1f Which function represents the sequence?

n	1	2	3	4	5	...
a_n	3	10	17	24	31	...

A. $f(n) = n + 3$ $1+3=4$ ✗
B. $f(n) = 7n - 4$ $7(1)-4=3$ ✓
C. $f(n) = 3n + 7$ $3(1)+7=10$ ✗
D. $f(n) = n + 7$ $1+7=8$

* plug in values for n and check for a_n *

n is going up by 1 and a_n is going up by 7

- Slope $= \frac{7}{1} = 7$
- y-int is $x=0$ ($n=0$) $3-7=-4$ ($n=1$)

$7n-4$

2f **Each week, Tim wants to increase the number of sit-ups he does daily by 2 sit-ups. The first week, he does 15 sit-ups each day.**

Write an explicit function in the form $f(n) = mn + b$ to represent the number of sit-ups, $f(n)$, Tim does daily in week n.

Days	Sit-ups	
1	15	+2
2	17	+2
3	19	

$f(n) = 2n + 13$

- y-int
- days = 0
- going up by 2 so go down by 2
- $15 - 2 = 13$

1g Look at the sequence in this table.

n	1	2	3	4	5	...
a_n	−1	1	3	5	7	...

+1 +1 +1

+2 +2 +2 +2

Which function represents the sequence?

A. $a_n = a_{n-1} + 1$
B. $a_n = a_{n-1} + 2$
C. $a_n = 2a_{n-1} - 1$
D. $a_n = 2a_{n-1} - 3$

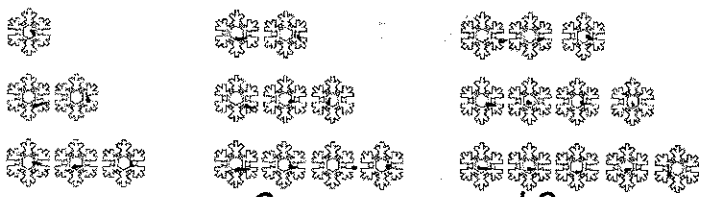
a_{n-1} tells me to look at a_n of the one before the one I want and see what to do to set my a_n . . . .

I want $n = 2$ so look at $n = 1$ $\{a_{n-1}\} = -1$

How do I get to $a_2 = 1$ from -1, I have to add 2

2. Consider this pattern.

$n =$ 1 2 3



$a_n =$ 6 9 12

Which function represents the sequence that represents the pattern?

A. $a_n = a_{n-1} - 3$
B. $a_n = a_{n-1} + 3$
C. $a_n = 3a_{n-1} - 3$
D. $a_n = 3a_{n-1} + 3$

Take a_n of one before and add 3

3g Which function is modeled in this table?

x	f(x)
1	8
2	11
3	14
4	17

+1 +3
+1 +3
+1 +3

m = 3/1 b = 8 − 3 = 5

A. $f(x) = x + 7$
B. $f(x) = x + 9$
C. $f(x) = 2x + 5$
D. $f(x) = 3x + 5$

$y = mx + b$
$y = 3x + 5$

4g Which explicit formula describes the pattern in this table? linear

d	C
2	6.28
3	9.42
5	15.70
10	31.40

1 → 3.14
2 → 6.28

$\frac{3.14}{1} = 3.14$

$\frac{6.28}{2} = 3.14$

$m = 3.14$

A. $d = 3.14 \times C$
B. $3.14 \times C = d$
C. $31.4 \times 10 = C$
D. $C = 3.14 \times d$

$C = 3.14d + 0$

find y-in by going back 2 units on table from 2
So go back $3.14(2)$ on C part of table

$6.28 - 3.14(2) = 0$

$f(x) = 4(x) - 20$

5 If $f(12) = 4(12) - 20$, which function gives $f(x)$?

A. $f(x) = 4x$
B. $f(x) = 12x$
C. $f(x) = 4x - 20$
D. $f(x) = 12x - 20$

1h A wild horse runs at a rate of 8 miles an hour for 6 hours. Let y be the distance, in miles, the horse travels for a given amount of time, x, in hours. This situation can be modeled by a function.

Which of these describes the domain of the function?

A. $0 \leq x \leq 6$
B. $0 \leq y \leq 6$
C. $0 \leq x \leq 48$
D. $0 \leq y \leq 48$

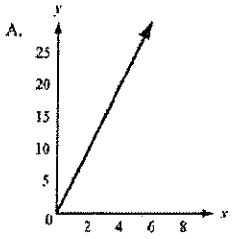
x values → hours → more or equal to zero
no more than 6

$x \geq 0$
$x \leq 6$

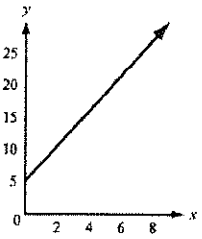
fixed cost ↑ Variable cost ↗

1 To rent a canoe, the cost is $3 for the oars and life preserver, plus $5 an hour for the canoe. Which graph models the cost of renting a canoe?

A.

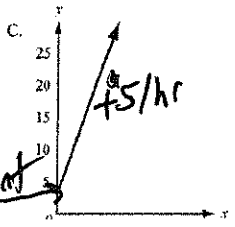


B.



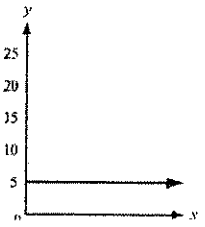
Start at fixed cost → y-int
go up by variable

C.

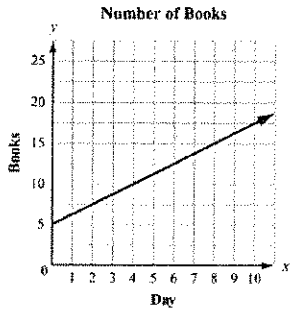


3 y-int

D.



