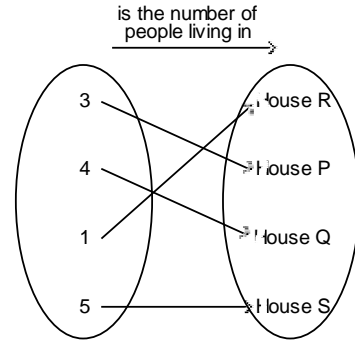


**Multiple Choice**

Identify the choice that best completes the statement or answers the question.

\_\_\_\_\_ 1. 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.  $\{(House P, 3), (House Q, 4), (House R, 1), (House S, 5)\}$



\_\_\_\_\_ 2. Canadian cities that currently have NHL hockey teams can be associated with the year in which they entered the league. Consider the relation represented by this table.

City	Year of Entry
Calgary	1980
Edmonton	1979
Montreal	1917
Ottawa	1992
Toronto	1917
Vancouver	1970

Which ordered pair belongs to this relation?

- a. (Toronto, 1917)
- b. (Edmonton, 1980)
- c. (Ottawa, 1917)
- d. (Calgary, Alberta)

\_\_\_\_\_ 3. 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

\_\_\_\_\_ 4. Identify the domain of this relation.  $\{(8, 10), (5, 7), (9, -11), (6, -8)\}$

- a.  $\{-8, 7, 9, 10\}$
- b.  $\{-11, -8, 7, 10\}$
- c.  $\{5, 6, 8, 9\}$
- d.  $\{5, 6, 9, 10\}$

\_\_\_\_\_ 5. This table shows the cost,  $C$  dollars, of different numbers of tickets sold,  $n$ . Identify the range.

Number of Tickets, $n$	Cost, $C$ (\$)
1	12.50
2	25.00
3	37.50
4	50.00
5	62.50

- a.  $\{1, 2, 3, 4, 5, \dots\}$
- b.  $\{12.50, 25.00, 37.50, 50.00, 62.50, \dots\}$
- c.  $\{1, 2, 3, 4, 5, 12.50, 25.00, 37.50, 50.00, 62.50\}$
- d.  $\{1, 12.50, 2, 25.00, 3, 37.50, 4, 50.00, 5, 62.50, \dots\}$

\_\_\_\_\_ 6. For the function  $f(x) = -3x + 8$ , determine  $f(-2)$ .

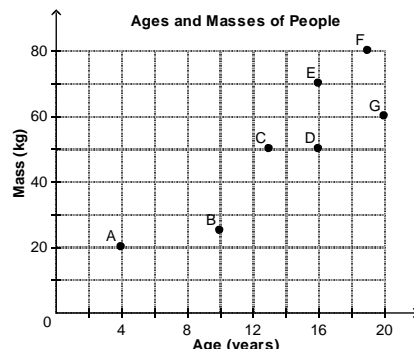
- a. 7
- b. 2
- c. 14
- d. 3

\_\_\_\_\_ 7. For the function  $f(x) = -3x + 8$ , determine  $x$  when  $f(x) = -25$ .

- a. 83
- b. -67
- c. 11
- d. -11

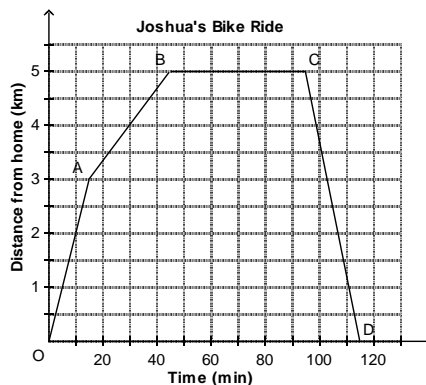
\_\_\_\_\_ 8. Each point on this graph represents a person. Which two people are the same age?

