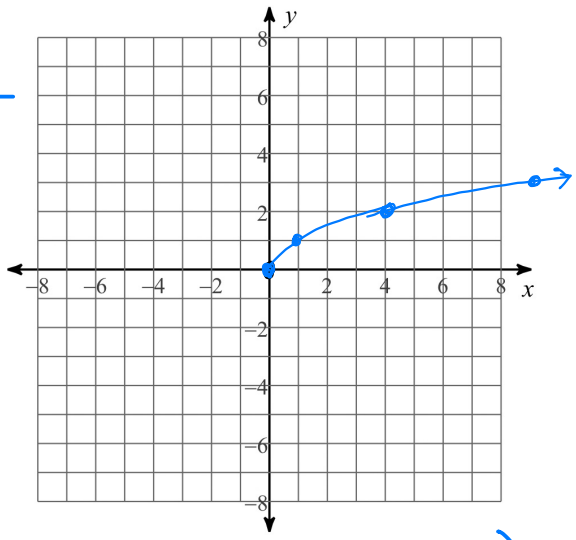
H Math 2 Name Key

Radical Functions

Identify the domain and range of each. Then sketch the graph. State x & y intercepts.

1) $y = \sqrt{x}$

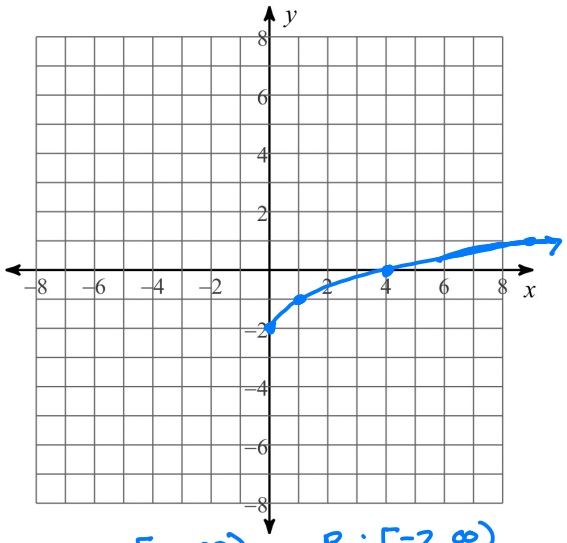
x	y
0	0
1	1
4	2
9	3
16	4
25	5



D: $[0,\infty)$ R: $[0,\infty)$

x-int $(0,0)$ y-int $(0,0)$

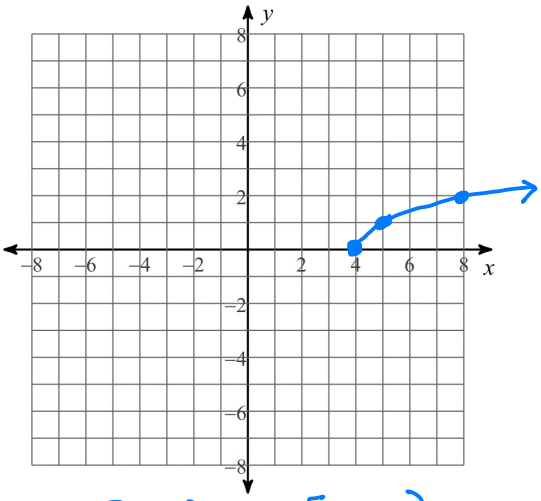
2) $y = \sqrt{x} - 2$ shift down 2



D: $[0,\infty)$ R: $[-2,\infty)$

x-int: $(4,0)$ y-int: $(0,-2)$

3) $y = \sqrt{x-4}$ shift right 4



D: $[4,\infty)$ R: $[0,\infty)$

x-int: $(4,0)$

$0^2 = \sqrt{x-4}^{\,2}$

$0 = x - 4$

$4 = x$

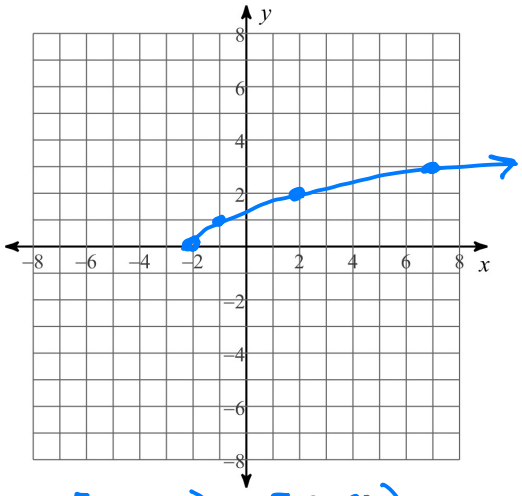
y-int: NONE

$y = \sqrt{0-4}$

$y = \sqrt{-4}$

$y = 2i$ so no y-int

4) $y = \sqrt{x+2}$ shift left 2