2. Juan and Patti decided to see who could read more books in a month. They began to keep track after Patti had already read 5 books that month. This graph shows the number of books Patti read for the next 10 days and the rate at which she will read for the rest of the month.



If Juan does not read any books before day 4 and he starts reading at the same rate as Patti for the rest of the month, how many books will he have read by day 12?

A. 5
B. 10
C. 15
D. 20

start 5
+4 4 days 10 books +5
8 days 15 books

day 4 he is 10 books behind

day 12

- Patti is reading 5 every 4 days
- 12 days is 20 books
- He starts 10 books behind

1j Which expression is equivalent to $121x^2 - 64y^2$?

A. $(11x - 16y)(11x + 16y)$
B. $(11x - 16y)(11x - 16y)$
C. $(11x + 8y)(11x + 8y)$
D. $(11x + 8y)(11x - 8y)$

Perfect square

perfect square

difference of perfect squares

$(\ +\ )(\ -\ )$

$(11x+\ )(11x-\ )$

$(11x+8y)(11x-8y)$

What goes into (divides) every term or What can I multiply together to get result

2j What is a common factor for the expression $24x^2 + 16x + 144$?

A. 16
B. $8x$
C. $8x^2 + 2x + 18$
D. $8(x - 2)(3x^2 + 9)$

$24x^2 + 16x + 144$

factor out 8

$8(3x^2 + 2x + 18)$

8 and $3x^2 + 2x + 18$

3j Which of these shows the complete factorization of $6x^2y^2 - 9xy - 42$?

A. $3(2xy^2 - 7)(xy^2 + 2)$
B. $(3xy + 6)(2xy - 7)$
C. $3(2xy - 7)(xy + 2)$
D. $(3xy^2 + 6)(2xy^2 - 7)$

* expand each by multiplying it

A) 3 *

	$2xy^2$	-7
xy^2	$2x^2y^4$	
$+2$		

B)

	$3xy$	6
$2xy$	$6x^2y^2$	$12xy$
-7	$-21xy$	-42

$6x^2y^2 - 9xy - 42$ but → not complete

C) $3xy + 6$ can factor to $3(xy+2)$ then have $2xy - 7$

1K What are the zeros of the function represented by the quadratic expression $2x^2 + x - 3$?

A. $x = -\frac{3}{2}$ and $x = 1$

B. $x = -\frac{2}{3}$ and $x = 1$

C. $x = -1$ and $x = \frac{2}{3}$

D. $x = -1$ and $x = -\frac{3}{2}$

poly - sol'n

$a = 2$
$b = 1$
$c = -3$

factor

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

-3 factors

$1 \cdot -3$
$-3 \cdot 1$

2k What is the vertex of the graph of $f(x) = x^2 + 10x - 9$?

A. (5, 66)
B. (5, –9)
C. (–5, –9)
D. (–5, –34)

Vertex $\frac{-b}{2a}$ $\frac{-10}{2(1)} = -5 =$ x value

evaluate for y

$(-5)^2 + 10(-5) - 9$

$25 + -50 - 9$

$25 + -59 = -34 =$ y value

or use poly-solv find (h, k)

$a = 1$
$b = 10$
$c = -9$

3k Which of these is the result of completing the square for the expression $x^2 + 8x - 30$?

A. $(x + 4)^2 - 30$
B. $(x + 4)^2 - 46$
C. $(x + 8)^2 - 30$
D. $(x + 8)^2 - 94$

1) Take half of 8 = 4
2) Square 4 = 16
3) add to expression and subtract

x^2+8x

$x^2+8x+16 \quad -30-16$

$(x^2+8x+16) \quad -46$

$(x+4)^2-46$

4k The expression $-x^2 + 70x - 600$ represents a company's profit for selling x items. For which number(s) of items sold is the company's profit equal to \$0?

A. 0 items
B. 35 items
C. 10 items and 60 items
D. 20 items and 30 items

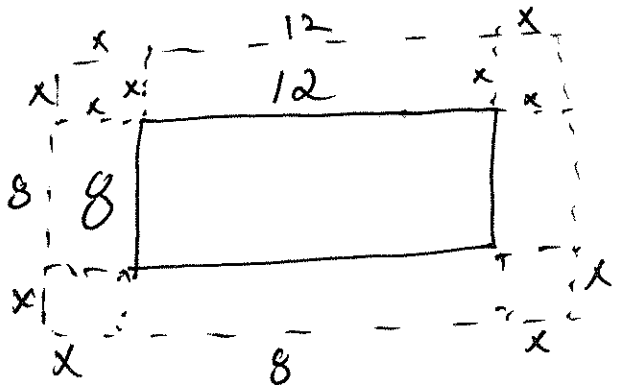
$y = 0$
* find solutions

$a = -1$
$b = 70$
$C = -600$

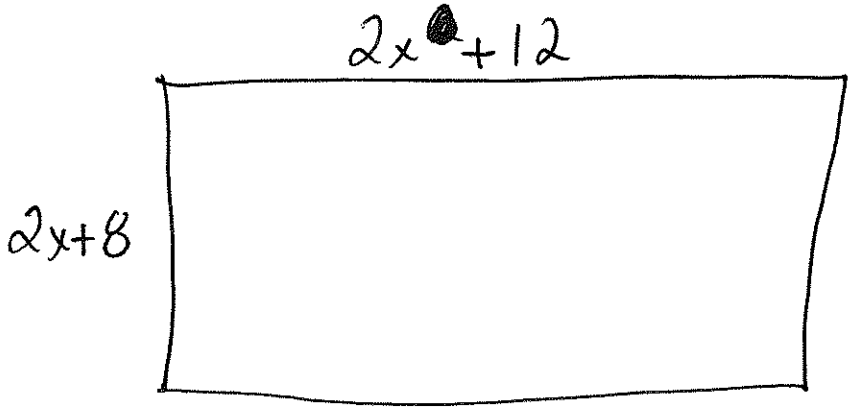
$x1 = 10$
$x2 = 60$

1) A garden measuring 8 feet by 12 feet will have a walkway around it. The walkway has a uniform width, and the area covered by the garden and the walkway is 192 square feet. What is the width of the walkway?

