1. Simplify: $(2x-2)^2$

$2x - 2$

	$2x$	-2
$2x$	$4x^2$	$-4x$
-2	$-4x$	4

$4x^2 - 8x + 4$

2. Factor completely: $y^2 + 2y - 35$ $a=1$ $b=2$ $c=-35$

$ac = -35$

$7 \mid -5$

$(y^2+7y)(5y-35)$

$y(y+7)-5(y+7)$

$(y-5)(y+7)$

3. Tickets to a movie cost $7.25 for an adult and $5.50 for students. A group of friends purchased 8 tickets for $52.75. How many adult tickets and how many student tickets were purchased?

x = adult tickets y = student tickets

5

3

$-7.25(x+y=8)$

$7.25x + 5.50y = 52.75$

$+ \quad -7.25x - 7.25y = -58$

$7.25x + 5.50y = 52.75$

$-1.75y = -5.25$

$\frac{-1.75y}{-1.75} = \frac{-5.25}{-1.75}$

$y = 3$

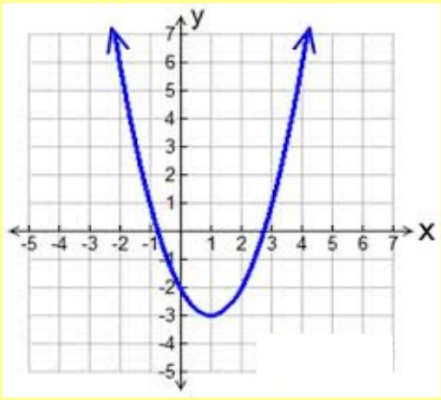
4. Solve for r : $A = \pi r^2$

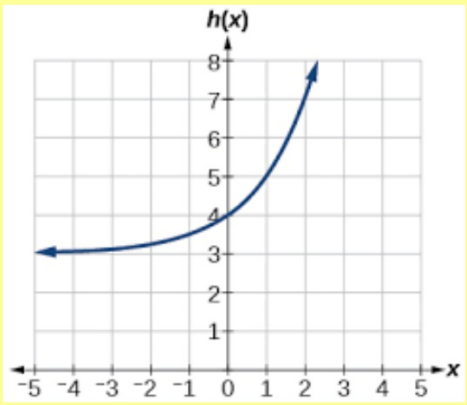
$\frac{A}{\pi} = \frac{\pi r^2}{\pi}$

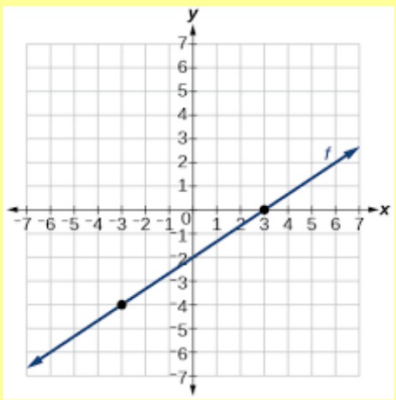
$\sqrt{\frac{A}{\pi}} = \sqrt{r^2}$

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

Linear versus Non-Linear Functions







Identifying from an equation...

Linear	Exponential	Quadratic
Standard form		
$y=mx + b$	$y=a(b)^x$	$y= ax^2 + bx + c$
Has a variable with no exponent	The exponent is the variable	Has a variable squared (To the second power)
Examples		
$y=-4x - 20$	$y=10(2)^x$	$y= -16x^2 +8x - 2$
$y= 1/2x + 3$	$y= 7(1/2)^x$	$y= 2x^2 - 4x + 1$
$2x + y = 14$	$y= 3^x$	$y= -x^2 + 8$

Identify as " increasing linear", "decreasing linear", "exponential growth", "exponential decay", "positive quadratic" or "negative quadratic"

$y = 2(1.05)^x$ exp. growth

$y = -3x^2 + 5x - 1$ neg. quadratic

$y = -8x + 20$ dec. linear

$y = 5x - 9$ inc. linear

$y = x^2 + 4x + 3$ pos. quadratic

$y = 3(0.8)^x$ exp decay

Identifying from a Table...

Linear

Look for a constant rate of change (Adding or Subtracting)

COMMON DIFFERENCE

Exponential

Look for a constant rate of change (Multiplying)

COMMON RATIO

Quadratic

Look for symmetry in the y-values

Pattern with the second difference

Remember!