- a. E and F
- b. C and D
- c. D and E
- d. B and C



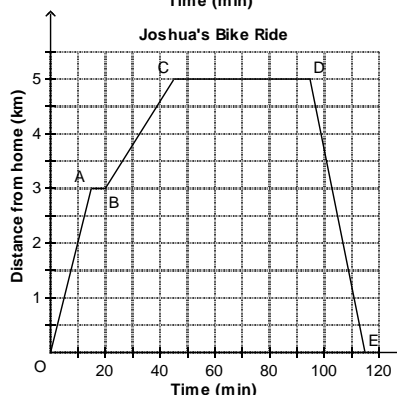
9. Joshua went on a bike ride. For part of the ride, Joshua stopped to play in a park with a friend. Which segment of the graph best describes this part of his bike ride?

- a. CD    b. AB    c. OA    d. BC

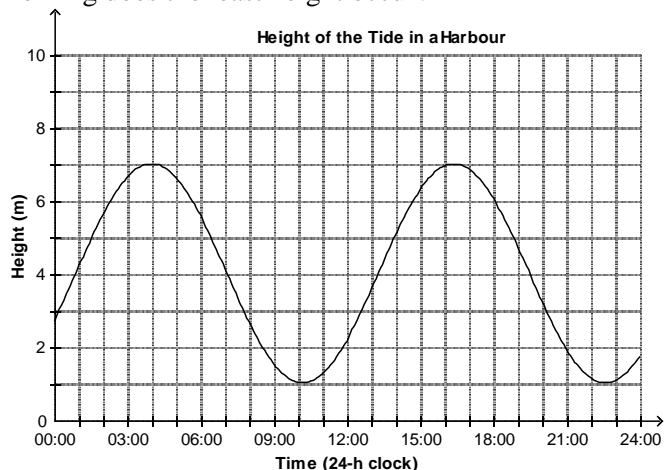


10. Joshua went on a bike ride. Which statement best describes what is happening for line segment DE in this graph?

- a. Joshua spends time at the park.  
 b. Joshua leaves home.  
 c. Joshua cycles to the park.  
 d. Joshua returns home.

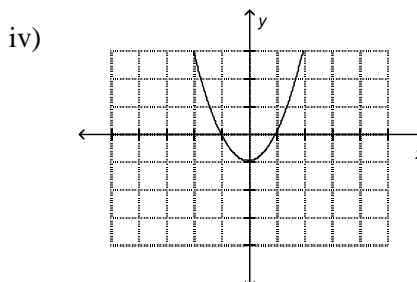
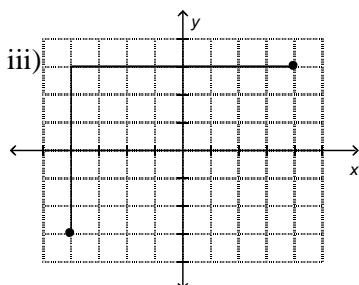
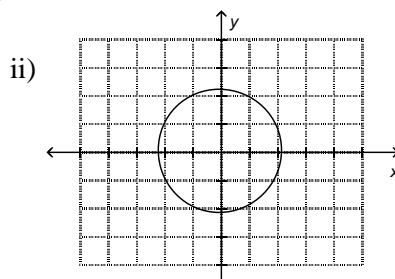
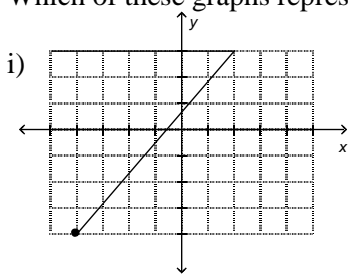


11. This graph shows the height of the tide in a harbour as a function of time in one day. At about what time in the morning does the least height occur?



- a. About 11:00 a.m.                      c. About 10:00 a.m.  
 b. About 4:00 a.m.                        d. About 1:00 a.m.

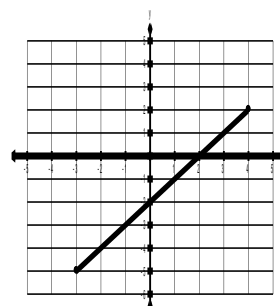
12. Which of these graphs represents a function?



