

1. Solve by Completing The Square

$$m^2 - 6m + 2 = 0$$

$$m^2 - 6m + 9 = -2 + 9$$

$$\sqrt{(m-3)^2} = \sqrt{7}$$

$$m - 3 = \pm \sqrt{7}$$

$$+3 \quad +3$$

$$m = 3 \pm \sqrt{7}$$

opp as is

2. Solve by Completing The Square

$$x^2 + 8x = 21$$

$$x^2 + 8x + 16 = 21 + 16$$

$$\sqrt{(x+4)^2} = \sqrt{37}$$

$$x + 4 = \pm \sqrt{37}$$

$$-4 \quad -4$$

$$x = -4 \pm \sqrt{37}$$

3. Multiply

a. $(m^3 - 2)(5m - n)$

$$5m^4 - m^3n - 10m + 2n$$

b. $(5x^3)(4y^2) = 20x^3y^2$

c. $7xy(3x^2 + 4y - 2)$

$$21x^3y + 28xy^2 - 14xy$$

d. $(x - 5)^2$

$$(x-5)(x-5)$$

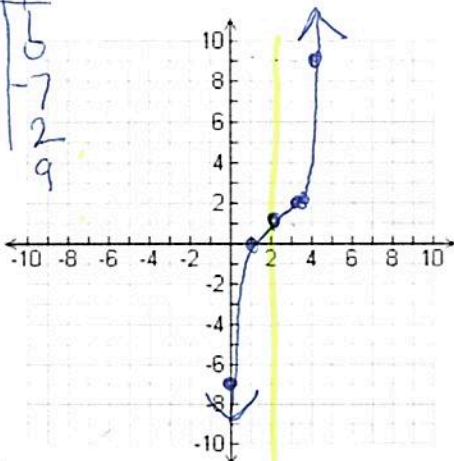
$$x^2 - 5x - 5x + 25$$

$$x^2 - 10x + 25$$

4. Graph $g(x) = (x - 2)^3 + 1$

$v: (2, 1)$

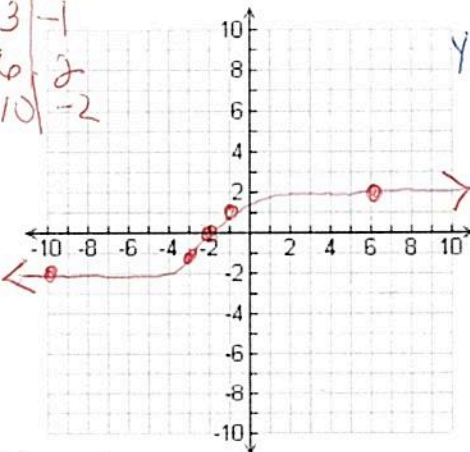
x	y
2	1
1	0
0	-7
3	2
4	9



5. Graph $h(x) = \sqrt[3]{x+2}$

$v: (-2, 0)$

x	y
-2	0
-1	1
-3	-1
6	2
-10	-2

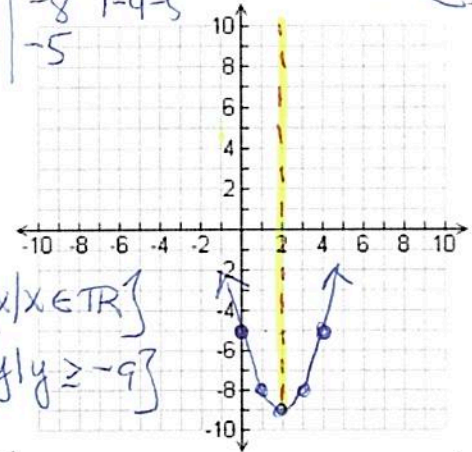


6. Graph $h(x) = x^2 - 4x - 5$

$v: (2, -9)$

x	y
2	-9
1	-8
0	-5

$\frac{4}{2(1)} = 2$
 $4 - 8 - 5 = -9$



$D: \{x | x \in \mathbb{R}\}$
 $R: \{y | y \geq -9\}$

7. Tell whether the function is linear, quadratic or exponential.

Explain.

$\{(-4, 8), (-2, 2), (0, 0), (2, 2), (4, 8)\}$

x	y
-4	8
-2	2
0	0
2	2
4	8

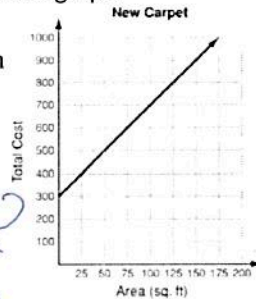
2nd difference is the same

8. The Johnsons are putting new carpet in their home. Installation is \$300 and the carpeting costs \$4 per square foot. The total price of the job as a function of area is shown in the graph.

a. Write an equation that represents the total price as a function of area.

$$y = 4x + 300$$

\uparrow \uparrow
 m b



b. Identify the slope and y-intercept and describe their meanings.

m: cost per sq. foot \$4

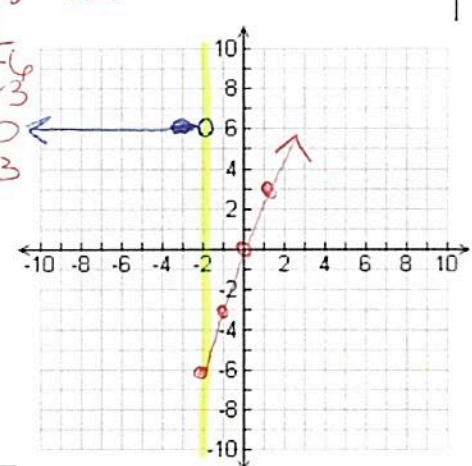
b: installation fee (price with "0" sq. feet)