D: $[-2,\infty)$ R: $[0,\infty)$

x-int: $(-2,0)$ y-int: $(0,\sqrt{2})$

$y = \sqrt{0+2}$

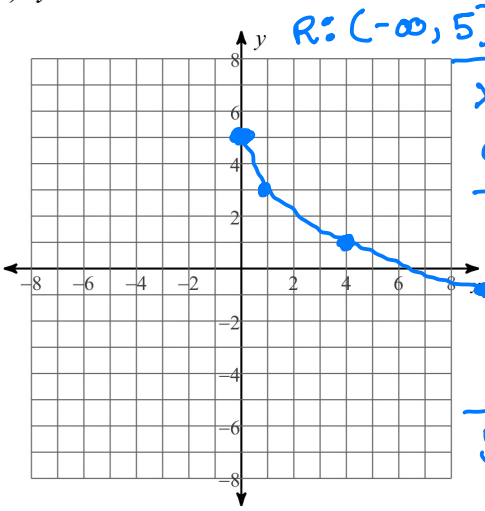
$y = \sqrt{2}$

• reflect over x-axis
• Vertical stretch by 2
• Shift up 5

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

D: $[0, \infty)$

R: $(-\infty, 5]$



x-int: $(6\frac{1}{4}, 0)$

$0 = -2\sqrt{x} + 5$

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

$\left(\frac{5}{2}\right)^2 = \left(\sqrt{x}\right)^2$

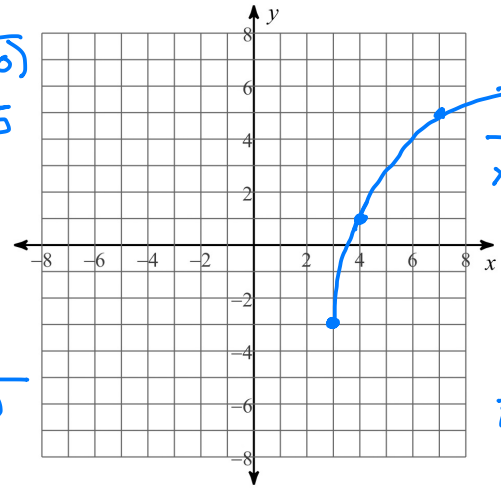
$x = \frac{25}{4}$

$x = 6\frac{1}{4}$

y-int: $(0, 5)$

• vertical stretch by 4
• Shift Right 3, down 3

6) $y = -3 + 4\sqrt{x-3}$ → $y = 4\sqrt{x-3} - 3$



D: $[3, \infty)$

R: $[-3, \infty)$

x-int $(3\frac{9}{16}, 0)$

