Curriculum Outcomes:

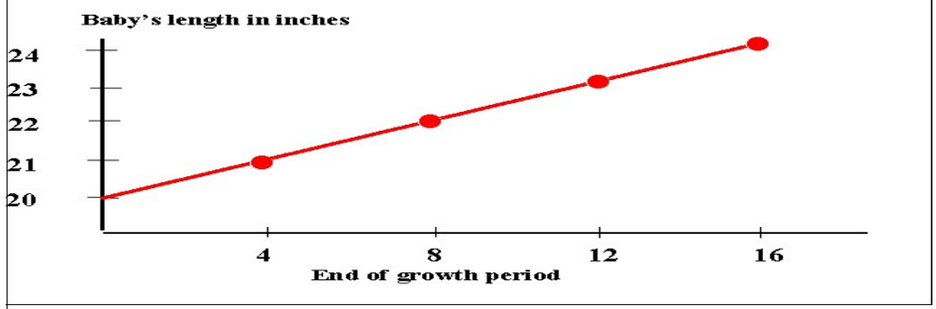
(PR1) Generalize a pattern arising from a problem-solving context using linear equations and verify by substitution.

(PR2) Graph linear relations, analyze the graph and interpolate or extrapolate to solve problems.

Student Friendly: Being able to identify a linear pattern in a t-table.

Feb 6-7:53 AM

Warm-Up
Math 9



Using the above graph, estimate the growth of a baby at the end of growth period 6.

Using the above graph, estimate the growth period when a baby is 23.5 inches.

Sep 14-6:47 PM

Lesson 4.1: Writing Equations to Describe Patterns

1. In each equation, determine the value of A when n is 3.
   a) $A = 2n + 1$ b) $A = 3n - 2$

2. The pattern in this table continues. Which equation below relates the figure number n, to the perimeter of the figure P?

Figure Number, n	Perimeter, P
1	7
2	10
3	13
4	16

Mar 29-1:02 PM

Lesson 4.1: Writing Equations to Describe Patterns

1. In each equation, determine the value of A when n is 3.
   a) $A = 2n + 1$ b) $A = 3n - 2$

$A = 2(3) + 1$
$A = 6 + 1$
$A = 7$

$A = 3(3) - 2$
$A = 9 - 2$
$A = 7$

2. The pattern in this table continues. Which equation below relates the figure number n, to the perimeter of the figure P?

x y

Figure Number, n	Perimeter, P
1	7
2	10
3	13
4	16

+1 +3

$P = 3n + 4$

Mar 29-1:02 PM

Lesson 4.1: Writing Equations to Describe Patterns

1. In each equation, determine the value of A when n is 3.
   a) $A = 2n + 1$ b) $A = 3n - 2$

2. The pattern in this table continues. Which equation below relates the figure number n, to the perimeter of the figure P?

Figure Number, n	Perimeter, P
1	7
2	10
3	13
4	16

Mar 29-1:02 PM

4. Rachel takes care of homes during the summer while their owners are away on vacation. She charges \$8, plus \$2.50 a day.
   a) Create a table that shows the charges when the owners are away for up to 5 days.
   b) Write an equation that relates the charge, C dollars, to the number of days, n, that the owners are away.
   c) What will the charge be when the owners are away for 14 days?
   d) How many days were the owners away when the charge was \$33?

Mar 29-1:04 PM

4. Rachel takes care of homes during the summer while their owners are away on vacation. She charges $8, plus $2.50 a day.
   a) Create a table that shows the charges when the owners are away for up to 5 days.
   b) Write an equation that relates the charge, C dollars, to the number of days, n, that the owners are away.
   c) What will the charge be when the owners are away for 14 days?
   d) How many days were the owners away when the charge was $33?

a)

d	C
0	8
1	10.5
2	13
3	15.5

b) $C = 2.5d + 8$

c) $C = 2.5(14) + 8$

$C = 43$

d) $33 = 2.5(x) + 8$

$x = 10$

Mar 29-1:04 PM

Lesson 4.2: Linear Relations

1. For each table of values below:
   i) Does it represent a linear relation?
   ii) If the relation is not linear, explain how you know.
   iii) If the relation is linear, describe it.

