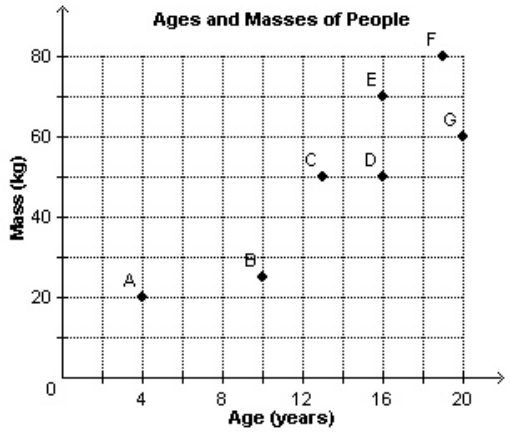
1 Each point on this graph represents a person. Which two people are the same age?



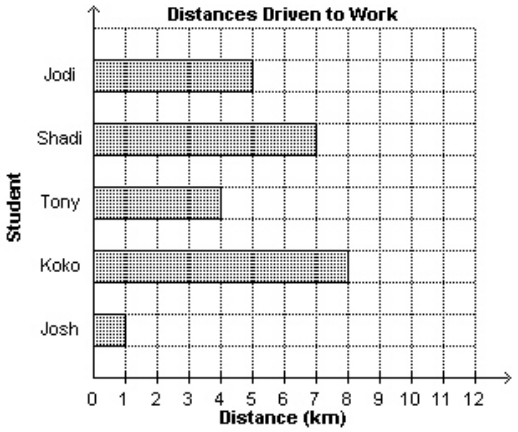
A E and F

B C and D

C D and E

D B and C

2 Consider the relation represented by this graph. Represent the relation as a set of ordered pairs.



A {(5, Jodi), (7, Shadi), (4, Tony), (8, Koko), (1, Josh)}

B {(Jodi, 7), (Shadi, 5), (Tony, 4), (Koko, 8), (Josh, 1)}

C {(Jodi, 5), (Shadi, 7), (Tom, 4), (Koko, 8), (Steven, 1)}

D {(Jodi, 5), (Shadi, 7), (Tony, 4), (Koko, 8), (Josh, 1)}

3 Which set of ordered pairs represents a linear relation?

i) $\{(4, 9), (5, 7), (6, 5), (7, 3), (8, 1)\}$

ii) $\{(5, 8), (6, 10), (7, 12), (8, 13), (9, 14)\}$

iii) $\{(-1, 1), (0, 0), (1, 1), (2, 4), (3, 9)\}$

iv) $\{(4, 6), (12, 5), (2, 4), (13, 3), (4, 2)\}$

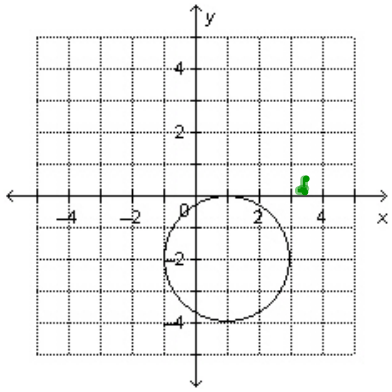
A iv

B i

C ii

D iii

4 Determine the range of the graph.



A $-1 \leq y \leq 0$

B $-4 \leq y \leq 0$

C $-1 \leq x \leq 3$

D $-4 \leq y \leq 3$

5 The relation between x and y is linear. Which number would complete this table?

x	3	7	11	15	19
y	19	13	7	?	–5

A –7

B 1

C –6

D 6

6 Write $y = 10x - 10$ in function notation.

A $f(x) = 10y - 10$

B $f(x) = 10x - 10$

C $f(y) = 10y - 10$

D $f(y) = 10x - 10$

7 Which situation represents a linear relation?
i) The number of cells decays at a rate of 12% each day.
ii) A taxi company charges a $3 flat fee plus $1 for each kilometre travelled.
iii) A population of bacteria doubles every hour for 6 h.
iv) An investor's portfolio increases in value by 6% each year.