$0 = 4\sqrt{x-3} - 3$

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

$\frac{9}{16} = x - 3$

$\frac{9}{16} + 3 = x$

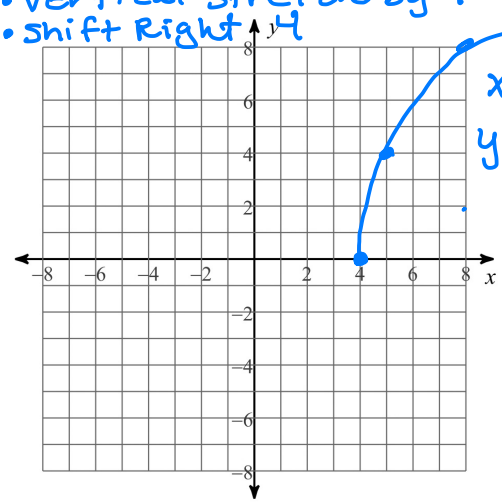
$3\frac{9}{16} = x$

y-int: NONE

7) $y = 4\sqrt{x-4}$

D: $[4, \infty)$ R: $[0, \infty)$

• vertical stretch by 4
• Shift Right 4

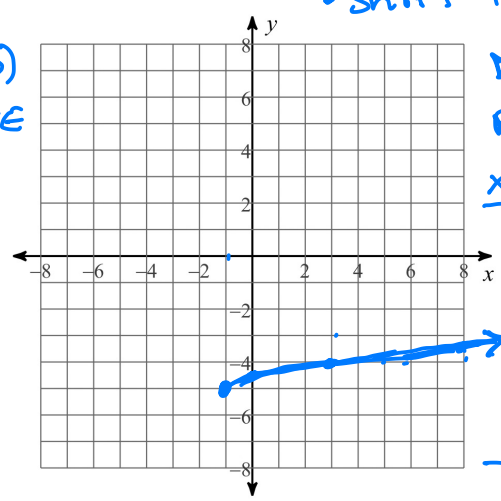


x-int: $(4, 0)$

y-int: NONE

8) $y = \frac{1}{2}\sqrt{x+1} - 5$

• vertical shrink by $\frac{1}{2}$
• shift left 1, down 5



D: $[-1, \infty)$

R: $[-5, \infty)$

x-int: $(99, 0)$

$0 = \frac{1}{2}\sqrt{x+1} - 5$

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

$10^2 = \left(\sqrt{x+1}\right)^2$

$100 = x + 1$

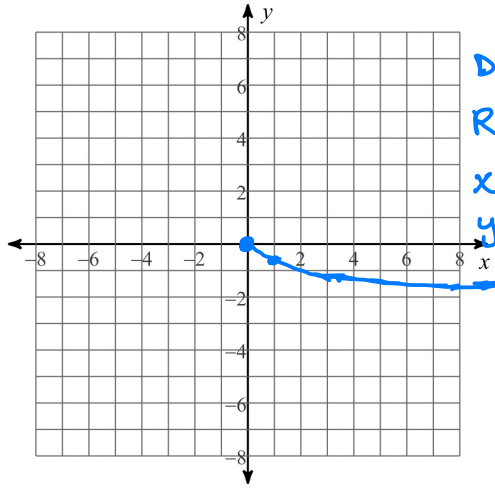
$99 = x$

y-int: $(0, -4.5)$