A. 2 feet
B. 3.5 feet
C. 4 feet
D. 6 feet



Total Area = 192



$(2x+12)(2x+8) = 192$

	2x	12
2x	$4x^2$	$+24x$
8	$+16x$	$+96$

L

$4x^2 + 40x + 96 = 192$
$-192 \quad -192$
$4x^2 + 40x - 96 = 0$

$a = 4$
$b = 40$
$c = -96$
$x = 2$ ← -12

2 The formula for the area of a circle is $A = \pi r^2$. Which equation shows the formula in terms of r?

A. $r = \frac{2A}{\pi}$

B. $r = \frac{\sqrt{A}}{\pi}$

C. $r = \sqrt{\frac{A}{\pi}}$

D. $r = \frac{A}{2\pi}$

$$A = \frac{\pi r^2}{\pi}$$

$$\frac{A}{\pi} = r^2$$

take square root of both sides

$$\sqrt{\frac{A}{\pi}} = r$$

1 What are the solutions to the equation $2x^2 - 2x - 12 = 0$?

A. $x = -4, x = 3$
B. $x = -3, x = 4$
C. $x = -2, x = 3$
D. $x = -6, x = 2$

$a = 2$
$b = -2$
$c = -12$

or

factor

$2(x^2 - x - 6)$

-6
$-3 \cdot 2 \rightarrow -1$ ✓
$-2 \cdot 3 \rightarrow 1$

$2(x-3)(x+2) = 0$

$x - 3 = 0$
$+3 \quad +3$
$x = 3$

$x + 2 = 0$
$-2 \quad -2$
$x = -2$

2 What are the solutions to the equation $6x^2 - x - 40 = 0$?

A. $x = -\frac{8}{3}, x = -\frac{5}{2}$

B. $x = -\frac{8}{3}, x = \frac{5}{2}$

C. $x = \frac{5}{2}, x = \frac{8}{3}$

D. $x = -\frac{5}{2}, x = \frac{8}{3}$

$a = 6$
$b = -1$
$c = -40$

$x_1 = \frac{-5}{2}$

$x_2 = \frac{8}{3}$

3 What are the solutions to the equation $x^2 - 5x = 14$?

A. $x = -7, x = -2$
B. $x = -14, x = -1$
C. $x = -2, x = 7$
D. $x = -1, x = 14$

-14 * move 14 to other side *

$x^2 - 5x - 14 = 0$

factor & solve

Factor

-14

$-2 \cdot 7 \xrightarrow{+} 5$

$-7 \cdot 2 \xrightarrow{+} -5$ ✓

$(x-7)(x+2) = 0$

$x - 7 = 0$ $\quad x + 2 = 0$

$+7 \quad +7 \qquad -2 \quad -2$

$x = 7 \qquad x = -2$

Solve

$a = 1$
$b = -5$
$c = -14$

4m An object is thrown in the air with an initial velocity of 5 m/s from a height of 9 m. The equation $h(t) = -4.9t^2 + 5t + 9$ models the height of the object in meters after t seconds.

About how many seconds does it take for the object to hit the ground? Round your answer to the nearest tenth of a second.

A. 0.940 second
B. 1.50 seconds
C. 2.00 seconds
D. 9.00 seconds

y

$y = 0$

Solve for → Solutions
x-int
Zeros
roots

$a = -4.9$
$b = 5$
$c = 9$

$x_1 = -.93$ no good

$x_2 = 1.958 \approx 2.00$

1 What explicit expression can be used to find the next term in this sequence?

2, 8, 18, 32, 50, . . .

A. $2n$
B. $2n + 6$
C. $2n^2$
D. $2n^2 + 1$

1 2 3 4 5

n → result

1 → 2
2 → 8
3 → 18
4 → 32
5 → 50

Plug in value for n and check for match

$n = 2$

A) $2(2) = 4$ not 8

B) $2(2)+6 = 10$ not 8

C) $2(2)^2 = 8 = 8$ Check $2(3)^2 = 18 = 18$

D) $2(2)^2+1 = 9$ not 8

20 The function $s(t) = vt + h - 0.5at^2$ represents the height of an object, s, from the ground after the time, t, when the object is thrown with an initial velocity of v at an initial height of h and where a is the acceleration due to gravity (32 feet per second squared).

A baseball player hits a baseball 4 feet above the ground with an initial velocity of 80 feet per second. About how long will it take the baseball to hit the ground?

A. 2 seconds
B. 3 seconds
C. 4 seconds
D. 5 seconds

$a = 32$

h

$h = 4$ $V = 80$

$vt + h - 0.5at^2$

$80t + 4 - .5(32)t^2$

h.t ground $\rightarrow h = 0$

$a = -.5(32) = -16$

$b = 80$

$c = 4$

$x1 = -.04$ no good

$x2 = 5.04$

30 A café's annual income depends on x, the number of customers. The function $I(x) = 4x^2 - 20x$ describes the café's total annual income. The function $C(x) = 2x^2 + 5$ describes the total amount the café spends in a year. The café's annual profit, $P(x)$, is the difference between the annual income and the amount spent in a year. subtract

Which function describes $P(x)$?