A i

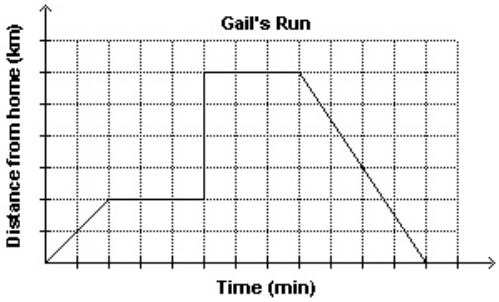
B ii

C iii

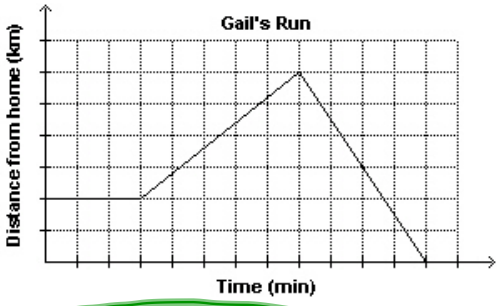
D iv

8 Gail leaves the house for her morning jog. She stops for a quick drink, then continues jogging before stopping again to chat with a friend. She then jogs back home. Which graph best represents Gail's run?

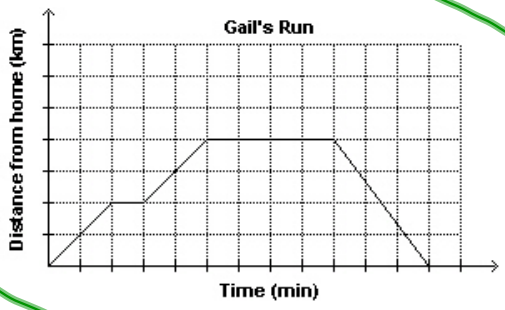
A



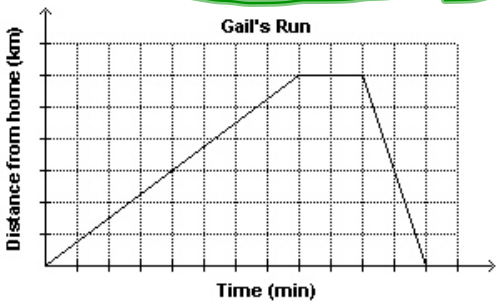
B



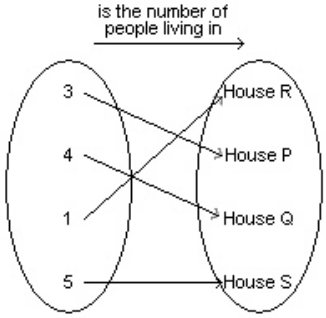
C



D



9 Consider the relation represented by this arrow diagram. Represent the relation as a set of ordered pairs.



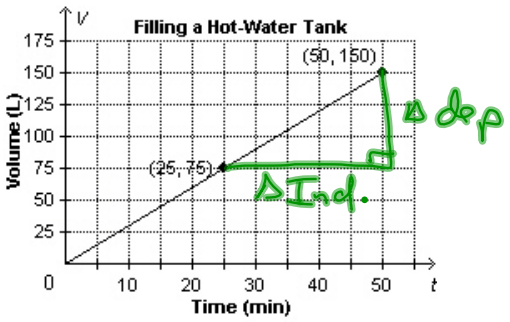
A {(House P, 1), (House Q, 3), (House R, 4), (House S, 5)}

B {(3, House P), (4, House Q), (1, House R), (5, House S)}

C {(1, House P), (3, House Q), (4, House R), (5, House S)}

D {(House P, 3), (House Q, 4), (House R, 1), (House S, 5)}

10 This graph represents a 150-L hot-water tank being filled at a constant rate. Determine the rate of change of the relation.