a)

x	y
1	5
2	12
3	19
4	26
5	33

b)

x	y
1	1
3	3
5	7
7	13
9	21

Mar 29-1:04 PM

Lesson 4.2: Linear Relations

1. For each table of values below:
   i) Does it represent a linear relation?
   ii) If the relation is not linear, explain how you know.
   iii) If the relation is linear, describe it.

a)

x	y
1	5
2	12
3	19
4	26
5	33

+1 ( ) +7
+1 ( ) +7
+1 ( ) +7
+1 ( ) +7

Linear

$y = 7x - 2$

b)

x	y
1	1
3	3
5	7
7	13
9	21

+2 ( ) +2
+2 ( ) +4
+2 ( ) +5
+2 ( ) +6

Nonlinear

Mar 29-1:04 PM

2. Each table of values represents a linear relation. Complete each table. Explain your reasoning.

c)

x	y
4	
2	14
0	19
–2	
–4	

Mar 29-1:07 PM

2. Each table of values represents a linear relation. Complete each table. Explain your reasoning.

c)

x	y
4	9
2	14
0	19
−2	24
−4	29

−2( )+5

−2( )

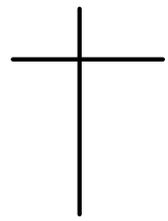
$y = \frac{5}{-2}x + 19$

Mar 29-1:07 PM

Create a table of values for each linear relation and then graph the relation.

$y = \frac{2}{3}x - 5$

$5x - 2y = -12$



Mar 29-1:07 PM

Create a table of values for each linear relation and then graph the relation.

$y = \frac{2}{3}x - 5$

$\frac{\Delta y}{\Delta x} = \frac{2}{3}$ (0, 5)

$\Delta x = 3$

x	y
-3	-7
0	-5
3	-3

$5x - 2y = -12$

$-2y = -5x - 12$

$y = \frac{5}{2}x + 6$

$\Delta x = 2$

x	y
-2	1
0	6
2	11

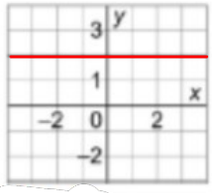
$\frac{\Delta y}{\Delta x} =$ (0, 6)

Mar 29-1:07 PM

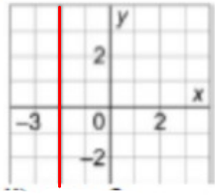
Lesson 4.3: Another Form of the Equation for a Linear Relation

1. Does each equation describe a vertical, a horizontal, or an oblique line? Describe each vertical or horizontal line.
   a) $y = 4$
   b) $2x + 5 = 7$
   c) $2x - y = 6$
   d) $3y + 9 = 0$

2. Which equation below describes each graph?
   a)



   b)

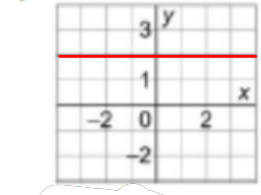


Mar 29-1:14 PM

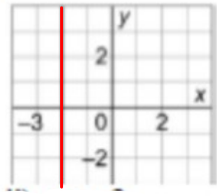
Lesson 4.3: Another Form of the Equation for a Linear Relation

1. Does each equation describe a vertical, a horizontal, or an oblique line? Describe each vertical or horizontal line.
   a) $y = 4$
   b) $2x + 5 = 7$
   c) $2x - y = 6$
   d) $3y + 9 = 0$

2. Which equation below describes each graph?
   a)



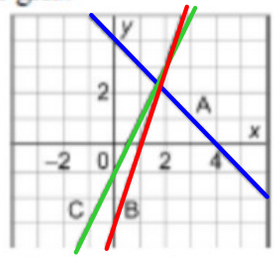
   b)



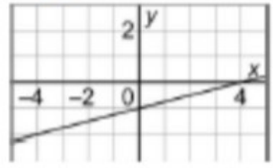
Mar 29-1:14 PM

Lesson 4.4: Matching Equations and Graphs

1. Match each equation with a graph on this grid.
   a) $y = 2x - 1$
   b) $y = -x + 4$
   c) $y = 3x - 3$



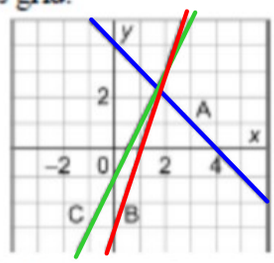
5. Which equation describes this graph? Justify your answers.
   a) $x - y = 4$
   b) $x - 4y = 4$
   c) $4x - y = 1$



