

Ch 1: Functions

1. Determine the inputs/outputs for the given functions

a.

$x = -6$

$f(x) = |x-2|$

$f(x) = ?$

8

b.

$x = -6$

$f(x) = |x-2|$

$f(x) = ?$

8

c.

$h(x) = \sqrt{5-x}$

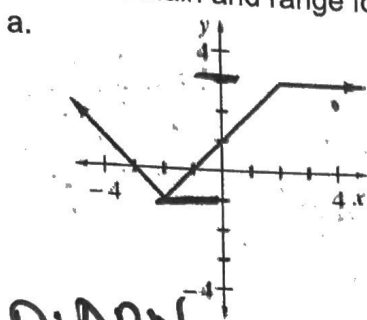
$h(9) = ?$

$\sqrt{5-9}$

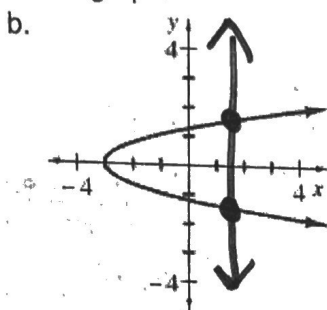
$\sqrt{-4}$

Not possible

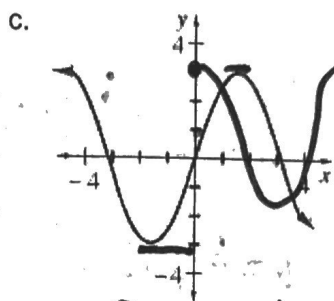
2. Determine if the following graphs are functions or not. Explain why or why not. Identify the domain and range for each graph.



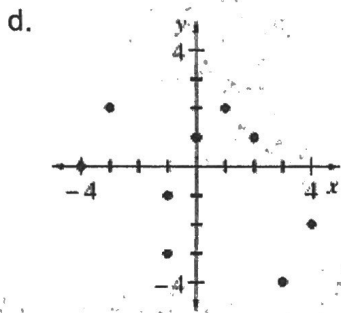
D: ARN
R: $-1 \leq y \leq 3$



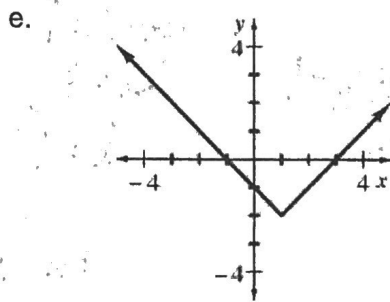
Not a function



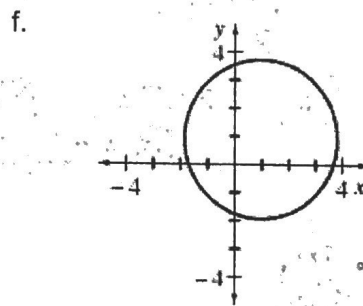
D: ARN
R: $-3 \leq y \leq 3$



Not a function



D: ARN
R: $y \geq -2$



Not a function

3. The following information is given for a tile pattern: Figure 3 and the corresponding graph. What is the rule for this tile pattern? What is the growth rate? How many tiles will Figure 0 have?

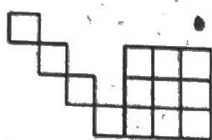


Figure 3

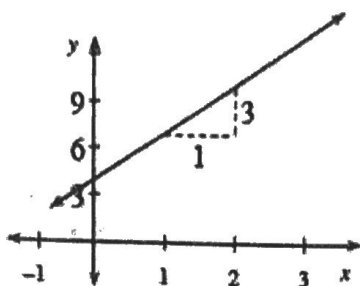


Figure 0 has 4 tiles.

The growth rate is 3.

Rule: $y = 3x + 4$

Ch 2: Linear Relationships

4. Write an equation of a line that:

- a. Passes through the points $(-2, 4)$ and $(12, 16)$

$$\frac{16-4}{12-(-2)} = \frac{12}{14} = \frac{6}{7}$$

$$y = \frac{6}{7}x + b$$

$$4 = \frac{6}{7}(-2) + b$$

$$y = \frac{6}{7}x + \frac{55}{7}$$

$$4 = -\frac{12}{7} + b \quad b = \frac{55}{7}$$

- b. Passes through the point $(-6, 7)$ and has a slope of -4

$$7 = -4(-6) + b$$

$$7 = 24 + b \quad b = -17$$

$$y = -4x - 17$$

Ch 3: Simplifying and Solving

5. Solve the following absolute value functions

- a. $3|x+5| + 4 = 7$

$$\frac{3|x+5|}{3} = \frac{3}{3}$$

$$|x+5| = 1 \quad x+5 = 1 \quad x+5 = -1$$

$$x = -4, -6$$

- b. $|2x-7| - 5 = -4$

$$|2x-7| = 1$$

$$2x-7 = 1 \quad 2x-7 = -1$$

$$2x = 8 \quad 2x = 6$$

$$x = 4 \quad x = 3$$

6. Simplify each expression

- b. $(2x+6)(2x-6)$

$2x$	$+6$
$4x^2$	$+12x$
$-12x$	-36

$$4x^2 - 36$$

- b. $(3x+7)^2$

$3x$	$+7$
$9x^2$	$+21x$
$+21x$	$+49$

$$9x^2 + 42x + 49$$

- c. $(a^2b^4)^3$

$$a^6b^{12}$$

- d.

$$\frac{54x^9y^{-4}}{-9x^8y^{-2}}$$

$$-6xy^{-2} \rightarrow \frac{-6x}{y^2}$$

10. There are 20 hardcover and paperback books in a box. There are 10 more hardcover books than paperback books. Write and solve a system of linear equations to find the number of paperback books and the number of hardcover books.

