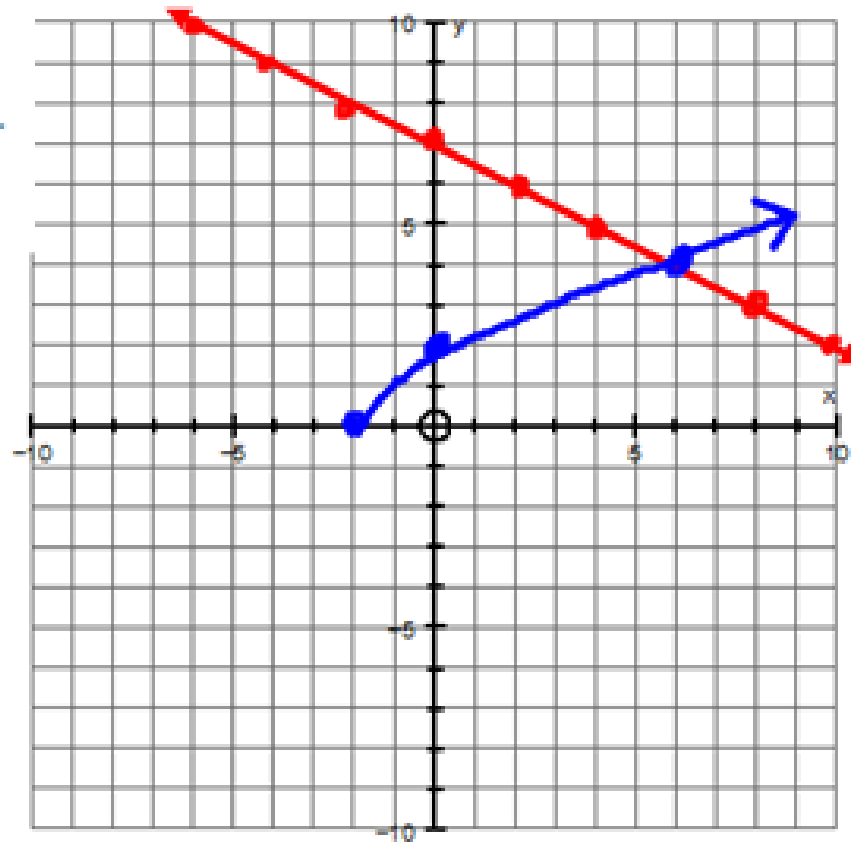
$$y_1 = -\frac{1}{2}x + 7 \quad \star$$

$$y_2 = \sqrt{2(x+2)}$$

HS  $\frac{1}{2}$  HT -2

$$(x, y) \rightarrow \left(\frac{1}{2}x - 2, y\right)$$

$$\begin{array}{r|l} 0 & 0 \\ 4 & 2 \\ 16 & 4 \\ 36 & 6 \end{array} \quad \begin{array}{r|l} 2 & 0 \\ 0 & 2 \\ 6 & 4 \\ 16 & 6 \end{array}$$



POI (6, 4)

answer:  $x = 6$

Solve  $-\frac{1}{2}x + 7 = \sqrt{2x+4}$  Graphically

mult each term by 2

$$-x + 14 = 2\sqrt{2x+4}$$

$$(-x+14)^2 = (2\sqrt{2x+4})^2$$

$$x^2 - 28x + 196 = 4(2x+4)$$

$$x^2 - 28x + 196 = 8x + 16$$

$$x^2 - 28x - 8x + 196 - 16 = 0$$

$$x^2 - 36x + 180 = 0$$

$$(x-30)(x-6) = 0$$

$$x = 30 \quad x = 6$$

Check

$$x = 30$$

$$-\frac{1}{2}(30) + 7 \stackrel{?}{=} \sqrt{2(30)+4}$$

$$-15 + 7 \stackrel{?}{=} \sqrt{64}$$

neg = pos

$\therefore$  reject  $x = 30$

HW

Pg 96 #1-7

Ch 1 review

Ch 2 review