A. $P(x) = 2x^2 - 20x - 5$
B. $P(x) = 4x^3 - 20x^2$
C. $P(x) = 6x^2 - 20x + 5$
D. $P(x) = 8x^4 - 40x^3 - 20x^2 - 100x$

Income - Spent

$(4x^2 - 20x) - (2x^2 + 5)$

$4x^2 - 20x$
$-2x^2 \quad -5$

$2x^2 - 20x - 5$

O

1. **Which statement BEST describes the graph of $f(x + 6)$?**
   - A. The graph of $f(x)$ is shifted up 6 units.
   - B. The graph of $f(x)$ is shifted left 6 units.
   - C. The graph of $f(x)$ is shifted right 6 units.
   - D. The graph of $f(x)$ is shifted down 6 units.

$f(x + \_\_)$

Written in function notation the plus + sign indicates

O

2. Which of these is an even function?

A. $f(x) = 5x^2 - x$

B. $f(x) = 3x^3 + x$

C. $f(x) = 6x^2 - 8$

D. $f(x) = 4x^3 + 2x^2$

O

3. **Which statement BEST describes how the graph of $g(x) = -3x^2$ compares to the graph of $f(x) = x^2$?**

   A. The graph of $g(x)$ is a vertical stretch of $f(x)$ by a factor of 3.

   B. The graph of $g(x)$ is a reflection of $f(x)$ across the x-axis.

   C. The graph of $g(x)$ is a vertical shrink of $f(x)$ by a factor of $\frac{1}{3}$ and a reflection across the x-axis.

   (D.) The graph of $g(x)$ is a vertical stretch of $f(x)$ by a factor of 3 and a reflection across the x-axis.

$g(x) = -3x^2$

$f(x) = x^2$

$-3x^2$

↑ reflection x-axis

↖ bigger than 1 "stretch"

p

1. A flying disk is thrown into the air from a height of 25 feet at time $t = 0$. The function that models this situation is $h(t) = -16t^2 + 75t + 25$, where t is measured in seconds and h is the height in feet. What values of t best describe the times when the disk is flying in the air?

   A. $0 < t < 5$
   B. $0 < t < 25$
   C. all real numbers
   D. all positive integers

time between leaving and landing so $y = 0$

solutions
roots
x-int
zeros

$a = -16$
$b = 75$
$c = 25$

X1 → -ft

X2 → 5 seconds height 0

time flying in air is more than 0 but less than 5

p

2. Use this table to answer the question.

x	$f(x)$
−2	15
−1	9
0	5
1	3
2	3

What is the average rate of change of x over the interval $-2 \leq x \leq 0$?

A. −10
B. −5
C. 5
D. 10

$-2 \rightarrow 15$
$+2 \quad > \quad -10$
$0 \rightarrow 5$

$\frac{-10}{2} = -5$

q

3. What is the end behavior of the graph of $f(x) = -0.25x^2 - 2x + 1$?

A. As x increases, $f(x)$ increases.
As x decreases, $f(x)$ decreases.

B. As x increases, $f(x)$ decreases.
As x decreases, $f(x)$ decreases.

C. As x increases, $f(x)$ increases.
As x decreases, $f(x)$ increases.

D. As x increases, $f(x)$ decreases.
As x decreases, $f(x)$ increases.

$-0.25x^2 - 2x + 1$

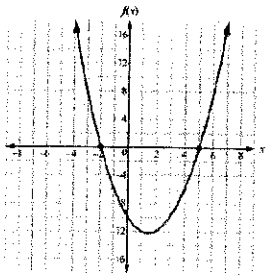
↑ ↑ quadratic

opens down

decreasing for every x

r

1. Use this graph to answer the question.



Zeros -2 & 5

y-int -10

Which function is shown in the graph?

A. $f(x) = x^2 - 3x - 10$
B. $f(x) = x^2 + 3x - 10$
C. $f(x) = x^2 + x - 12$
D. $f(x) = x^2 - 5x - 8$

A or B

A) $a = 1$ $b = -3$ $c = -10$

$x_1 = -2$ $x_2 = 5$

$a = -16$ $x_1 =$ negative
$b = 64$
$c = 5$ $x_2 = 4.07$

r

2. The function $f(t) = -16t^2 + 64t + 5$ models the height of a ball that was hit into the air, where t is measured in seconds and h is the height in feet.

This table represents the height, $g(t)$, of a second ball that was thrown into the air.

Time, t (in seconds)	Height, $g(t)$ (in feet)
0	4
1	36
2	36
3	4

hit right after 3 seconds

Which statement BEST compares the length of time each ball is in the air?

A. The ball represented by $f(t)$ is in the air for about 5 seconds, and the ball represented by $g(t)$ is in the air for about 3 seconds.

B. The ball represented by $f(t)$ is in the air for about 3 seconds, and the ball represented by $g(t)$ is in the air for about 5 seconds.

C. The ball represented by $f(t)$ is in the air for about 3 seconds, and the ball represented by $g(t)$ is in the air for about 4 seconds.

D. The ball represented by $f(t)$ is in the air for about 4 seconds, and the ball represented by $g(t)$ is in the air for about 3 seconds.

$f(t)$ 1st → 4 seconds

$g(t)$ 2nd → 3 seconds

r

1. A certain population of bacteria has an average growth rate of 2%. The formula for the growth of the bacteria's population is $A = P_0 \cdot 1.02^t$, where P_0 is the original population and t is the time in hours.

   If you begin with 200 bacteria, about how many bacteria will there be after 100 hours?

   A. 7
   B. 272
   C. 1,449
   D. 20,000

$A = 200 \cdot (1.02)^{100}$

$A = 1448.9$

S

1. Which function represents this sequence?

n	1	2	3	4	5	...
a_n	6	18	54	162	486	...

•3 •3 •3 multiply by 3 → exponential

A. $f(n) = 3^{n-1}$
B. $f(n) = 6^{n-1}$
C. $f(n) = 3(6^{n-1})$
D. $f(n) = 6(3^{n-1})$

$a b^{x}$

↑ ↑

Start rate

↑

1st #(n=1)

$6(3^{n-1})$

S

2. The points (0, 1), (1, 5), (2, 25), and (3, 125) are on the graph of a function. Which equation represents that function?