$$\begin{aligned}
 h + p &= 20 \\
 h &= p + 10 \\
 p + 10 + p &= 20 \\
 2p + 10 &= 20 \\
 2p &= 10 \\
 p &= 5 \\
 h &= p + 10 \\
 h &= 5 + 10 \\
 h &= 15
 \end{aligned}$$

Ch 5/7: Exponential Functions

11. Movie tickets now average \$9.75 a ticket, but are increasing 15% per year. How much will they cost 5 years from now?

$$\begin{aligned}
 y &= 9.75(1 + 0.15)^t \\
 y &= 9.75(1.15)^5 = \$18.25
 \end{aligned}$$

12. Does the following function represent exponential growth or decay? What is the percent change?

a. $y = 3(1.08)^x$

Growth
8%

b. $y = \frac{1}{2}(1.12)^x$

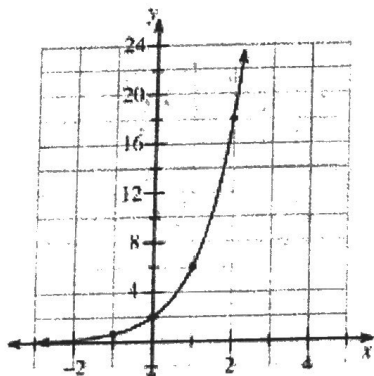
Growth
12%

c. $y = 4(0.80)^x$

Decay
20%

13. Write an equation for the following graph/table

a.



$$y = 2(3)^x$$

b.

x	-1	0	1	2	3
y	8	4	2	1	0.5

$$y = 4\left(\frac{1}{2}\right)^x$$

7. Solve the following equations for the given variable

c. $2x - 3y = 9$ (for x)

$$\frac{2x}{2} = \frac{3y+9}{2}$$

$$x = \frac{3y+9}{2}$$

d. $V = \sqrt[3]{s}$ (for s)

$$s = \sqrt[3]{V}$$

b. $5x + 3y = 15$ (for y)

$$3y = -5x + 15$$

$$y = -\frac{5}{3}x + 5$$

d. $a^3 + b = c^2$ (for a)

$$a = \sqrt[3]{c^2 - b}$$

$$a = \sqrt[3]{c^2 - b}$$

Ch 4: System of Equations

8. Solve the following system of equations using the specified method

a. Equal Values Method

$$y = 0.5x - 5$$

$$y = 1.5x + 1$$

$$0.5x - 5 = 1.5x + 1$$

$$-0.5x - 1 = 0.5x + 1$$

$$-6 = 1x$$

$$x = -6$$

$$(-6, -4)$$

$$y = 0.5(-6) - 5$$

$$y = -3 - 5$$

$$y = -8$$

b. Substitution

$$\frac{1}{2}y + x = -10$$

$$y = -2x - 20$$

$$\frac{1}{2}(-2x - 20) + x = -10$$

$$-x - 10 + x = -10$$

$$0 = 0$$

$$\text{IMS}$$

c. Elimination

$$y - x = 14$$

$$-1(y - x = 5)$$

$$-y + x = -5$$

$$0 = 9$$

No

Solution

9. There are 28 horses and sheep in a field. There are 6 times as many sheep as horses. Write and solve a system of linear equations to find the number of horses and the number of sheep.

$$h + s = 28$$

$$s = 6h$$

$$h + 6h = 28$$

$$7h = 28$$

$$h = 4$$

$$s = 6(4)$$

$$s = 24$$

14. Rewrite the following expressions in radical form

b. $16^{5/4}$
 $(\sqrt[4]{16})^5$

b. $(-8)^{2/3}$
 $(\sqrt[3]{-8})^2$

c. $(-27)^{2/3}$
 $(\sqrt[3]{-27})^2$

Ch 8: Quadratic Functions

15. Solve the following quadratic expressions for x using the specified method

a. Factoring

$2x^2 + 5x - 3 = y$

	x	3	
2x	2x ²	6x	
-1	-1x	-3	

$(x+3)(2x-1)$

b. Square Roots

$y = 3x^2 - 64$

~~$3x^2 = 64$~~
 ~~$x^2 = 64/3$~~
 ~~$x = \pm \sqrt{64/3}$~~
 ~~$x = \pm 8/\sqrt{3}$~~
 Skip this one

c. Completing the square

$x^2 + 2x - 3 = y$

$(x+1)^2 = 4$
 $x+1 = \pm 2$
 $x = -3, 1$

x	1	
x ²	2x	1

$(x+1)^2 = 4$
 $(x+1) - 4 = 4$

d. Quadratic formula

$-6x^2 - x + 6 = y$

$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{1 \pm \sqrt{(-1)^2 - 4(-6)(6)}}{2(-6)}$
 $= \frac{1 \pm \sqrt{145}}{-12}$

16. For the following function, find the roots, line of symmetry, vertex, and y-intercept. Then graph the function

$x^2 + 7x + 6 = y$

Roots: $(-6, 0), (-1, 0)$

Line of symmetry: $x = -\frac{7}{2}$ or -3.5

Vertex: $(-3.5, -6.25)$

y-intercept: $(0, 6)$

x	+1	
x ²	7x	6

$(x+6)(x+1) = 0$
 $x = -6, -1$

$(-\frac{7}{2})^2 + 7(-\frac{7}{2}) + 6 = y$
 $6x + 12.25 + (-49.5) + 6 = y$
 $12.25 - 18.5 = y$
 $y = -6.25$
 $\frac{-b-1}{2} = -\frac{7}{2}$