$y = \frac{1}{2}\sqrt{0+1} - 5$

9) $y = -\frac{1}{2}\sqrt{x}$

• Reflect over x-axis
• vertical shrink by $\frac{1}{2}$



D: $[0, \infty)$

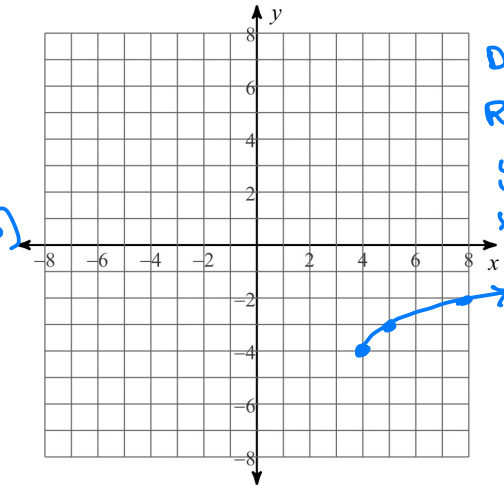
R: $(-\infty, 0]$

x-int: $(0, 0)$

y-int: $(0, 0)$

10) $y = \sqrt{x-4} - 4$

Shift right 4, down 4



D: $[4, \infty)$

R: $[-4, \infty)$

y-int: NONE

x-int: $(20, 0)$

$0 = \sqrt{x-4} - 4$

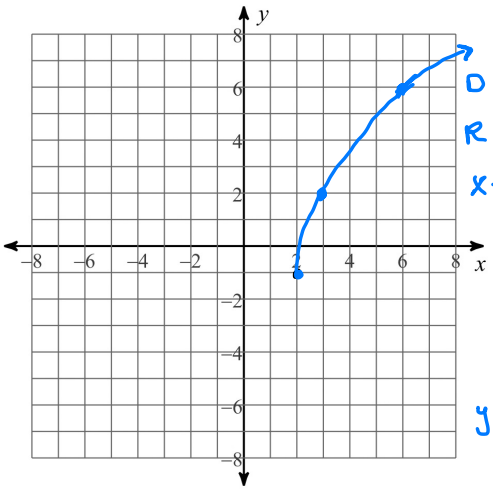
$4 = \sqrt{x-4}$

$16 = x - 4$

$20 = x$

11) $y = 3\sqrt{x-2} - 1$

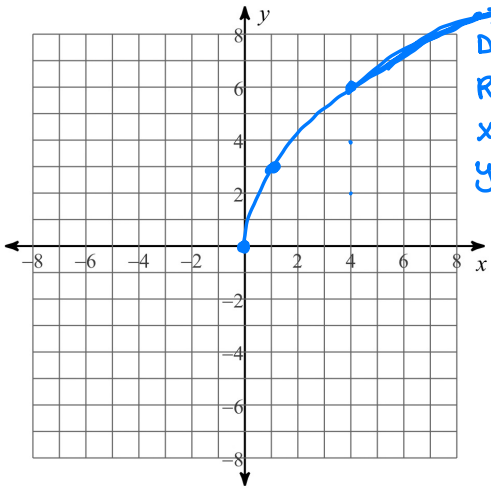
• vertical stretch by 3
• shift right 2, down 1



D: $[2, \infty)$
R: $[-1, \infty)$
x-int: $(2\frac{1}{9}, 0)$
$0 = 3\sqrt{x-2} - 1$
$\frac{1}{3} = \sqrt{x-2}$
$\frac{1}{9} = x - 2$
$2 + \frac{1}{9} = x$
y-int: NONE