$\frac{\Delta dep}{\Delta Ind}$

$ROC = \frac{75\ L}{25\ min.} = 3\ L/min$

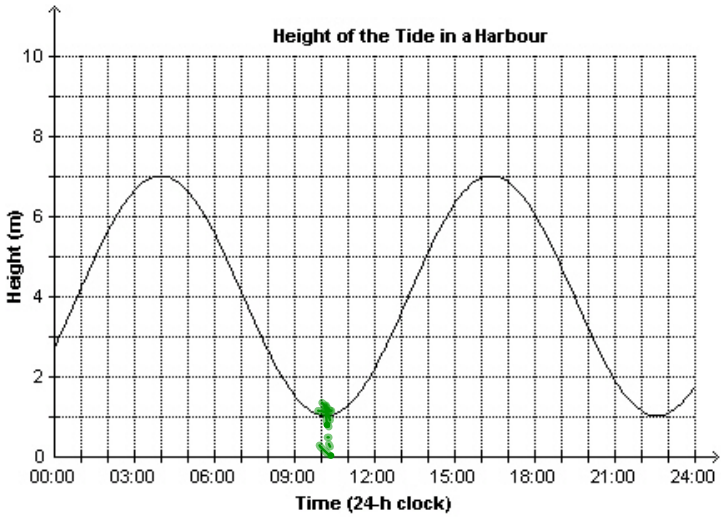
A 25 L/min

B 3 L/min

C 75 L/min

D 0.33 L/min

11 This graph shows the height of the tide in a harbour as a function of time in one day. At about what time in the morning does the least height occur?



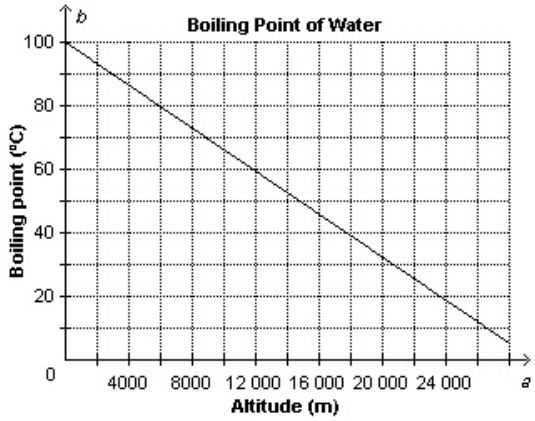
A About 11:00 a.m.

B About 4:00 a.m.

C About 10:00 a.m.

D About 1:00 a.m.

12 This graph represents the boiling point of water, *b* degrees Celsius, as a function of altitude, *a* metres. Identify the independent variable.



A *m*

B *a*

C *b*

D *C*

13 The altitude of a plane, *a* metres, is related to the time, *t* minutes, that has elapsed since it started its ascent. Determine the rate of change of this linear relation.

***t* (min)**	0	2	4	6	8
***a* (m)**	4000	5400	6800	8200	9600

A 1500 m/min

B 1400 m/min

C 1200 m/min

D 700 m/min

$RoC = \frac{1400\text{ m}}{2\text{ min}}$

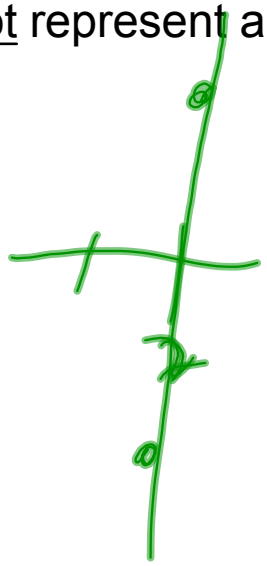
14 Which set of ordered pairs does not represent a function?

i) $\{(2,5),(3,8),(4,11),(2,-1)\}$

ii) $\{(4,6),(5,-7),(7,9),(8,-10)\}$

iii) $\{(-3,-8),(-1,-6),(-2,5),(0,7)\}$

iv) $\{(7,0),(4,-1),(-6,5),(-8,0)\}$



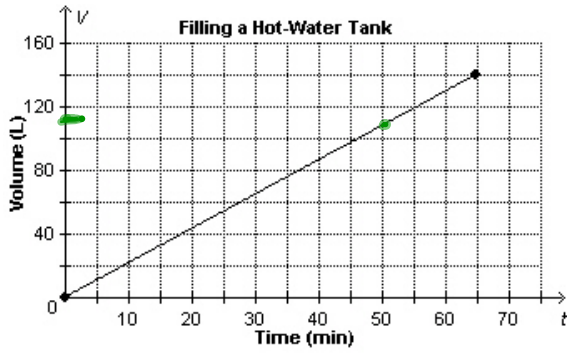
A i

B ii

C iv

D iii

15 This graph represents the time it takes to fill a 140-L hot-water tank. Determine the volume of water in the tank after 50 min.



