Math 10

Lesson 3–6 Answers

Lesson Questions

Question 1

a) Nonlinear.

t	n
0	1
20	2
40	4
60	8
80	16
100	32

20 20 20 20 20

1 2 4 8 16

b) Linear

A	T
60	3
120	6
180	9
240	12
300	15

60 60 60 60

3 3 3 3

Question 2

a) The cost of the hall is a linear relationship with the number of people who attend. For every person, the rent is \$5 more.

b) The equation $x^2 + y^2 = 25$ is a 2nd degree relation, therefore it is non-linear.

c) The relation is linear. Both variables change by the same amount each time.

8 8 8 8

{(10, 12), (15, 4), (20, –4), (25, –12), (30, –20)}

5 5 5 5

Question 3

Representations A, B, and D model the relation.

Question 4

a) The equation $x = -2$ is a 1st degree relation, therefore it is linear.

b) The equation $y = x + 25$ is a 1st degree relation, therefore it is linear.

c) The equation $y = x^2 + 25$ is a 2nd degree relation, therefore it is non-linear.

d) The equation $y = \dfrac{1}{x}$ is an inverse relation, therefore it is non-linear.

Question 5

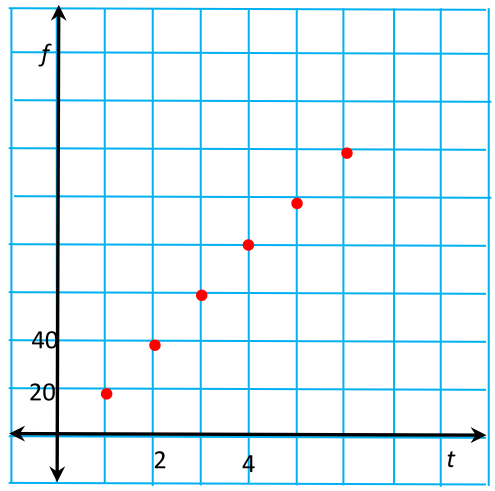
a) The relation is linear. The number of fireworks fired every minute is the same. After 1 minute, 20 fireworks, after 2 minutes, 40 fireworks have been fired, etc.

b) Call time t and fireworks fired as f. The independent variable is t and the dependent variable is f. The number of fireworks fired depends on the time.

c)

t	f
0	0
1	20
2	40
3	60
4	80
5	100

d) The data is discrete – not fired continuously.



e) The rate of change is 20 fireworks/min

f) $f = 20t$

Question 6

Graph A
a) V, t
b) domain: $0 \le t \le 80$, range: $0 \le V \le 1600$
c) 20 L/min
d) $V = 20t$

Graph B
a) V, t
b) domain: $0 \le t \le 40$, range: $0 \le V \le 1600$
c) –40 L/min
d) $V = 1600 - 40t$

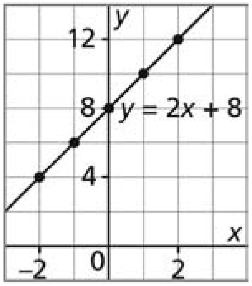
Assignment

1. a) Linear b) Not linear c) Linear d) Not linear

2. a) Linear b) Not linear c) Not linear

3. a) Linear b) Linear c) Not linear d) Not linear

4. a)

i


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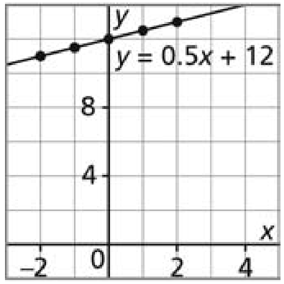

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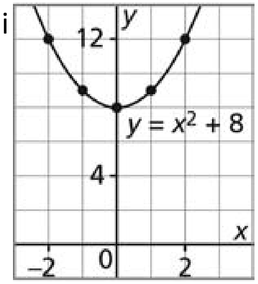

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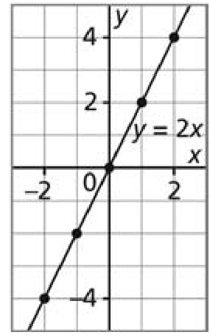

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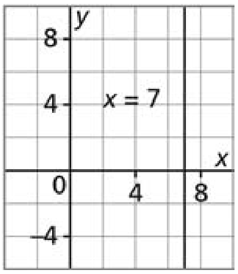

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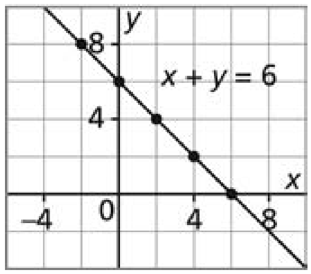

   b) Relations i, ii, iv, v, and vi are straight lines, so they are linear relations.

5. a) i) Independent variable: *s*; dependent variable: *d*   ii) Not linear
   b) i) Independent variable: *t*; dependent variable: *a*   ii) Linear   iii) –200 m/min

6. Answers may vary. For example:
   I could examine the change in the first and second coordinates. If both changes are constant, the relation is linear.
   I could also graph the ordered pairs. If the points lie on a straight line, the relation is linear.

7. a) Answers may vary. For example: The equation relates the dependent variable, *C*, to the rate of change, 15, times the independent variable, *n*, plus a constant, 550.
   b) 15; cost per guest

8. Answers may vary. For example: Create a table of values for the relation. Then, either check the differences in the numbers in each column or plot the points. If the differences are constant or the points lie along a line, the relation is linear. Otherwise, it is not linear.

9. a) Independent variable: *t*; dependent variable: *C*
   b) \$0.08/min; every minute, the cost of the phone call increases by \$0.08.

10. a) Equation 3 and Set B
    b) Equation 1 and Set C
    c) Equation 2 and Set A

11. a) i) Linear ii) Not linear iii) Linear iv) Linear v) Not linear
    b) i) Independent variable: time since the hang glider started her descent; dependent variable: hang glider's altitude; rate of change: –50 m/min; every minute, the hang glider's altitude decreases by 50 m.