12) $y = 3\sqrt{x}$

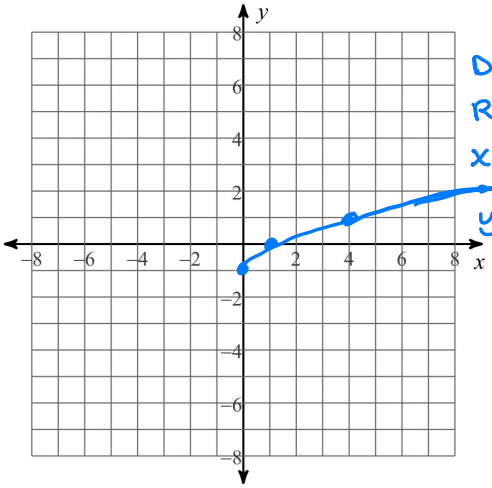
• vertical stretch by 3



D: $[0, \infty)$
R: $[0, \infty)$
x-int: $(0,0)$
y-int: $(0,0)$

13) $y = \sqrt{x} - 1$

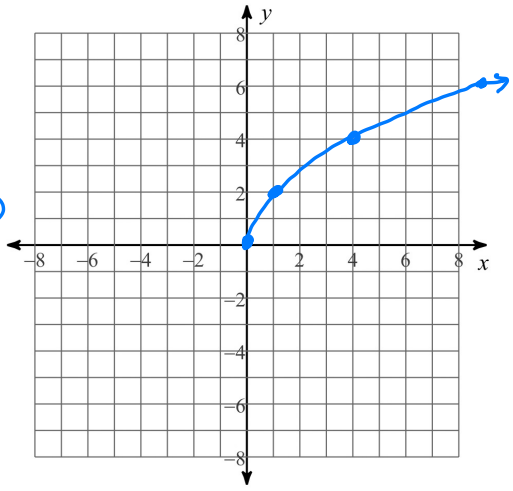
• Shift down 1



D: $[0, \infty)$
R: $[0, \infty)$
x-int: $(1,0)$
y-int: $(0,-1)$

14) $y = 2\sqrt{x}$

• vertical stretch by 2



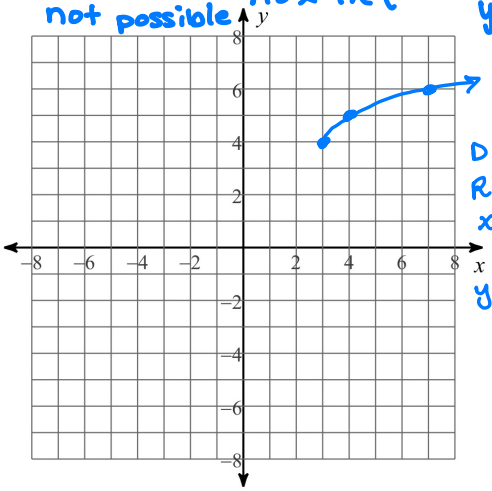
D: $[0, \infty)$
R: $[0, \infty)$
x-int: $(0,0)$
y-int: $(0,0)$

15) $y = \sqrt{x-3} + 4$

• Shift right 3, up 4

$0 = \sqrt{x-3} + 4$
$-4 = \sqrt{x-3}$
not possible
no x-int

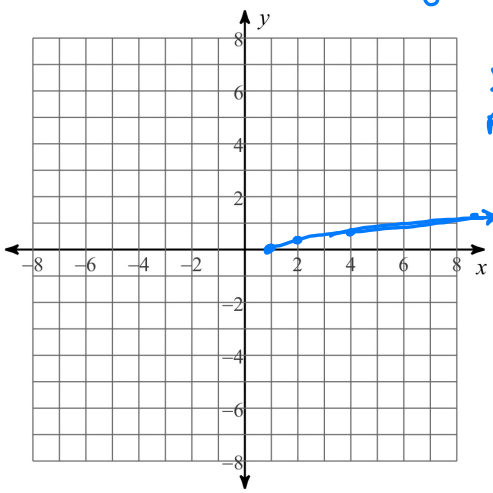
$y = \sqrt{0-3} + 4$
$y = \sqrt{-3} + 4$



D: $[3, \infty)$
R: $[4, \infty)$
x-int: NONE
y-int: NONE

16) $y = \frac{2}{5}\sqrt{x-1}$

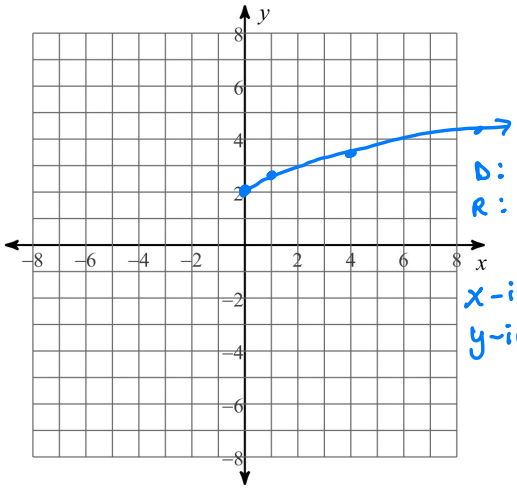
• vertical shrink by $\frac{2}{5}$
• shift right 1