A about 23 L

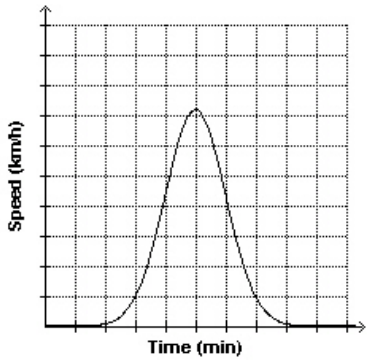
B about 97 L

C about 119 L

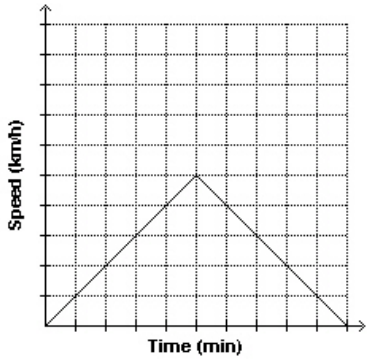
D about 108 L

16 A person in a car drives away from a stop sign, cruises at a constant speed, and then slows down as she approaches another stop sign. Which graph best represents this situation?

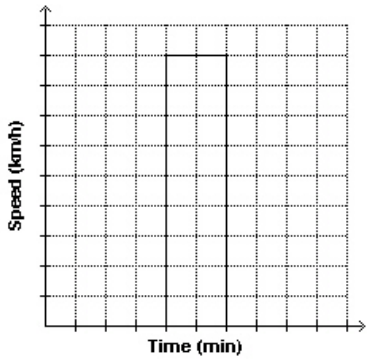
A



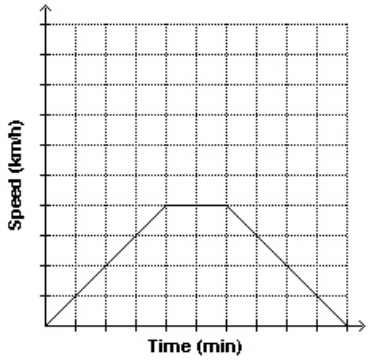
B



C



D



17 Which equation does not represent a linear relation?

i) $y = x^2 - 10$

ii) $x = -5$

iii) $y = -6x + 10$

iv) $6x + 11y = 13$

A iii

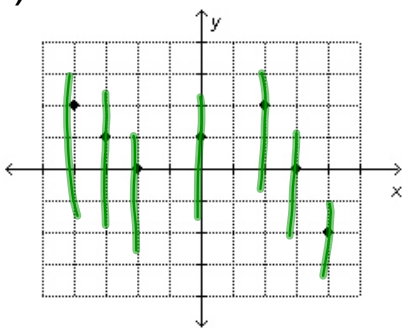
B ii

C i

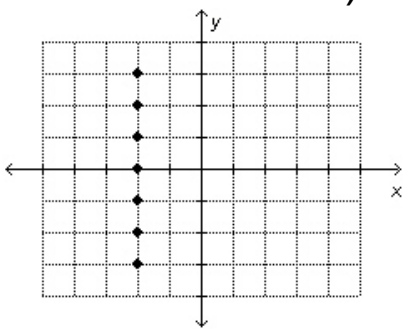
D iv

18 Which of these graphs represents a function?

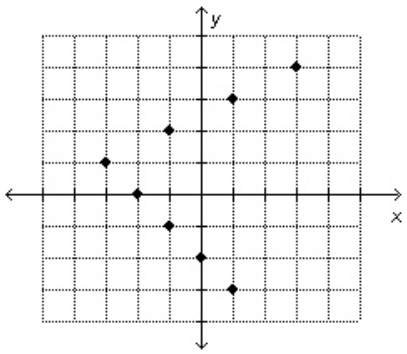
i)