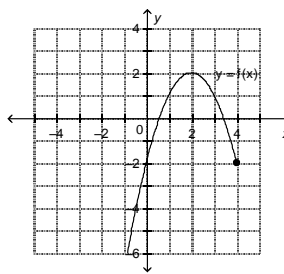
- a. iv                      b. ii                      c. i                      d. iii

13. Determine the domain of this graph.

- a.  $\{x | -5 \leq x \leq 2, x \in R\}$                       c.  $\{x | -3 \leq x \leq 4, x \in R\}$   
 b.  $\{y | -5 \leq y \leq 2, y \in R\}$                       d.  $\{y | -3 \leq y \leq 4, y \in R\}$

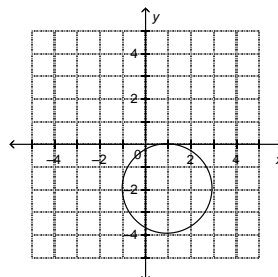


14. Determine the domain and range of the graph of this function.



- a.  $2 \leq x \leq 4; y \leq 2$
- b.  $x \leq 4; y \leq 2$
- c.  $x \leq 2; y \leq 4$
- d.  $x \leq 4; -2 \leq y \leq 2$

15. 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.  $-4 \leq y \leq 3$

16. Which table of values represents a linear relation?

i)

<b>Distance (m)</b>	0	5	10	15	20
<b>Time (s)</b>	0	1	2	3	4

iii)

<b>Time (s)</b>	0	1	2	3	4
<b>Speed (m/s)</b>	0	1	2	4	8

ii)

<b>Time (s)</b>	0	3	6	9	12
<b>Distance (m)</b>	0	10	22	36	52

iv)

<b>Distance (m)</b>	0	4	16	36	64
<b>Speed (m/s)</b>	0	2	4	6	8

- a. iii
- b. i
- c. ii
- d. iv

17. 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.

<b><math>t</math> (min)</b>	0	2	4	6	8
<b><math>a</math> (m)</b>	4000	5400	6800	8200	9600

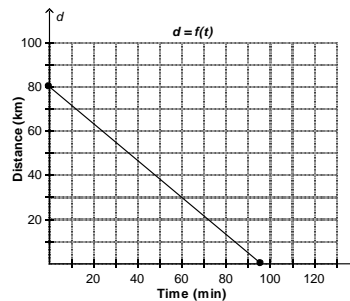
- a. 1500 m/min
- b. 1400 m/min
- c. 1200 m/min
- d. 700 m/min

18. 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.

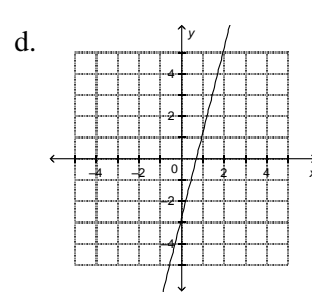
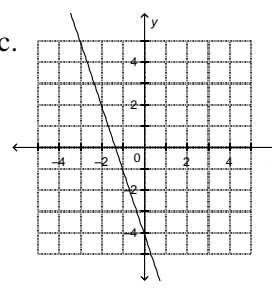
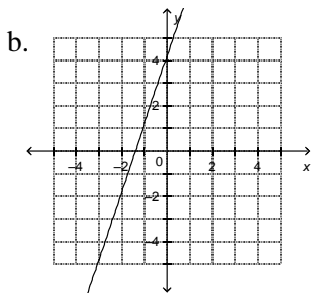
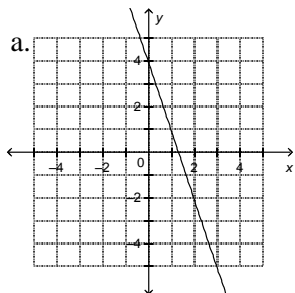
- a. i
- b. ii
- c. iii
- d. iv

19. This graph shows distance,  $d$  kilometres, as a function of time,  $t$  minutes. Determine the vertical and horizontal intercepts.