A. $f(x) = 2^x$
B. $f(x) = 3^x$
C. $f(x) = 4^x$
D. $f(x) = 5^x$

0 1 2 3

1 5 25 125

·5 ·5 ·5

Rate is 5

t

1. Which function shows the function $f(x) = 3^x$ being translated 5 units to the left?

A. $f(x) = 3^x - 5$
B. $f(x) = 3^{(x+5)}$
C. $f(x) = 3^{(x-5)}$
D. $f(x) = 3^x + 5$

* left and right transfers happen inside ( ) and go opposite direction of sign *

$(x + ?) \rightarrow$ left

$(x - ?) \rightarrow$ Right

t

2. Which function shows the function $f(x) = 3^x$ being translated 5 units down?

(A) $f(x) = 3^x - 5$
B. $f(x) = 3^{(x+5)}$
C. $f(x) = 3^{(x-5)}$
D. $f(x) = 3^x + 5$

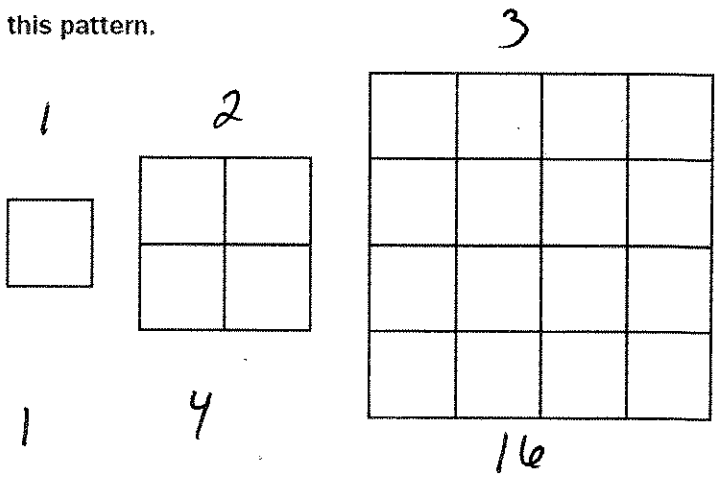
± up and down translations happen outside ( ) and follow the sign ±

$x + \_\_\_\_\_ \rightarrow up$

$x - \_\_\_\_\_ \rightarrow down$

U

1. Consider this pattern.



Which function represents the sequence that represents the pattern?

A. $a_n = (4)^{(n-1)}$

B. $a_n = (4)^{(a_n-1)}$

C. $a_n = (a_n)(4)^{(n-1)}$

D. $a_n = (a_n)^4$

A) $4^{(1-1)} = 4^0 = 1$

$4^{(2-1)} = 4^1 = 4$

$4^{(3-1)} = 4^2 = 16$

* difference in A and B, is notation

$n = x$

$a_n = y$

U

2. Which function is modeled in this table?

x	f(x)
1	1000
2	800
3	640
4	512

A. $f(x) = 1{,}000(0.80)^x$
B. $f(x) = 1{,}000(0.20)^x$
C. $f(x) = 1{,}000(0.80)^{x-1}$
D. $f(x) = 1{,}000(0.20)^{x-1}$

$\frac{800}{1000} = .8$

$\frac{640}{800} = .8$

exponential

ab^x

start (rate)

y when $x = 1$

$1000(.80)^x$

U

3. Which explicit formula describes the pattern in this table?

d	C
0	1
1	6
2	36
3	216

×6 ×6 ×6

multiply so exponential

A. $C = 6d$
B. $C = d + 6$
C. $C = 6^d$
D. $C = d^6$

b^x

6^x

U

4. If $f(12) = 100(0.50)^{12}$, which expression gives $f(x)$?

A. $f(x) = 0.50^x$
B. $f(x) = 100^x$
C. $f(x) = 100(x)^{12}$
D. $f(x) = 100(0.50)^x$

f(12)

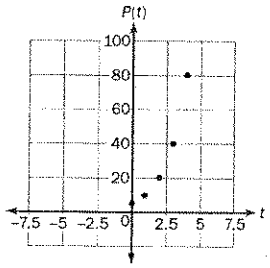
12 has replaced x in function notation

V

b>2

a=5

1. A population of squirrels doubles every year. Initially, there were 5 squirrels. A biologist studying the squirrels created a function to model their population growth: $P(t) = 5(2^t)$, where t is the time in years. The graph of the function is shown.



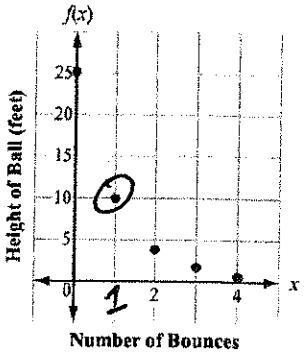
What is the range of the function?

A. any real number
B. any whole number greater than 0
C. any whole number greater than 5
D. any whole number greater than or equal to 5

Can't go below 0 on # squirrels and start with 5 so has to be greater than 5 or equal

V

2. The function graphed on this coordinate grid shows $f(x)$, the height of a dropped ball in feet after its xth bounce.

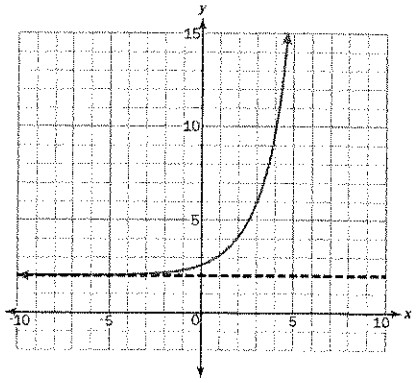


On which bounce was the height of the ball 10 feet?