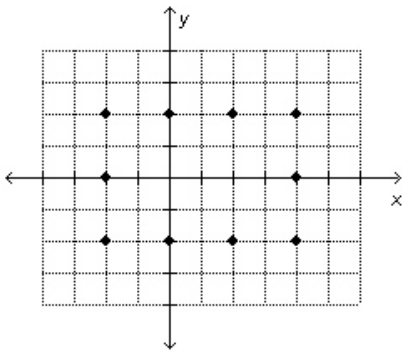
ii)



iii)



iv)



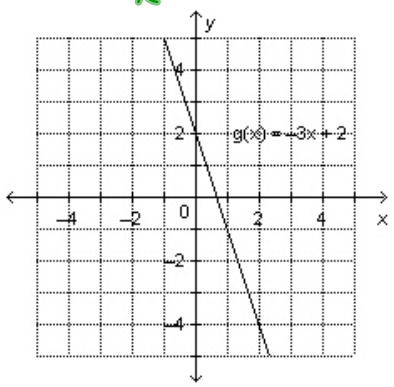
A ii

B i

C iii

D iv

19 This is a graph of the function $g(x) = -3x + 2$. Determine the domain value when the range value is –4.



A –2

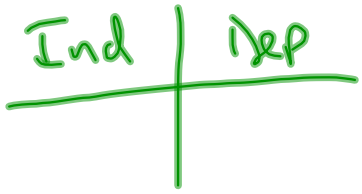
B 0.5

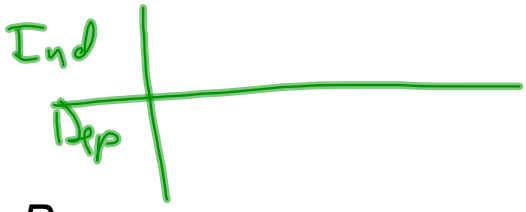
C 11

D 2

20 Identify the independent variable and the dependent variable for this table of values.

Hours Worked, *h*	**Gross Pay, *P* ($)**
4	38.00
5	47.50
9	85.50
20	190.00
30	285.00





A independent variable: *P*
dependent variable: *h*

B independent variable: domain
dependent variable: range

C independent variable: gross pay
dependent variable: hours worked

D independent variable: hours worked
dependent variable: gross pay

21 For the function $f(x) = -3x + 8$, determine $f(-2)$.

A 7

B 2

C 14

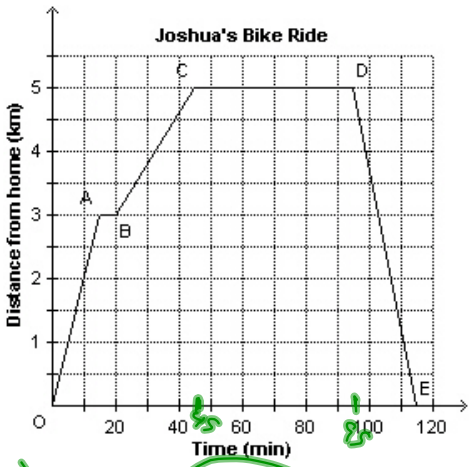
D 3

$F(-2) = -3(-2) + 8$

$= 6 + 8$

$= 14$

22 Joshua went on a bike ride. During the ride, he stopped to play at a park, as shown by line segment CD. How much time did Joshua spend at the park?



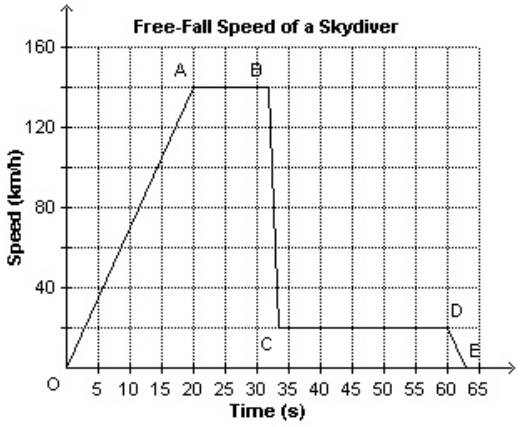
A 65 min.

B 75 min.

C 70 min.

D 80 min.

23 This graph shows the free-fall speed of a skydiver as a function of time. Which statement best describes what is happening for line segment BC in the graph?