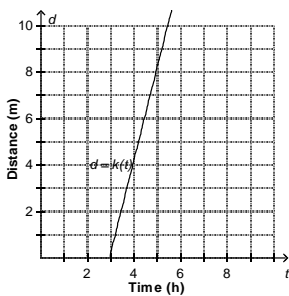
- a. Vertical intercept: 80  
Horizontal intercept: 96
- b. Vertical intercept: 64  
Horizontal intercept: 96
- c. Vertical intercept: 96  
Horizontal intercept: 80
- d. Vertical intercept: 80  
Horizontal intercept: 64

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

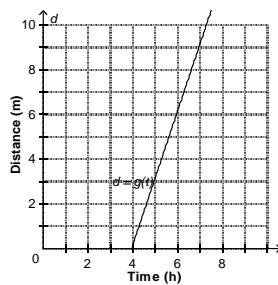


21. Each graph below shows distance,  $d$  metres, as a function of time,  $t$  hours.  
Which graph has a rate of change of 4 m/h and a vertical intercept of 3 m?

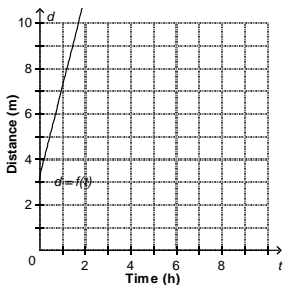
a.



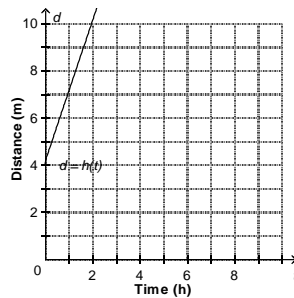
c.



b.



d.



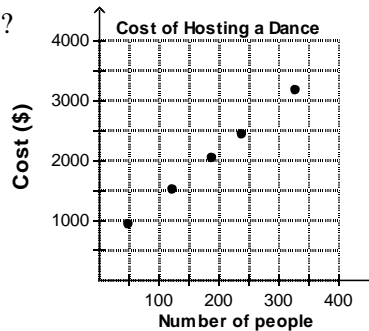
22. The graph shows the cost of hosting an anniversary party.  
What is the maximum number of people who can attend the party for a cost of \$1500?

- a. 61 people
- b. 38 people
- c. 33 people
- d. 27 people



**Short Answer**

23. (A) How can you tell that this graph represents a function?

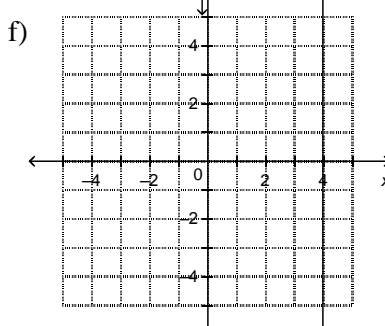
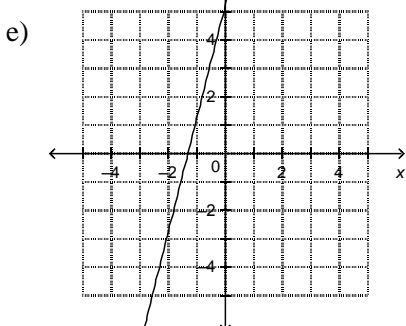
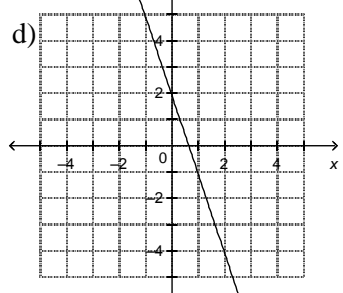
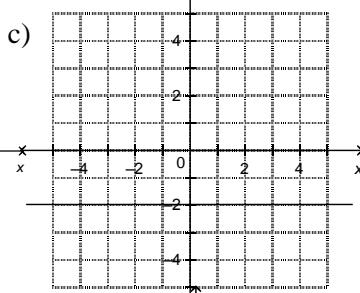
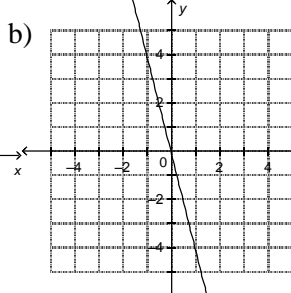
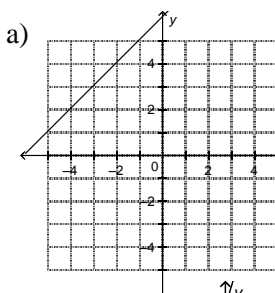


(B) Explain why the points on this graph are not joined.