D: $[1, \infty)$
R: $[0, \infty)$
x-int: $(1,0)$
y-int: NONE

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

• vertical shrink by $\frac{3}{4}$
• shift up 2

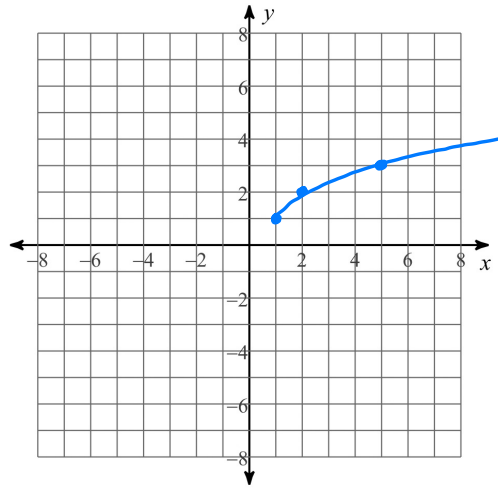


D: $[0, \infty)$
R: $[2, \infty)$

x-int: NONE
y-int: $(0, 2)$

18) $y = \sqrt{x-1} + 1$

• shift right 1, up 1

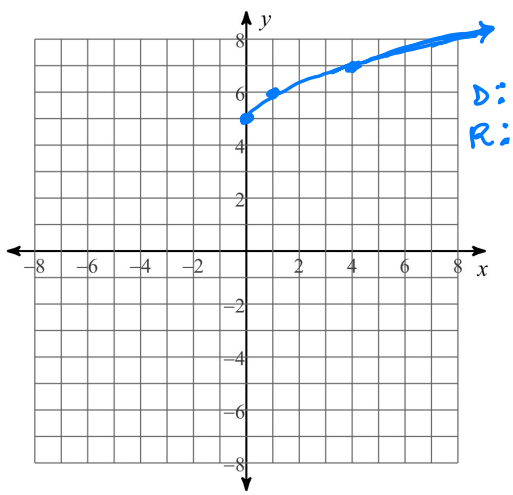


D: $[1, \infty)$
R: $[1, \infty)$

x-int: NONE
y-int: NONE

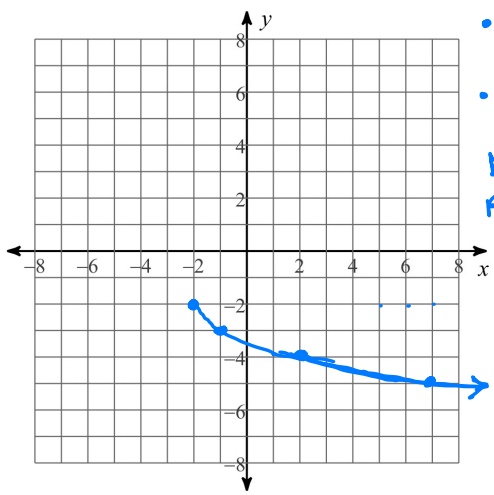
19) $y = \sqrt{x} + 5$

• shift up 5



D: $[0, \infty)$
R: $[5, \infty)$

20) $y = -2 - \sqrt{x+2}$ → $y = -\sqrt{x+2} - 2$



• reflect over x-axis
• shift left 2, down 2

D: $[-2, \infty)$
R: $(-\infty, -2]$
x-int: NONE
y-int: $(0, -2-\sqrt{2})$

$y = -2 - \sqrt{0+2}$
$y = -2 - \sqrt{2}$