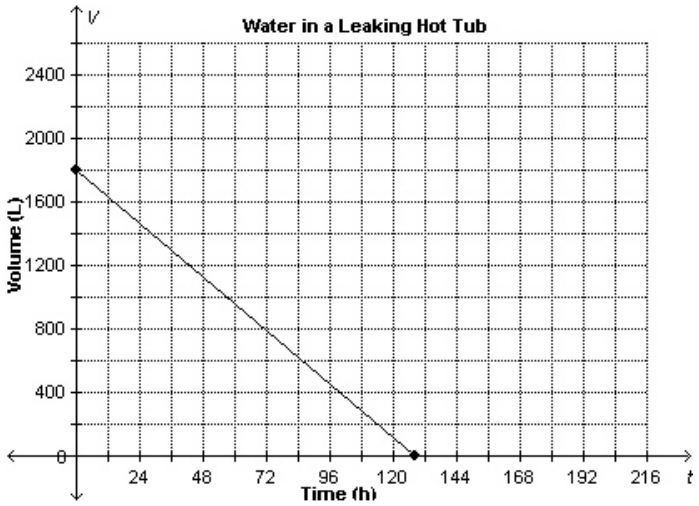
A The skydiver landed on the ground.

B The skydiver opened her parachute.

C The skydiver was free-falling.

D The skydiver jumped out of the plane.

24 This graph shows the volume of water remaining in a leaking hot tub as a function of time. Determine the domain and range.



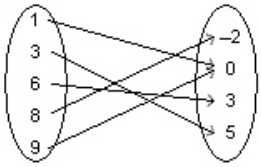
A Domain: $t \leq 129$
Range: $0 \leq V \leq 1800$

B Domain: $0 \leq V \leq 1800$
Range: $t \leq 129$

C Domain: $0 \leq t \leq 129$
Range: $V \leq 1800$

D Domain: $0 \leq t \leq 129$
Range: $0 \leq V \leq 1800$

25 Identify the range of this relation.



A $\{-2, 3, 5\}$

B $\{3, 6, 8\}$

C $\{-2, 0, 3, 5\}$

D $\{1, 3, 6, 8, 9\}$

26 For the function $g(x) = 2x - 9$, determine x when $g(x) = -15$.

A –3

B 12

C –39

D –12

$-15 = 2x - 9$

$\frac{-6}{2} = \frac{2x}{2}$

$-3 = x$

$g(-15)$

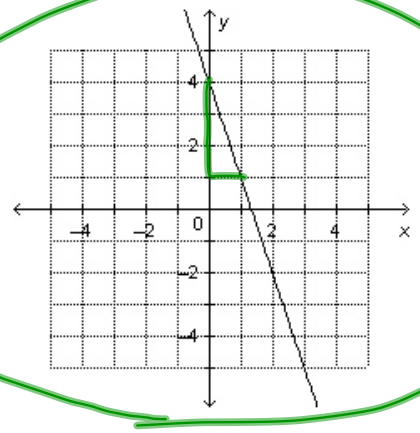
27 Which graph represents the linear function $f(x) = -3x + 4$?