24. Which equations represent linear relations? Create tables of values if necessary.

- a)  $5x - y = 8$
- b)  $x^2 + y^2 = 11$
- c)  $x = 7 - 6y$
- d)  $y = x^2 + 29x - 30$
- e)  $y = x^3 + 8$
- f)  $y - 5 = 0$

25. Which graphs have:  
i) a negative rate of change?  
ii) a positive rate of change?  
iii) neither a negative nor a positive rate of change?



### Problem

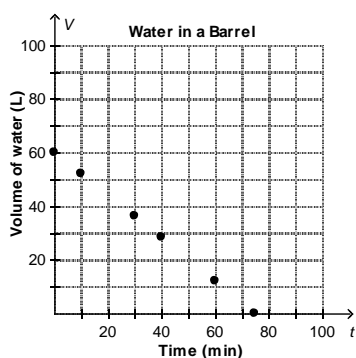
26. This table shows some of the host cities of the Canada Winter Games and the year in which they hosted.

Host City	Year
Brandon, Manitoba	1979
Grande Prairie, Alberta	1995
Lethbridge, Alberta	1975
Saskatoon, Saskatchewan	1971
Whitehorse, Yukon	2007

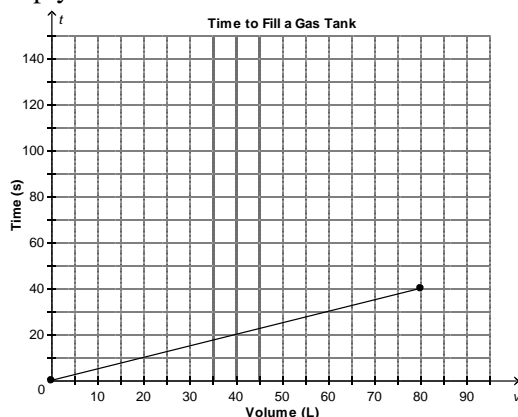
- a) Describe the relation in words.  
 b) Represent this relation:  
 i) as an arrow diagram  
 ii) as a set of ordered pairs
27. The equation  $C = 11g + 250$  represents the total cost,  $C$  dollars, for a sports banquet when  $g$  people attend.
- a) Describe the function.  
 Write the function in function notation.
- b) Determine  $C(46)$ .  
 What does this number represent?
- c) Determine the value of  $g$  when  $C(g) = 1581$ .  
 What does this number represent?
28. This table shows the volume of water in a barrel that is leaking at a constant rate.

Time, $t$ (min)	Volume of Water, $V$ (L)
0	60
10	52
30	36
40	28
60	12
75	0

A student drew a graph of the function.



- a) Describe any errors in the graph.  
 b) Write the domain and range of the graph.
29. This graph shows the time it takes to fill a gas tank from empty.

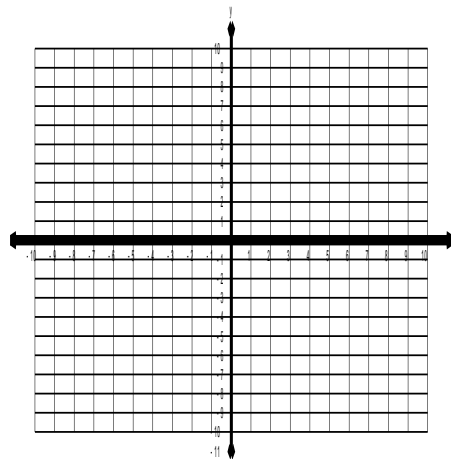


- a) Determine the vertical and horizontal intercepts.  
 Write the coordinates of the point where the graph intersects the axes.  
 Describe what the point represents.
- b) Determine the rate of change.  
 What does it represent?
- c) Write the domain and range.
- d) About how long will it take to fill a 45-L gas tank?