Mar 29-1:17 PM

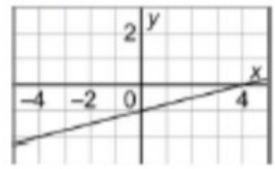
Lesson 4.4: Matching Equations and Graphs

1. Match each equation with a graph on this grid.
   a) $y = 2x - 1$ green
   b) $y = -x + 4$ blue
   c) $y = 3x - 3$ red



5. Which equation describes this graph? Justify your answers.
   a) $x - y = 4$
   b) $x - 4y = 4$
   c) $4x - y = 1$

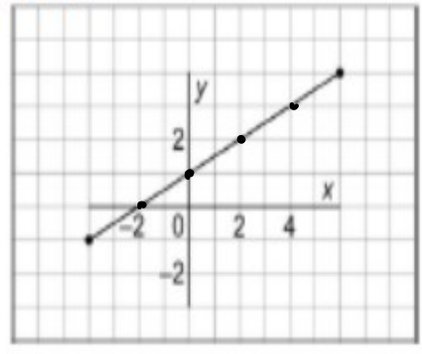
b



Mar 29-1:17 PM

Lesson 4.5: Using Graphs to Estimate Values

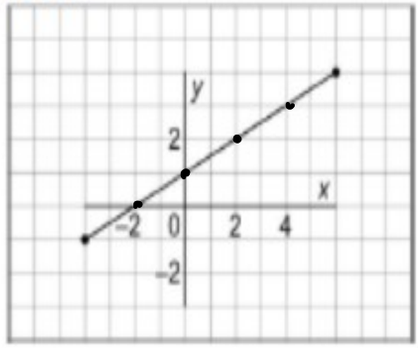
1. This graph represents a linear relation.
   a) Determine the value of x for each value of y.
      i) $y = 1$ ii) $y = 3$
      iii) $y = 0$
   b) Determine the value of y for each value of x.
      i) $x = 2$ ii) $x = 8$
      iii) $x = -6$



Mar 29-1:18 PM

Lesson 4.5: Using Graphs to Estimate Values

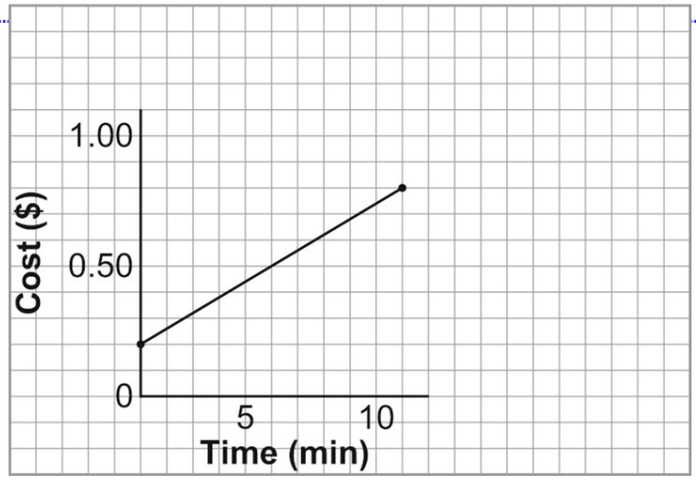
1. This graph represents a linear relation.
   a) Determine the value of x for each value of y.
      i) $y = 1$ $x=0$ ii) $y = 3$ $x=4$
      iii) $y = 0$ $x=-2$
   b) Determine the value of y for each value of x.
      i) $x = 2$ $y=2$ ii) $x = 8$ $y=5$
      iii) $x = -6$
      $x=-2$