9. Graph the piecewise function

$$f(x) = \begin{cases} 6, & \text{if } x < -2 \\ 3x, & \text{if } x \geq -2 \end{cases}$$

$f(x) = 6$
 $f(x) = 3x$

x	y
-2	-6
-1	-3
0	0
1	3



10. Write a recursive and explicit rule for the geometric sequence

$-16, 4, -1, \frac{1}{4}, \dots$
 $r = -\frac{1}{4}$
 $a_1 = -16$

R: $A_n = r \cdot A_{n-1}, A_1 = ?$
 $A_n = (-\frac{1}{4})A_{n-1}, A_1 = -16$

E: $A_n = a_1(r^{n-1})$
 $A_n = -16(-\frac{1}{4}^{n-1})$

Find the next two terms.

$-\frac{1}{16}, \frac{1}{64}$

11. Solve for b ; $A = \frac{a+b+c}{3}$

$3A = a + b + c$
 $-a \quad -c$

$3A - a - c = b$

12. a) Solve for a ; $d = \frac{1}{2}at^2$

$\frac{2d}{1t^2} = a$ $\frac{1}{2}t^2 \quad \frac{1}{2}t^2$

b) Solve for v ; $F = \frac{mv^2}{r}$

$\frac{Fr}{m} = \frac{mv^2}{m}$
 $\sqrt{\frac{Fr}{m}} = \sqrt{v^2}$ $\frac{Fr}{m} = v^2$

13. How many solutions and what type of solution does the equation $x^2 - 4x = 12$ have?

$x^2 - 4x - 12 = 0$
 $b^2 - 4ac = 0$
 $a = 1$
 $b = -4$
 $c = -12$

$16 - 4(1)(-12) = 64$
2 SOLUTIONS

Pos \rightarrow 2 SOL
 0 \rightarrow 1 SOL
 Neg \rightarrow 0 SOL

14. The elephant population in northwestern Namibia and Etosha National Park can be predicted by the expression $f(b) = 2649(1.045)^b$, where b is the number of years since 1995. Is this exponential growth or decay? growth

What is the growth/decay rate? 4.5%

What does the value 2,649 represent?
y-intercept

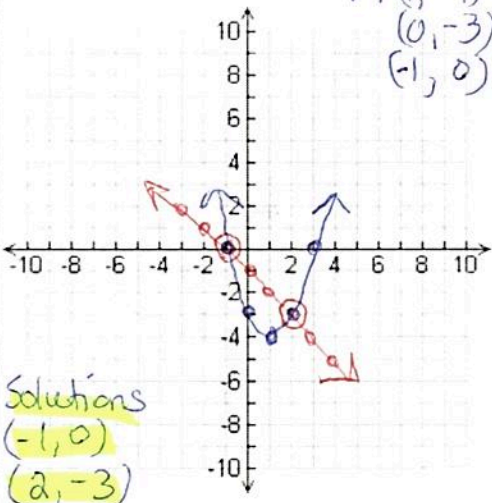
- A. The predicted increase in the number of elephants in the region each year
- B.** The predicted number of elephants in the region in 1995
- C. The year when the elephant population is predicted to stop increasing
- D. The percentage the elephant population is predicted to increase each year

15. Solve the system $\begin{cases} 4x - y = 2 \\ y = x^2 + 1 \end{cases}$

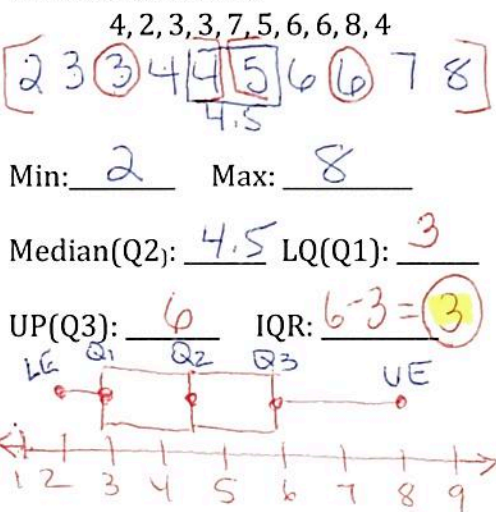
$4x - (x^2 + 1) = 2$
 $4x - x^2 - 1 = 2$
 $x^2 - 4x + 3 = 0$
 $(x - 3)(x - 1) = 0$
 $x = 3 \quad x = 1$
 $y = 3^2 + 1 = 10$ $(3, 10)$
 $y = 1^2 + 1 = 2$ $(1, 2)$

16. Solve the nonlinear system by graphing.

$\begin{cases} y = x^2 - 2x - 3 \\ y = -x - 1 \end{cases}$
 $2x(1) = 2$
 $1 - 2 - 3 = -4$
 $v: (1, -4)$
 $(0, -3)$
 $(-1, 0)$



17. Draw a box and whisker plot for the data below.



18. Find the average rate of change of the function $f(x) = x^2 + 5$ over the interval $[1, 4]$.

$\frac{f(b) - f(a)}{b - a}$
 $\frac{21 - 6}{4 - 1} = \frac{15}{3} = 5$
ARC

Is the average rate of change of a quadratic function constant or variable? Explain.
Variable. It changes depending on the interval.