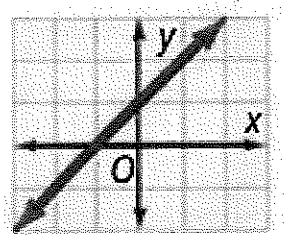
Name: Date:

9.7 Notes

Equations:

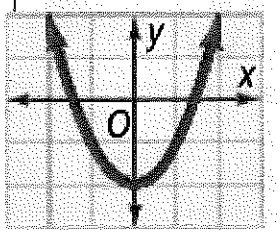
Linear: $y = mx + b$ Quadratic: $y = ax^2 + bx + c$ Exponential: $y = a \cdot b^x$

difference in y values is constant



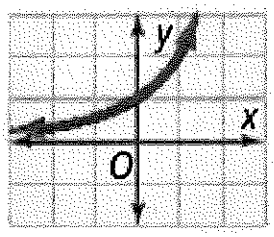
x	y
1	2
2	3
3	4

difference of the difference in y-values is constant



1) 2
3) 2
5)

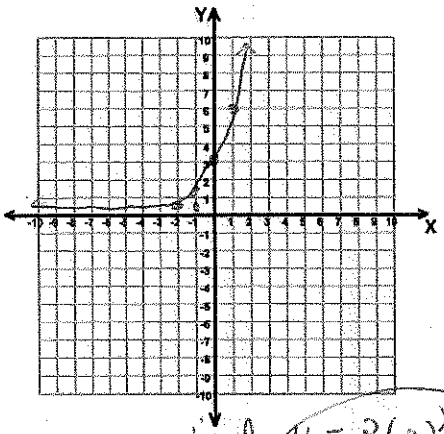
y values have a common ratio



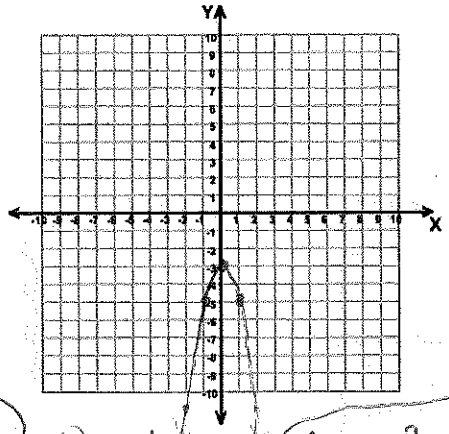
x	y
1	1
2	2
3	4
	8

Graph the set of points. Which model is appropriate for each set?

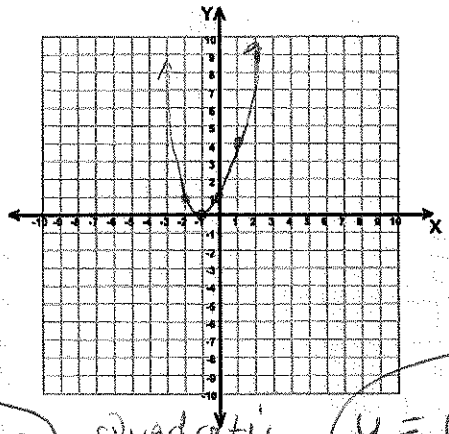
1. (–2, 0.75), (–1, 1.5), (0, 3), (1, 6) **2.** (–2, –11), (–1, –5), (0, –3), (1, –5), (2, –11) **3.** (–2, 1), (–1, 0), (0, 1), (1, 4), (2, 9)



exponential $y = 3(2)^x$



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



Quadratic $y = (x+1)^2$

Recognizing Patterns:

Linear

x	y
–2	–1
–1	2
0	5
1	8

+1, +1, +1 — 3, 3, 3

$y = 3x + 5$

exponential

x	y
–2	0.25
–1	0.5
0	1
1	2

+1, +1, +1 — ratio 2, 2, 2

$y = 2^x$

Quadratic

x	y
–1	1
0	–1
1	1
2	7
3	17

+1, +1, +1, +1 — –2, +2, +6, +10

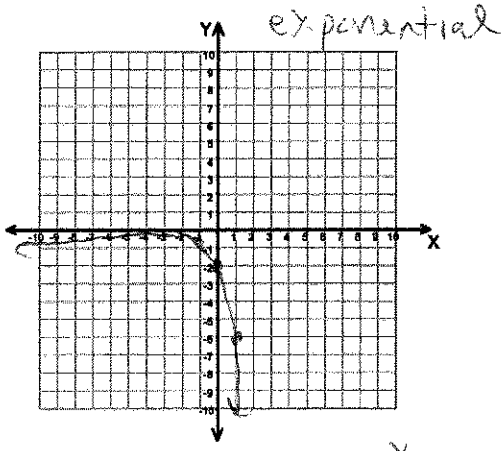
Difference 4, 4, 4

$y = 2x^2 - 1$

You Try:

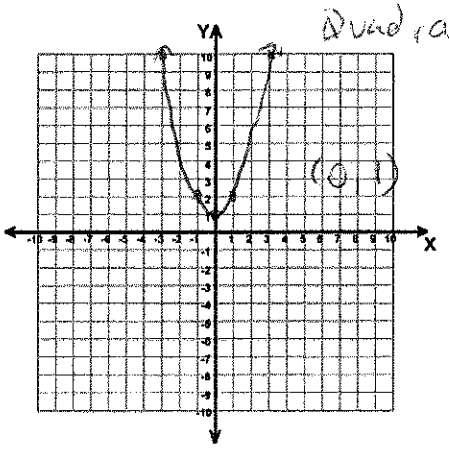
1. Graph each set of points. Which model is most appropriate for each set?

A.(−1, −0.67), (0, −2), (1, −6), (2, −18)



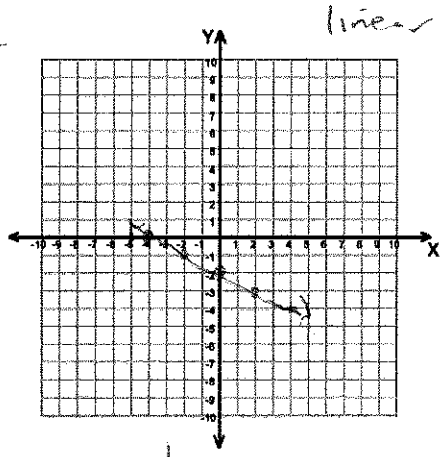
$y = -2(3)^x$

B. (−3, 10), (−1, 2), (0, 1), (1, 2), (3, 10)



$y = x^2 + 1$

C. (−4, 0), (−2, −1), (0, −2), (2, −3), (4, −4)



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

2. Which type of function best models the ordered pairs (−1, 0.5), (0, 1), (1, 2), (2, 4), and (3, 8)? Use differences or ratios.

exponential

$y = 2^x$

3.

x	y
0	−12
1	−11
2	−8
3	−3
4	4

+1, +3, +5, +7) 2

Quadratic

$y = x^2 - 12$

4.

x	y
0	3
1	−2
2	−7
3	−12
4	−17

−5, −5, −5, −5

$y = -5x + 3$

5.

x	y
0	3
1	12
2	48
3	192
4	768

9

$\frac{12}{3} = 4$

$\frac{48}{12} = 4$

$\frac{192}{48} = 4$

$y = 3(4)^x$

4. The population of a city for years since 2000 is shown below. Which kind of function best models the data? Write an equation to model the data.

exponential $y = 1500(2)^x$

Years since 2000	0	1	2	3	4	5	6	7	8
Population	1500		6000		24,000		96,000		384,000

$\frac{6000}{1500} = 4$

Value of Used Car

Years	Value ($)
0	12,575
1	11,065
2	9750
3	8520
4	7540

5. The data shows the value of a used car over time. Which function best models the data?

Write the equation.

$\frac{11065}{12575} = .88$ $\frac{9750}{11065} = .88$

$y = 12575(.88)^x$