Mar 29-1:18 PM

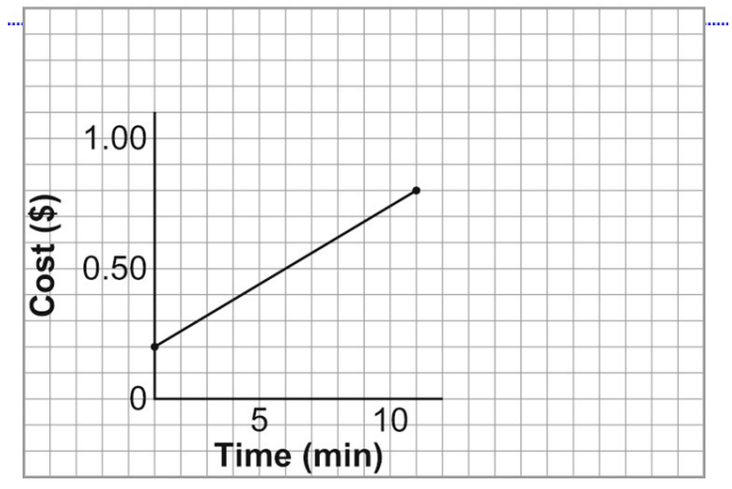
4. The graph shows how the cost of a long distance call changes with the time for the call.
   a) Estimate the cost of a 7-min call.
      Is this interpolation or extrapolation? Explain.
   b) The cost of a call was $1.00.
      Estimate the time for the call.
   c) The cost of a call was $1.50.
      Estimate the time for the call.

Cost of Long Distance Calls



Mar 29-1:19 PM

4. The graph shows how the cost of a long distance call changes with the time for the call.
   a) Estimate the cost of a 7-min call. aprox 0.58
      Is this interpolation or extrapolation? Explain.
   b) The cost of a call was $1.00. aprox 14.5
      Estimate the time for the call.
   c) The cost of a call was $1.50. aprox 23
      Estimate the time for the call.



Mar 29-1:19 PM

Homework Questions??

Unit test Wednesday

Review for Test Page 201 - 203

1(c, d,e,f,g),
4,
5(b, c),
8,
10,
11,
12,
13,
14,
15,
17

Dec 13-7:30 PM

Lesson 4.1: Writing Equations to Describe Patterns

1. In each equation, determine the value of A when n is 3.
   a) $A = 2n + 1$ b) $A = 3n - 2$
   c) $A = 4n + 3$ d) $A = 30 - 2n$

2. The pattern in this table continues. Which equation below relates the figure number n, to the perimeter of the figure P?

Figure Number, n	Perimeter, P
1	7
2	10
3	13
4	16

   a) $P = 3n + 7$ b) $P = 7n + 3$
   c) $P = 3n + 4$ d) $n = 3P + 7$

3. The pattern in each table below continues. For each table:
   i) Describe the pattern that relates v to t.
   ii) Write an equation that relates v to t.
   iii) Verify your equation by substituting values from the table.

a)

Term Number, t	Term Value, v
1	8
2	13
3	18
4	23

b)

Term Number, t	Term Value, v
1	34
2	31
3	28
4	25

4. Rachel takes care of homes during the summer while their owners are away on vacation. She charges \$8, plus \$2.50 a day.
   a) Create a table that shows the charges when the owners are away for up to 5 days.
   b) Write an equation that relates the charge, C dollars, to the number of days, n, that the owners are away.
   c) What will the charge be when the owners are away for 14 days?
   d) How many days were the owners away when the charge was \$33?

Apr 5-7:55 AM

Lesson 4.2: Linear Relations

1. For each table of values below:
   i) Does it represent a linear relation?
   ii) If the relation is not linear, explain how you know.
   iii) If the relation is linear, describe it.

a)

x	y
1	5
2	12
3	19
4	26
5	33

b)

x	y
1	1
3	3
5	7
7	13
9	21

c)

x	y
4	11
2	14
0	17
–2	20
–4	23

d)

x	y
–2	–12
–1	–5
0	0
1	3
2	4

2. Each table of values represents a linear relation. Complete each table. Explain your reasoning.

a)

x	y
1	
2	
3	14
4	18
5	

b)

x	y
1	
3	3
5	–1
7	
9	

c)

x	y
4	
2	14
0	19
–2	
–4	

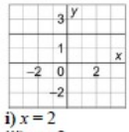
3. Create a table of values for each linear relation and then graph the relation. Use values of x from –2 to 2.
   a) $y = x + 4$ b) $y = 2x + 1$ c) $y = 5 - 2x$

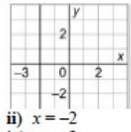
4. A computer repair company charges \$80 for a service call, plus \$50 an hour for labour.
   a) Create a table to show the relation between the time in hours for the service call and the total cost.
   b) Is this relation linear? Justify your answer.
   c) Let n represent the time in hours for the service call and C represent the total cost in dollars. Write an equation that relates C and n.
   d) How much will a 7-h service call cost?