When the independent variable changes by a constant amount,

- linear functions have constant first differences.
- quadratic functions have constant second differences.
- exponential functions have a constant ratio.

Examples:

linear

$y = 3x + 4$

x	-2	-1	0	1	2
y	-2	1	4	7	10

+3 +3 +3 +3

Quadratic

x	-2	-1	0	1	2
y	-6	-6	-4	0	6

+0 +2 +4 +6

+2 +2 +2

Expo

$y = 2(5)^x$

x	-2	-1	0	1
y	0.08	0.4	2	10

(5) (5) (5)

Is the table linear, quadratic or exponential?

x	y
1	5
2	9
3	13
4	17
5	21

x	y
1	0
2	-1
3	0
4	3
5	8

-1 → 2, +1 → 2, 3 → 2, 5

x	y
1	3
2	9
3	27
4	81
5	243

×(3), ×(3), ×(3), ×(3)

L Q E

Write a function to represent the following table...

E-mail forwarding	
Time (Days)	Number of People Who Received the E-mail
0	8
1	56
2	392
3	2744

$y = 8(7)^x$

Now, predict the number of people who received the email after a week...

6,588,344 People

Write a function to represent the following table...

Oven Temperature				
Time (min)	0	10	20	30
Temperature (°F)	375	325	275	225

10 10 10

-50 -50 -50

$y = -5x + 375$

What would you expect the temperature of the oven to be in an hour?

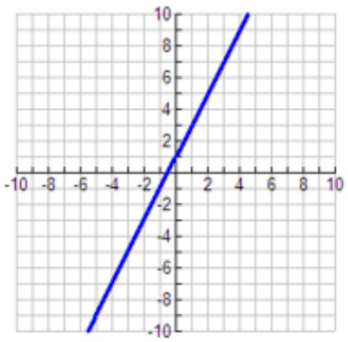
60 min

75°F

Identifying from a graph...

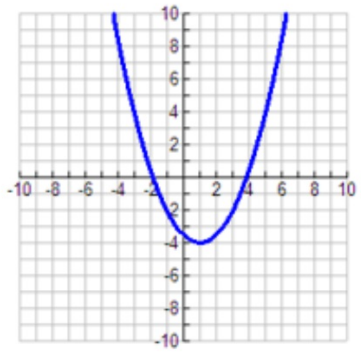
Linear

Makes a straight line



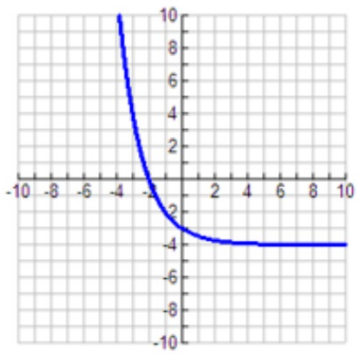
Quadratic

Makes a U or ∩



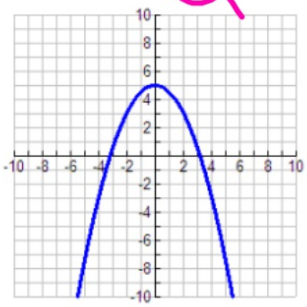
Exponential

Rises or falls quickly in one direction

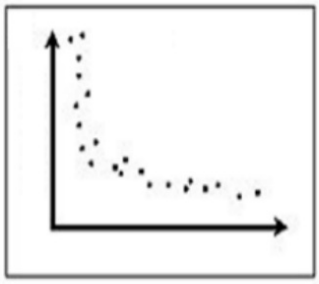


LINEAR, QUADRATIC or EXPONENTIAL?

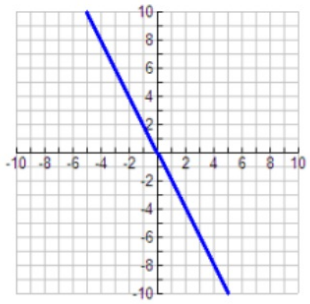
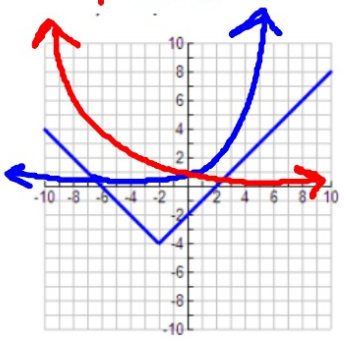
a) Q



b) E



c) L



d) None