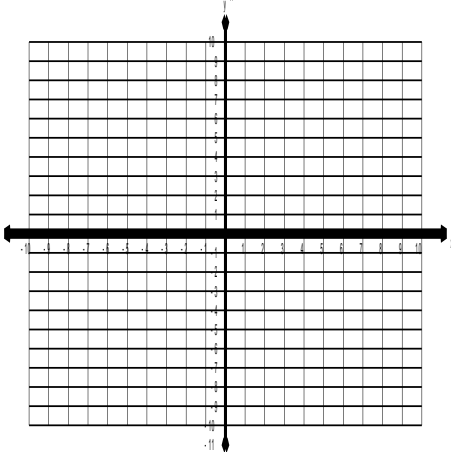
30.a) Determine the x and y-intercepts of the graph:  $5x + 8y + 40 = 0$

B) Graph the line.

C) What is the slope?



31. Graph  $y = \frac{-2}{5}x + 3$  using the slope and y-intercept



**Answer Section**

1.B 2. A 3. A 4.C 5.B 6.C 7.C 8.C 9.D 10.D 11.C 12.A 13.C 14.B 15.B 16.B 17.D 18.B 19.A 20.A 21.B 22.C

23.(A)The graph represents a function because there is only one cost for each number of people.

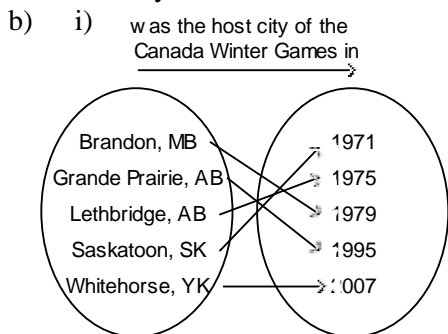
(B)The points are not joined because the data are only valid for whole numbers of people.

24.The relations in parts a, c, and f are linear.

25. i)Graphs b and d have a negative rate of change. ii) Graphs a and e have a positive rate of change.

iii)Graphs c and f have neither a negative nor a positive rate of change.

26.a)The relation shows the association “was the host city of the Canada Winter Games in” from a set of cities to a set of years.



ii){(Brandon, Manitoba; 1979), (Grande Prairie, Alberta; 1995), (Lethbridge, Alberta; 1975), (Saskatoon, Saskatchewan; 1971), (Whitehorse; Yukon, 2007)}

27.a)The total cost of the banquet is a function of the number of people attending. In function notation:  $C(g) = 11g + 250$   
b)756 This means that when 46 people attend the banquet, the total cost is \$756.

c) 121 When 121 people attend the banquet, the total cost is \$1581.

28.a) The points on the graph should be connected because all values of time and volume are permissible between the indicated plotted points.

b) Domain:  $0 \leq t \leq 75$ ; range:  $0 \leq V \leq 60$

29.a) The vertical intercept is 0. The horizontal intercept is 0.

The point where the graph intersects the axes has coordinates (0, 0).

This means that the amount of gas in a gas tank after 0 s is 0 L.

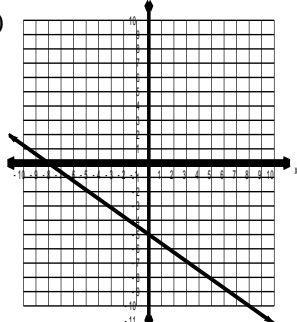
b) 0.5s/L The rate of change is positive so the volume is increasing with time.  
Every second, 0.5 L of gas is added to the tank.

c) The domain is the set of possible values of the volume of gas:  $0 \leq v \leq 80$

The range is the set of possible values of the time:  $0 \leq t \leq 40$

d) To estimate how long will it take to fill a 45-L gas tank, use the graph.From 45 on the  $v$ -axis, draw a vertical line to the graph, then a horizontal line to the  $t$ -axis. From the graph, it will take approximately 23 s.

30a) (-8,0) and (0,-5) b)



c) -5/8 31.