Apr 5-7:56 AM

Lesson 4.3: Another Form of the Equation for a Linear Relation

1. Does each equation describe a vertical, a horizontal, or an oblique line? Describe each vertical or horizontal line.
   a) $y = 4$ b) $2x + 5 = 7$
   c) $2x - y = 6$ d) $3y + 9 = 0$

2. Which equation below describes each graph?
   a)
   

   i) $x = 2$
   iii) $y = 2$
   b)
   

   ii) $x = -2$
   iv) $y = -2$

3. The sum of two numbers is 8. Let x and y represent the two numbers.
   a) Create a table for 5 different values of x.
   b) Graph the data. Should you join the points?
   c) Write an equation that relates x and y.

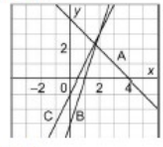
4. Graph each line. Explain your work.
   a) $x = 4$ b) $2y = 6$
   c) $y - 2 = -6$ d) $2x + 3 = 8$

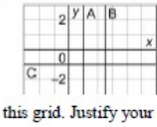
5. For each equation below:
   - Make a table for the given values of x.
   - Graph the equation.
     a) $3x + y = 3$; for $x = -2, 0, 2$
     b) $x - 2y = 8$; for $x = -2, 0, 2$

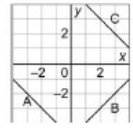
6. a) Graph these equations on the same grid.
   $x + y = 6$ $y = 1$ $x - y = -6$
   b) Which shape is formed by these lines?

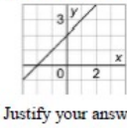
Apr 5-7:56 AM

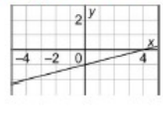
Lesson 4.4: Matching Equations and Graphs

1. Match each equation with a graph on this grid.
   a) $y = 2x - 1$
   b) $y = -x + 4$
   c) $y = 3x - 3$
   

2. Match each equation with a graph on this grid.
   a) $y = -1$
   b) $0 = -x + 1$
   c) $2 = 2x - 3$
   

3. Match each equation with a graph on this grid. Justify your answers.
   a) $x + y = 5$
   b) $x - y = 5$
   c) $x + y = -5$
   

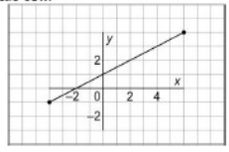
4. Which equation describes this graph? Justify your answers.
   a) $y = x + 2$
   b) $y = -x + 2$
   c) $y = x - 2$
   

5. Which equation describes this graph? Justify your answers.
   a) $x - y = 4$
   b) $x - 4y = 4$
   c) $4x - y = 1$
   

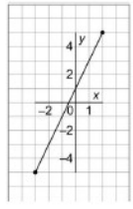
Apr 5-7:56 AM

Lesson 4.5: Using Graphs to Estimate Values

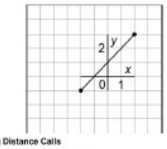
1. This graph represents a linear relation.
   a) Determine the value of x for each value of y.
      i) $y = 1$ ii) $y = 3$
      iii) $y = 0$
   b) Determine the value of y for each value of x.
      i) $x = 2$ ii) $x = 8$
      iii) $x = -6$



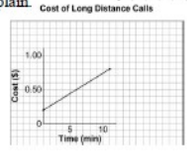
2. This graph represents a linear relation.
   a) Determine the value of x for each value of y.
      i) $y = 3$ ii) $y = -2$
      iii) $y = 7$
   b) Determine the value of y for each value of x.
      i) $x = 0$ ii) $x = -2$
      iii) $x = -4$



3. This graph represents a linear relation.
   a) Determine the value of x for each value of y.
      i) $y = 2$ ii) $y = 0$
      iii) $y = 5$
   b) Determine the value of y for each value of x.
      i) $x = 0$ ii) $x = 3$
      iii) $x = -5$



4. The graph shows how the cost of a long distance call changes with the time for the call.
   a) Estimate the cost of a 7-min call.
      Is this interpolation or extrapolation? Explain.
   b) The cost of a call was $1.00.
      Estimate the time for the call.
   c) The cost of a call was $1.50.
      Estimate the time for the call.