(A) bounce 1
B. bounce 2
C. bounce 3
D. bounce 4

W

1. Look at the graph.



Which equation represents this graph?

A. $y = 2^{(x+1)} - 2$
B. $y = 2^{(x-1)} + 2$
C. $y = 2^{(x+2)} - 1$
D. $y = 2^{(x-2)} + 1$

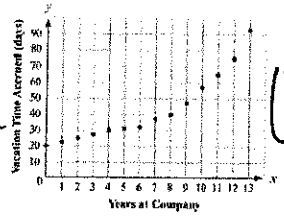
growth

shift +2 up

X

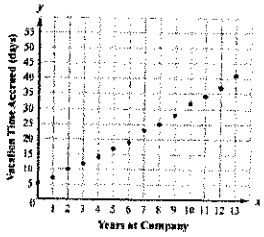
1. Which scatter plot BEST represents a model of linear growth?

A.



growth

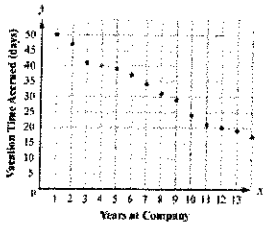
B.



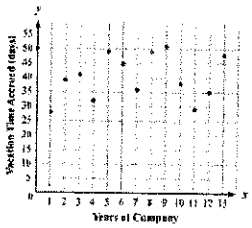
growth

decay

C.



D.



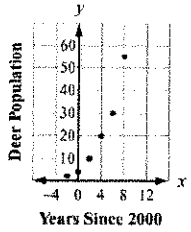
steady

X

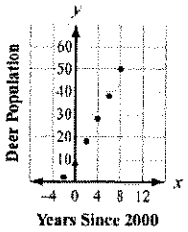
2. Which scatter plot BEST represents a model of exponential growth?

exp. growth

A.

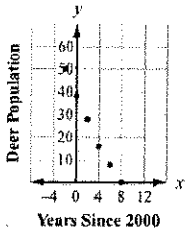


B.



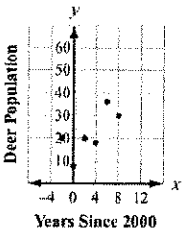
linear growth

C.



decay

D.



somewhat linear

X

3. Which table represents an exponential function?

A.

x	0	1	2	3	4
y	5	6	7	8	9

+1 +1 +1

linear

B.

x	0	1	2	3	4
y	22	44	66	88	110

+22 +22

linear

C.

x	0	1	2	3	4
y	5	13	21	29	37

+8 +8 +8

linear

b.

x	0	1	2	3	4
y	3	9	27	81	243

·3 ·3 ·3

exponential

X

4. A table of values is shown for $f(x)$ and $g(x)$.

x	$f(x)$
0	0
1	1
2	4
3	9
4	16
5	25

x	$g(x)$
0	−2
1	−1
2	1
3	5
4	13
5	29

Which statement compares the graphs of $f(x)$ and $g(x)$ over the interval [0, 5]?

not at 5 → A. The graph of $f(x)$ always exceeds the graph of $g(x)$ over the interval [0, 5].

only at 5 → B. The graph of $g(x)$ always exceeds the graph of $f(x)$ over the interval [0, 5].

C. The graph of $g(x)$ exceeds the graph of $f(x)$ over the interval [0, 4], the graphs intersect at a point between 4 and 5, and then the graph of $f(x)$ exceeds the graph of $g(x)$.

Wrong order

D. The graph of $f(x)$ exceeds the graph of $g(x)$ over the interval [0, 4], the graphs intersect at a point between 4 and 5, and then the graph of $g(x)$ exceeds the graph of $f(x)$.

	$f(x)$	$g(x)$
0	0	−2
5	25	29

X

5. Which statement is true about the graphs of exponential functions?

A. The graphs of exponential functions never exceed the graphs of linear and quadratic functions. F

B. The graphs of exponential functions always exceed the graphs of linear and quadratic functions. F

C. The graphs of exponential functions eventually exceed the graphs of linear and quadratic functions. T

D. The graphs of exponential functions eventually exceed the graphs of linear functions but not quadratic functions.

X

6. Which statement BEST describes the comparison of the function values for $f(x)$ and $g(x)$?

x	f(x)	g(x)
0	0	−10
1	2	−9
2	4	−6
3	6	−1
4	8	6

A. The values of $f(x)$ will always exceed the values of $g(x)$.
B. The values of $g(x)$ will always exceed the values of $f(x)$.
C. The values of $f(x)$ exceed the values of $g(x)$ over the interval [0, 5].
D. The values of $g(x)$ begin to exceed the values of $f(x)$ within the interval [4, 5].

- as X increases the gap between f(x) and g(x) is getting smaller
- g(x) will pass f(x) at some point

y

1. If the parent function is $f(x) = mx + b$, what is the value of the parameter m for the line passing through the points (–2, 7) and (4, 3)?

A. –9

B. $-\frac{3}{2}$

C. –2

D. $-\frac{2}{3}$

What is slope

$\frac{y_1 - y_2}{x_1 - x_2}$

(-2, 7) (4, 3)

$\frac{7-3}{-2-4} = \frac{4}{-6} = -\frac{2}{3}$

y

2. Consider this function for cell duplication. The cells duplicate every minute.

$f(x) = 75(2)^x$

Describe the parameters of this function.

exponential

$a b^x$ ← times it occurs

↑ ↑

Start with — rate changes

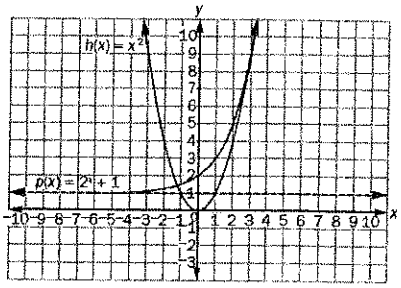
$75(2)^x$

↑ ↑

Start — doubles

Z

1. Look at the graph of the functions $h(x)$ and $p(x)$.



Which transformations of $h(x)$ and $p(x)$ translate each function so both pass through the point (0, 1)?

