

Identify the vertex of the following functions.

1) $y = (x - 1)^3 - 9$

V: (1, -9)

2) $f(x) = \sqrt[3]{x} + 5$

V: (0, 5)

3) $y = |x + 2| + 7$

V: (-2, 7)

Describe the shifts/transformations of the following equations and the shape they'd make if you were to graph them.

4) $y = (x - 2)^2 + 4$
right 2, up 4

U-shaped

5) $f(x) = \sqrt[3]{x+1} + 2$
left 1, up 2

snake/dolphin

6) $y = (x - 3)^3 - 1$
right 3, down 1

robot/stairs

Describe the change that occurs from the function $f(x) = |x| + 1$ to the equation below.

7) $y = |x + 2|$
←

moves left 2

8) $y = |x| - 5$
↓

moves down 6

9) $y = |x - 1| + 4$
→

moves right 1
moves up 3Describe the change that occurs from the function $f(x) = \sqrt{x}$ to the equation below.

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

moves down 4

11) $y = \sqrt{x - 4}$
←

moves right 4

12) $y = \sqrt{x + 1} - 2$
←

moves left 1, down 2

Describe the change that occurs from the function $f(x) = 3x - 2$ to the equation below.

13) $y = 3x + 1$

moves up 3

14) $y = 3x - 4$

moves down 2

15) $y = \frac{2}{3}x + 5$
y-int 15)

moves up 7
becomes less steep16) Identify the domain of the functions.

a) $y = (x + 1)^2$ $(-\infty, \infty)$

b) $y = 4x - 3$ $(-\infty, \infty)$

c) $y = \sqrt[3]{x} - 2$ $(-\infty, \infty)$

d) $y = (x - 5)^3 - 2$ $(-\infty, \infty)$

e) $y = \sqrt{x - 4} + 1$ $[4, \infty)$

17) Identify the range of the functions.

a) $y = (x - 2)^3 + 1$ $(-\infty, \infty)$

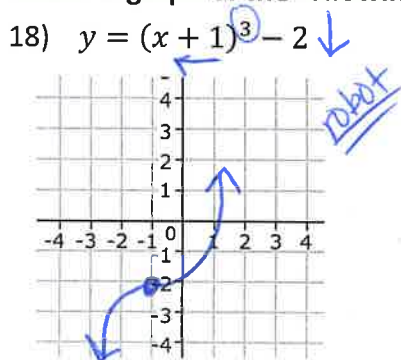
b) $y = (x + 3)^2 + 2$ $[2, \infty)$

c) $y = |x + 4| - 1$ $[-1, \infty)$

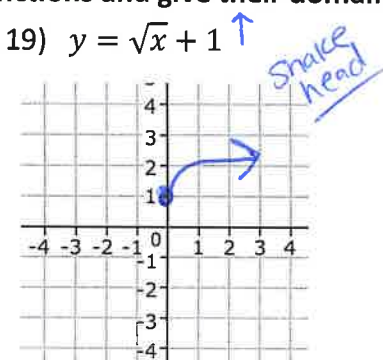
d) $y = \sqrt[3]{x + 2} + 3$ $(-\infty, \infty)$

e) $y = \frac{1}{2}x + 3$ $(-\infty, \infty)$

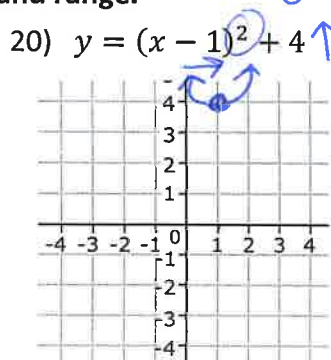
Sketch a graph of the following functions and give their domain and range.



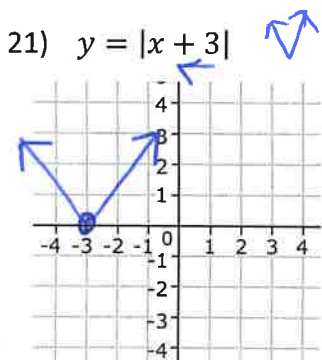
D: $(-\infty, \infty)$
R: $(-\infty, \infty)$



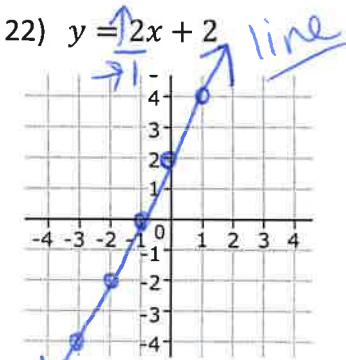
D: $[0, \infty)$
R: $[1, \infty)$



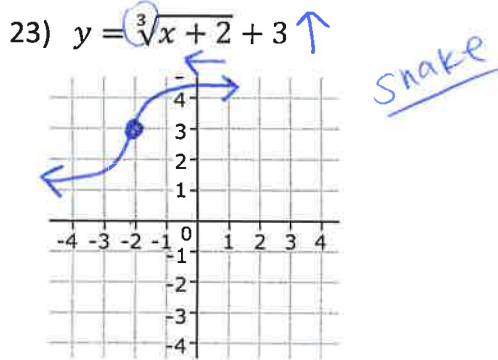
D: $(-\infty, \infty)$
R: $[4, \infty)$



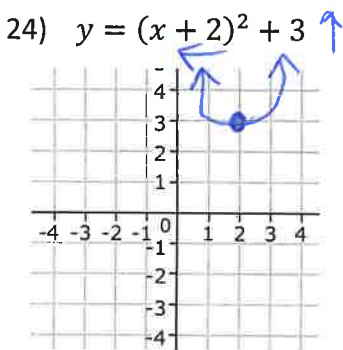
D: $(-\infty, \infty)$
R: $[0, \infty)$



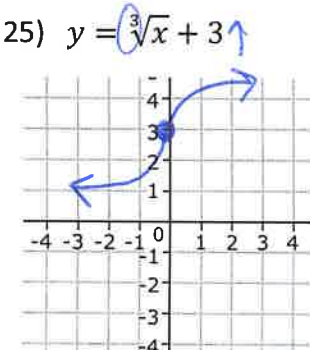
D: $(-\infty, \infty)$
R: $(-\infty, \infty)$



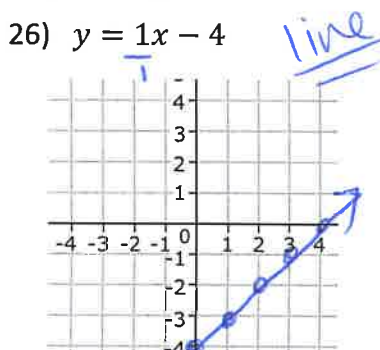
D: $(-\infty, \infty)$
R: $(-\infty, \infty)$



D: $(-\infty, \infty)$
R: $[3, \infty)$



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



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