Apr 5-7:56 AM

Extra Practice 1 – Master 4.20

Lesson 4.1

1. a) 7 b) 7
   c) 15 d) 24

2. The correct equation is $P = 3n + 4$.
3. a) i) The first term is 8 and as t increases by 1, v increases by 5.
      ii) $v = 5t + 3$
   b) i) The first term is 34 and as t increases by 1, v decreases by 3.
      ii) $v = 37 - 3t$

4. a)

Number of Days Away, n	Charge, C ($)
1	10.50
2	13.00
3	15.50
4	18.00
5	20.50

   b) $C = 2.5n + 8$
   c) $43
   d) 10 days

Extra Practice 2 – Master 4.21

Lesson 4.2

1. a) i) Yes
      iii) As x increases by 1, y increases by 7.
   b) i) No
      ii) As x increases by 2, y does not increase by a constant number.
   c) i) Yes
      iii) As x decreases by 2, y increases by 3.
   d) i) No
      ii) As x increases by 1, y does not increase by a constant number.

2.

a)

x	y
1	6
2	10
3	14
4	18
5	22

b)

x	y
1	7
3	3
5	−1
7	−5
9	−9

c)

x	y
4	9
2	14
0	19
−2	24
−4	29

   a) As x increases by 1, y increases by 4.
   b) As x increases by 2, y decreases by 4.
   c) As x decreases by 2, y increases by 5.

3.

a)

x	y
−2	2
−1	3
0	4
1	5
2	6

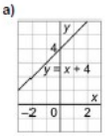
b)

x	y
−2	−3
−1	−1
0	1
1	3
2	5

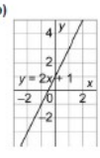
c)

x	y
−2	9
−1	7
0	5
1	3
2	1

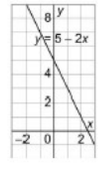
a)



b)



c)



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4. a)

Time, n hours	Total Cost, C ($)
1	130
2	180
3	230
4	280

b) Yes, as the time in hours increases by 1, the total cost increases by $50.
c) $C = 50n + 80$
d) $430

Extra Practice 3 – Master 4.22

Lesson 4.3

1. a) The graph is a horizontal line that intersects the y-axis at 4.
b) The graph is a vertical line that intersects the x-axis at 1.
c) The graph is an oblique line.
d) The graph is a horizontal line that intersects the y-axis at –3.

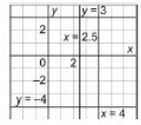
2. a) $y = 2$ b) $x = –2$

3. a) Tables may vary.

x	y
0	8
2	6
4	4
6	2
8	0

b) Yes, the points should be joined because x and y can have any value between the plotted points.
c) $x + y = 8$

4. a) A vertical line that intersects the x-axis at 4
b) A horizontal line that intersects the y-axis at 3
c) A horizontal line that intersects the y-axis at –4
d) A vertical line that intersects the x-axis at 2.5



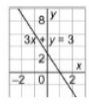
5.

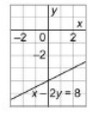
a) $3x + y = 3$

x	y
–2	9
0	3
2	–3

b) $x – 2y = 8$

x	y
–2	–5
0	–4
2	–3





6.

a) $x + y = 6$

x	y
0	6
2	4
4	2

$x – y = –6$

x	y
–4	2
–2	4
0	6

b) An isosceles triangle

Extra Practice 4 – Master 4.23

Lesson 4.4

1. a) Graph C b) Graph A c) Graph B

2. a) Graph C b) Graph A c) Graph B

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Master 4.27

Extra Practice and Activating Prior Knowledge Sample Answers

3. Students should make tables of values, or choose points on each line, then substitute coordinates in each equation.
a) Graph C b) Graph B
c) Graph A