A. $h(x - 1) = (x - 1)^2$ and $p(x + 1) = 2^{(x+1)} + 1$
B. $h(x + 1) = (x + 1)^2$ and $p(x - 1) = 2^{(x-1)} + 1$
C. $h(x) - 1 = x^2 - 1$ and $p(x) + 1 = (2^x + 1) + 1$
D. $h(x) + 1 = x^2 + 1$ and $p(x) - 1 = (2^x + 1) - 1$

Z

2. Look at the functions $f(x)$ and $g(x)$.

$$f(x) = x^2$$
$$g(x) = 2^x + 3$$

Which transformation of $f(x)$ makes $f(x) < g(x)$?

A. $f(-x)$

B. $-f(x)$

C. $\frac{1}{2}f(x)$

D. $2f(x)$

aa

1. Which function is modeled in this table?

x	f(x)	
1	8	·5
2	40	·5
3	200	·5
4	1,000	·5

exponential

lines ✗ A. $f(x) = x + 7$

lines ✗ B. $f(x) = 5x + 8$

rate must be 5

✗ C. $f(x) = (8)^x$ rate wrong

(D.) $f(x) = \frac{8}{5}(5)^x$

aa

2. If $f(12) = 4(12) - 20$, which function gives $f(x)$?

A. $f(x) = 4x^2 - 20$
B. $f(x) = 4^x - 20$
C. $f(x) = 4x - 20$
D. $f(x) = 4x^2 + 12x - 20$

$f(12)$
$f(x)$

$4(12)-20$
$4(x)-20$

aa

3. Which function has a range of $f(x) \leq \frac{3}{4}$?

less than $\frac{3}{4}$

A. $f(x) = \frac{3}{4}x + 5$ linear

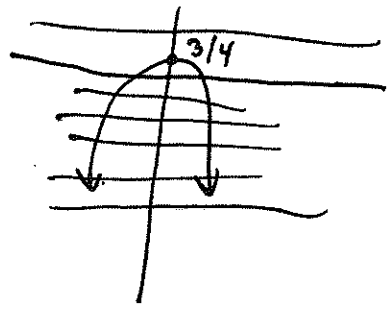
B. $f(x) = -x^2 + \frac{3}{4}$

C. $f(x) = x^2 - \frac{3}{4}$

D. $f(x) = \frac{3}{4} - 5x$

$-x^2$ reflected ∩ $\frac{3}{4}$ = y-int top (ceiling)

B)



bb

1. A sample of 1,000 bacteria becomes infected with a virus. Each day, one-fourth of the bacteria sample dies due to the virus. A biologist studying the bacteria models the population of the bacteria with the function $P(t) = 1{,}000(0.75)^t$, where t is the time, in days.

What is the range of this function in this context?

A. any real number such that $t \geq 0$
B. any whole number such that $t \geq 0$
C. any real number such that $0 \leq P(t) \leq 1{,}000$
D. any whole number such that $0 < P(t) \leq 1{,}000$

$\frac{1}{4}$ dies

$\frac{3}{4}$ lives

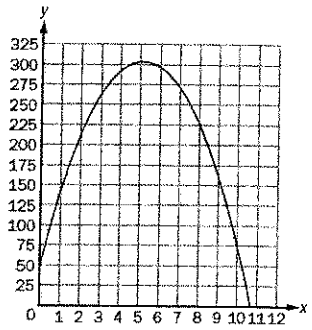
range less than 1000 but never 0 because exponential

↑ or below

P(t) = bacteria left

bb

2. The graph shows the height, y, in meters, of a rocket above sea level in terms of the time, t, in seconds, since it was launched. The rocket landed at sea level.



What does the x-intercept represent in this situation?

A. the height from which the rocket was launched
B. the time it took the rocket to return to the ground
C. the total distance the rocket flew while it was in flight
D. the time it took the rocket to reach the highest point in its flight

y: above sea level

X-int → Solution → y = 0
zero
roots

X-int height is on ground

X = Seconds (t)

CC

1. This table shows the average low temperature, in °F, recorded in Macon, GA, and Charlotte, NC, over a six-day period.

Day	1	2	3	4	5	6
Temperature in Macon, GA (°F)	71	72	66	69	71	73
Temperature in Charlotte, NC (°F)	69	64	68	74	71	75

Which conclusion can be drawn from the data?

A. The interquartile range of the temperatures is the same for both cities. F

B. The lower quartile for the temperatures in Macon is less than the lower quartile for the temperatures in Charlotte. F

C. The mean and median temperatures in Macon were higher than the mean and median temperatures in Charlotte. T

D. The upper quartile for the temperatures in Charlotte was less than the upper quartile for the temperatures in Macon.

M: 69 C: 68

Macon

$\bar{x}$ 70.3

s_x 2.28

min 66

Q_1 69

med 71

Q_3 72

max 73

IQR $Q_3 - Q_1$

72 − 69 = 3

Charlotte

$\bar{x}$ 70.16

s_x 3.71

min 64

Q_1 68

med 70

Q_3 74

max 75

IQR 74 − 68 = 6

CC

2. A school was having a coat drive for a local shelter. A teacher determined the median number of coats collected per class and the interquartile range of the number of coats collected per class for the freshmen and for the sophomores.

   - The freshmen collected a median number of coats per class of 10, and the interquartile range was 6.
   - The sophomores collected a median number of coats per class of 10, and the interquartile range was 4.