$y = mx + b$

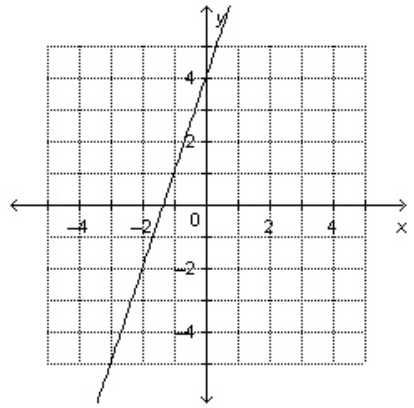
ROC

y-Int

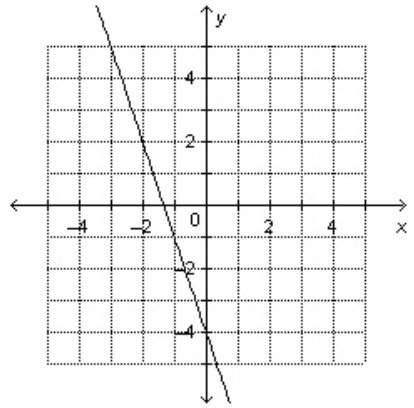
A



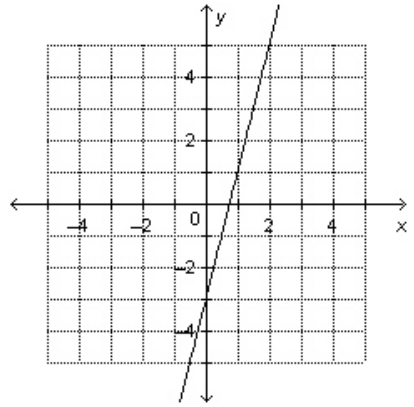
B



C



D



28 The function $C(f) = \frac{5}{9}(f - 32)$ converts a temperature, f degrees Fahrenheit, to C degrees Celsius. Determine $C(39)$ to the nearest degree.

A 38°C

B 102°C

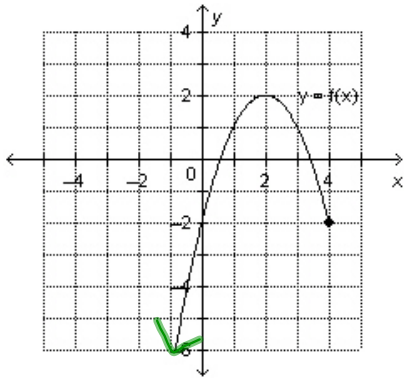
C 4°C

D –4°C

$C(39) = \frac{5}{9}(39 - 32)$

$= \frac{35}{9}$

29 Determine the domain and range of the graph of this function.



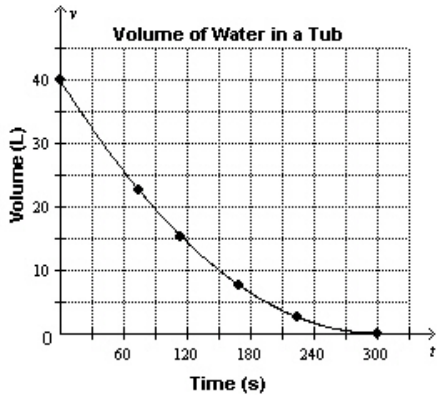
A $2 \leq x \leq 4;\ y \leq 2$

B $x \leq 4;\ y \leq 2$

C $x \leq 2;\ y \leq 4$

D $x \leq 4;\ -2 \leq y \leq 2$

30 A bathtub contains 40 L of water. The plug is pulled. This graph shows the volume of water remaining in the tub, v, as a function of time, t. What is a restriction on the range?



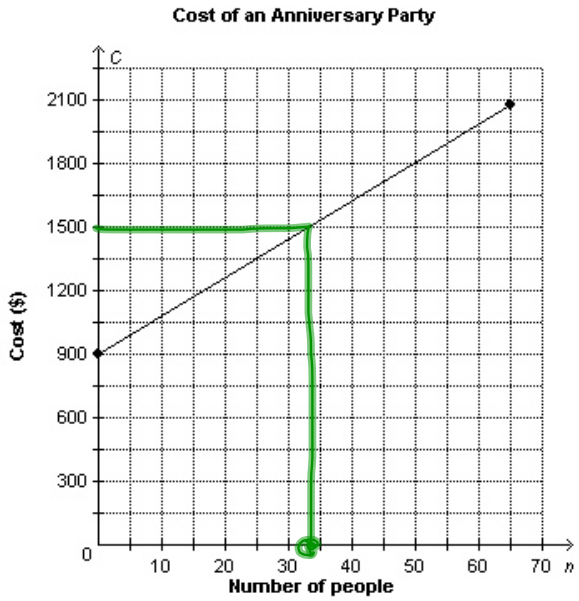
A The range can only contain negative numbers.

B The range cannot contain negative numbers.

C The range can only contain whole numbers up to 40.

D The range can only contain whole numbers greater than 40.

31 The graph shows the cost of hosting an anniversary party. What is the maximum number of people who can attend the party for a cost of $1500?



A 61 people

B 38 people

C 33 people

D 27 people