4. Students should make tables of values, or choose points on each line, then substitute coordinates in each equation.
$y = x + 2$

5. $x – 4y = 4$

Extra Practice 5 – Master 4.24

Lesson 4.5

1. a) i) $x = 0$ ii) $x = 4$
iii) $x = –2$
b) i) $y = 2$ ii) $y = 5$
iii) $y = –2$

2. a) i) $x = 1$ ii) $x = –1.5$
iii) $x = 3$
b) i) $y = 1$ ii) $y = –3$
iii) $y = –7$

3. a) i) $x = 1$ ii) $x = –1$
iii) $x = 4$
b) i) $y = 1$ ii) $y = 4$
iii) $y = –4$

4. a) Approximately $0.56. This is interpolation because I am reading a data point that lies between the plotted points.
b) Approximately 13 min
c) Approximately 22 min

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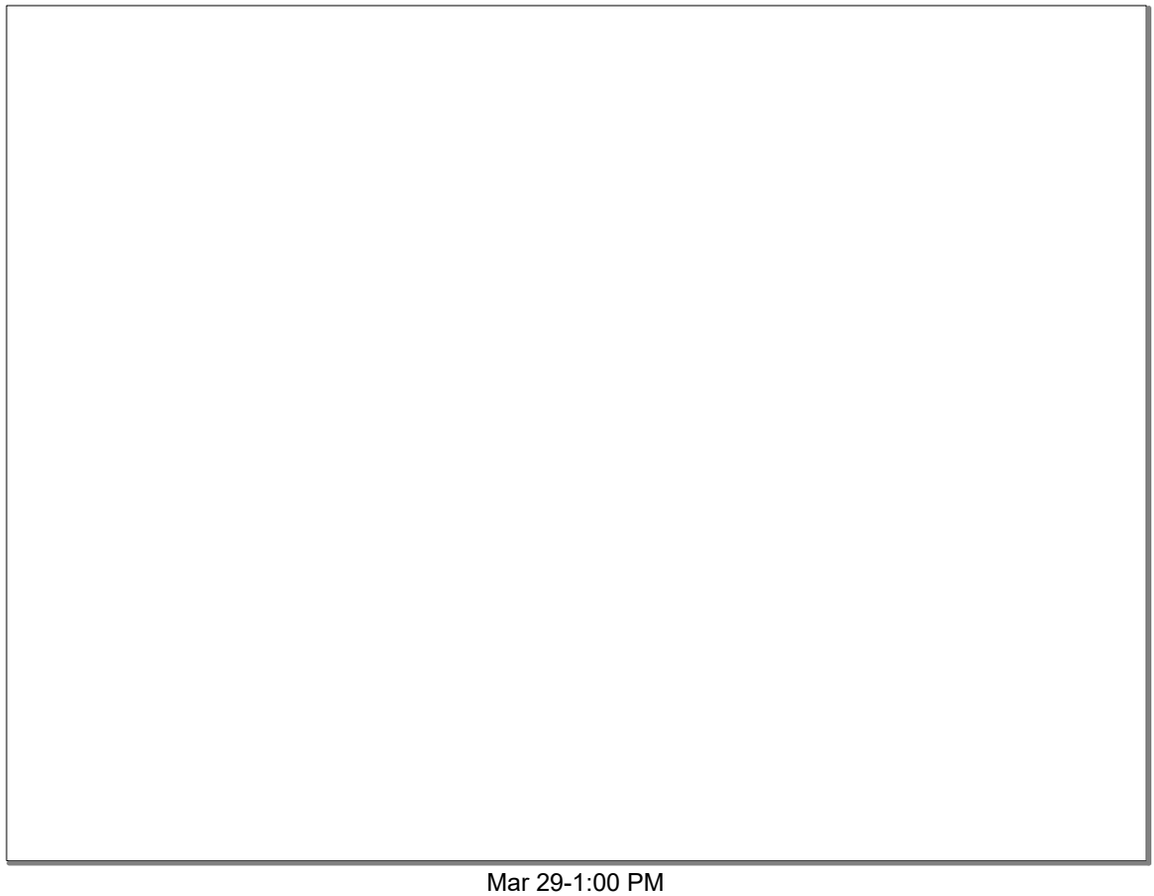

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