   Which range of numbers includes the third quartile of coats collected for both freshmen and sophomore classes?

   A. 4 to 14
   B. 6 to 14
   C. 10 to 16
   D. 12 to 15

med 10 IQR 6
med 10 IQR 4

CC

3. A reading teacher recorded the number of pages read in an hour by each of her students. The numbers are shown below.

44, 49, 39, 43, 50, 44, 45, 49, 51

For this data, which summary statistic is NOT correct?

A. The minimum is 39.
B. The lower quartile is 44.
C. The median is 45.
D. The maximum is 51.

data

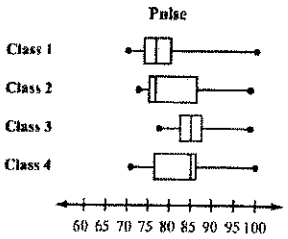
enter #'s in L1

2nd data

2: 1-Var Stats

CC

4. A science teacher recorded the pulse of each of the students in her classes after the students had climbed a set of stairs. She displayed the results, by class, using the box plots shown.



Which class generally had the highest pulse after climbing the stairs?

A. Class 1
B. Class 2
C. Class 3
D. Class 4

Box & whisker shows Median
Class 3 has highest Median

CC

5. Peter went bowling. Monday to Friday, two weeks in a row. He only bowled one game each time he went. He kept track of his scores below.

Week 1: 70, 70, 70, 73, 75
Week 2: 72, 64, 73, 73, 75

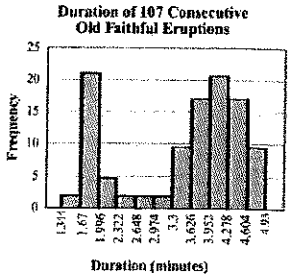
64 will pull mean down

What is the BEST explanation for why Peter's Week 2 mean score was lower than his Week 1 mean score?

A. Peter received the same score three times in Week 1.
B. Peter had one very low score in Week 2.
C. Peter did not beat his high score from Week 1 in Week 2.
D. Peter had one very high score in Week 1.

CC

6. This histogram shows the frequency distribution of duration times for 107 consecutive eruptions of the Old Faithful geyser. The duration of an eruption is the length of time, in minutes, from the beginning of the spewing of water until it stops. What is the BEST description for the distribution?

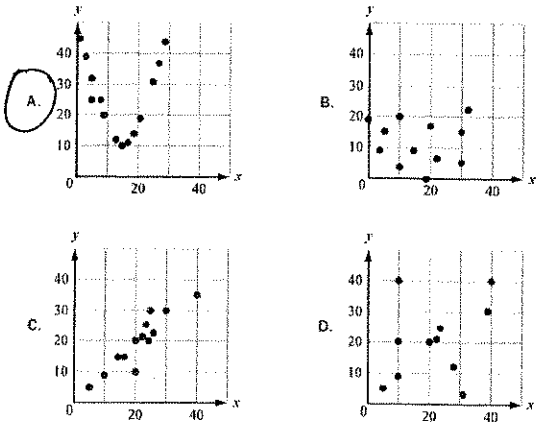


A. bimodal
B. uniform
C. multiple outlier
D. skewed to the right

High frequency on 2 sides with low frequency between

dd

1. Which graph MOST clearly displays a set of data for which a quadratic function is the model of best fit?



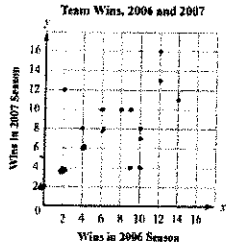
quadratic is ↻

so

A

dd

2. This graph plots the number of wins in the 2006 season and in the 2007 season for a sample of professional football teams.



Which equation BEST represents a line that matches the trend of the data?

A. $y = x + 2$

B. $y = x + 7$

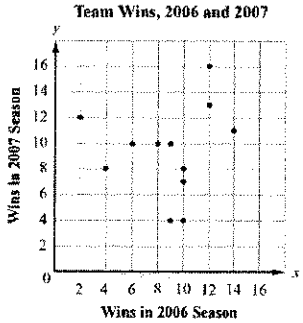
C. $y = \frac{3}{5}x + 1$

D. $y = \frac{3}{5}x + 5$

plot each line and determine which fits best

ee

1. This graph plots the number of wins in the 2006 season and in the 2007 season for a sample of professional football teams.



Based on the regression model, what is the predicted number of 2007 wins for a team that won 5 games in 2006?

A. 4
B. 7
C. 8
D. 12

x , y

Type each ordered pair into L_1 & L_2

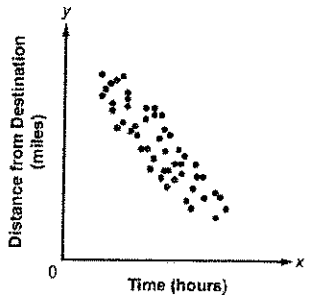
4: LinReg will give $ax+b$

↑ ↑

slope y-int

ee

2. Which BEST describes the correlation of the two variables shown in the scatter plot?



A. weak positive
B. strong positive
C. weak negative
D. strong negative

Negative slope
Closely bunched

ee

3. Which of these statements is an example of causation?

A. When the weather becomes warmer, more meat is purchased at the supermarket.
B. More people go to the mall when students go back to school.
C. The greater the number of new television shows, the fewer the number of moviegoers.
D. After operating costs are paid at a toy shop, as more toys are sold, more money is made.

ee

4. To rent a carpet cleaner at the hardware store, there is a set fee and an hourly rate. The rental cost, c, can be determined using this equation when the carpet cleaner is rented for h hours.

$$c = 25 + 3h$$

Which of these is the hourly rate?

A. 3
B. $3h$
C. 25
D. $25h$

25 constant

3 how hourly charge changes based on hours rented (h)