Section 6.6 Compare Linear, Quadratic, and Exponential Functions

1. Classify each of the following relations as linear, quadratic, or exponential.
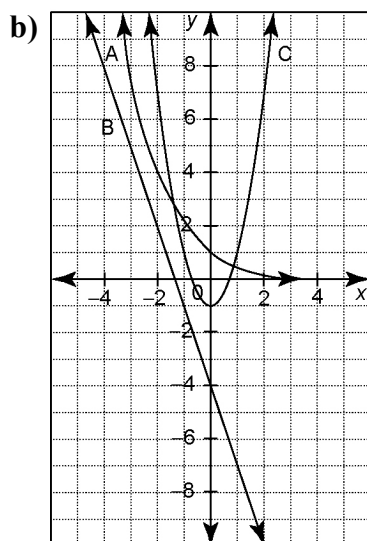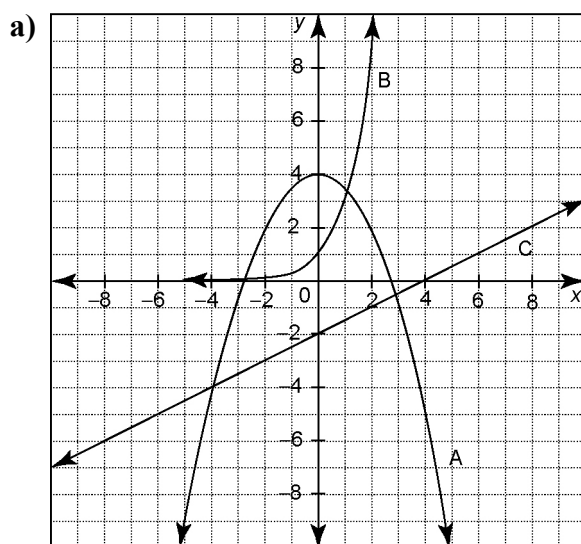**a)** $y = 2x - 2$ **b)** $y = 0.01x^2$
c) $y = -x$ **d)** $y = 0.99^x$

2. Classify each of the relations shown as linear, quadratic, or exponential.

a)

b)

3. Predict whether a quadratic, exponential, or linear model would best fit each situation.
a) the position of person running straight at a constant speed of 3 m/s
b) the population of a city that has been increasing at a rate of 2% each year
c) the height of a rock over time after being thrown directly upward
d) the population of a city that doubles every 35 years

4. Use first differences, second differences, and/or ratios to classify each relation as linear, quadratic, exponential, or none of these.

a)

x	y
−3	7.5
−2	5.0
−1	2.5
0	0
1	−2.5
2	−5.0
3	−7.5

b)

x	y
−3	15.625
−2	6.250
−1	2.500
0	1.000
1	0.400
2	0.160
3	0.064

c)

x	y
−3	−2.4
−2	−1.9
−1	−1.6
0	−1.5
1	−1.0
2	−0.5
3	0.0

5. Diego is a marine biologist who is studying the spread of an invasive mussel species in a lake. The total area of the lake affected each week for 6 weeks is shown. Is the growth best modelled by a linear, a quadratic, or an exponential function? Justify your answer.

Time (weeks)	Area (m²)
0	8.4
1	17.1
2	31.8
3	53.5
4	80.2
5	113.2
6	151.7

6. The cost per compact disc in relation to the number produced is shown. Is the relation between cost and the number produced best modelled using a linear, a quadratic, or an exponential relation? Justify your answer.

Number of CDs Produced	Cost Per CD ($)
1000	0.293
2000	0.266
3000	0.242
4000	0.220
5000	0.200

7. Jordan deposited $200 into a savings account that pays her 1% interest each year.
a) Assume that Jordon does not withdraw or deposit additional funds. Should the relation between Jordan's savings and time be modelled using a linear, quadratic, or exponential relation? Explain your choice.
b) Jordan's savings over time are shown. Does the relation match your prediction? Explain.

Time (years)	Jordan's Savings ($)
0	200.00
1	202.00
2	204.02
3	206.06
4	208.12
5	210.20

8. Assign the values 0.5, 1, and 2 to a, b, and c such that $y_1 < y_2 < y_3$ when $x = 3$.
$$y_1 = x + a \qquad y_2 = bx^2 \qquad y_3 = c^x$$

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