Name:_____   Per:_____

Algebra I Semester *Practice* Final 2016-17

Please note:
- Absolutely <u>no cell phones</u> out during the test.
- You may borrow a calculator from the teacher, but you may <u>not</u> use a calculator another student is using for the test.
- All work must be shown for each problem to receive full credit.

Important Equations from the first semester:

> ### *Linear Equations*
> **Slope Intercept Form:** $y = mx + b$
>
>   <u>m</u> is the slope & <u>b</u> is the y-intercept
>
> **Standard Form:** $Ax + By = C$
>
> **Slope formula :** $m = \dfrac{y_2 - y_1}{x_2 - x_1}$
>
> **Explicit Formula for Arithmetic Sequences:**
>
> $f(n) = f(1) + d\,(n - 1)$
>
> common difference
> first term
> one less than the term number

<u>**Academic Honor Contract**</u>
Please sign the following contract before beginning your exam.

   a **principled** Rex Putnam learner, I give my word that the work on this test is my own and not that of any of my classmates.

Signature: _____

ESSENTIAL LEARNING TARGETS

1.1 a/b Solving Equations *Essential Learning*	Score:

Questions

1. **Solve for x:** $30 = 4(x + 2) - 8x$

$$30 = 4x + 8 - 8x \rightarrow \frac{22}{-4} = \frac{-4x}{-4}$$
$$30 = -4x + 8$$
$$-8 \qquad -8$$

2. **Solve for x:** $\frac{x}{6} + 3 = 9$ $6 \cdot \frac{x}{6} = 6 \cdot 6$ $x = 36$
$$-3 \quad -3$$

    a. $x = 1.5$ b. $x = 0.5$

    c. $x = 1$ (d.) $x = 36$

3. **Solve for x:** $4x - 2 = 15$
$$\frac{+2 \quad +2}{}$$
$$\frac{4x}{4} = \frac{17}{4} \qquad x = \frac{17}{4}$$

4. **Solve for x:** $\frac{x}{3} = -5$ (3) $3 \cdot$

    a. $x = -\frac{1}{15}$ (b.) $x = -15$

    c. $x = \frac{1}{15}$ d. $x = 15$

Answers

1. $x = -5.5$

2.   D

3. $x = 4.25$

4.   B

2.1 a/b Modeling with Expressions *Essential Learning*	Score:

5. Consider the following expression $5x - 8y + 23z + 6$

    a. **How many terms does the expression have?**

    b. **What are the coefficients?**

5.

a. ___4 terms___

b. ___5, -8, 23___

6. Salvador's class has collected 68 cans in a food drive. They plan to sort the cans into x bags, with an equal number of cans in each bag. **Write an expression to show how many cans there will be in each bag.**

6. ___D___

a. $68 - x$	b. $68x$
c. $68 + x$	d. $\frac{68}{x}$

7. At the zoo, a child pays c dollars for a ticket and an adult pays g dollars. **Explain in words the meaning of $g = 3c$.** → Adults cost 3x

    a. An adult ticket costs three times as much as a child ticket.

    b. An adult ticket costs a third as much as a child ticket.

    c. Three times as many child tickets as adults tickets are sold.

    d. A third as many adults as children go to the zoo.
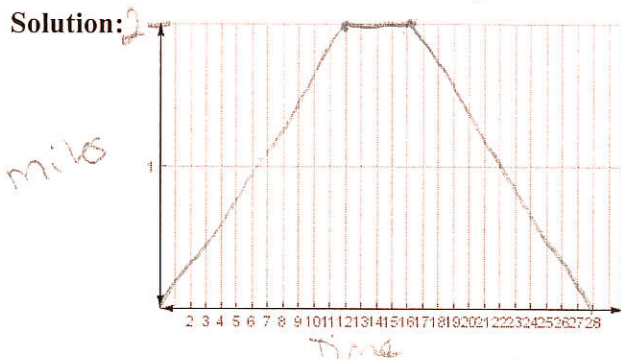
7. ___A___

8. Simplify the expression. $-12(4x-2)$

$-48x + 24$

8. ___-48x + 24___

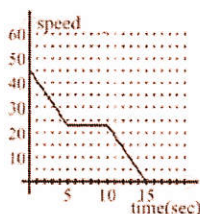| 3.1 Graphing Relationships *Essential Learning*	Score:

9. Bill's mother sends him to the corner store for milk and tells him to be back in 30 minutes. It takes him 12 minutes to run 2 miles to the store. He stays at the store for 4 minutes then runs another 12 minutes back home. **Graph the situation.**
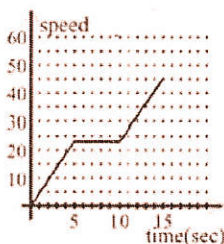
Solution:

10. **Which graph below would match the situation described?** A car travelling at 23 mi/h accelerates to 45 mi/h in 5 seconds. It maintains that speed for the next 5 seconds.
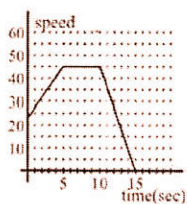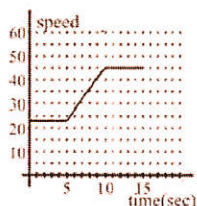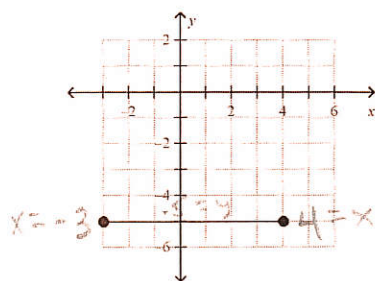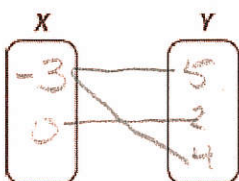
10. _____D_____

a.

b.

c.

d.

11. Find the domain and range:

11. _H_____

F D:$-3 \leq x \leq 4$; R:$0 \leq y \leq -5$
G D: $-4 \leq x \leq 5$; R$-6 \leq y \leq 0$

H D:$-3 \leq x \leq 4$; R: $y = -5$
I D: $x = -5$; R: $-3 \leq y \leq 4$

3.2 Understanding Relations & Functions *Essential Learning*	**Score:**

12. Create a mapping for the ordered pairs (-3, 5), (0, 2) (-3, 4). **Is the relation a function? Why or why not?**

12. _No_____

Explain: $X = -3$
Repeats and maps
to 2 y's.

13. Determine whether the graph represents a function or not.
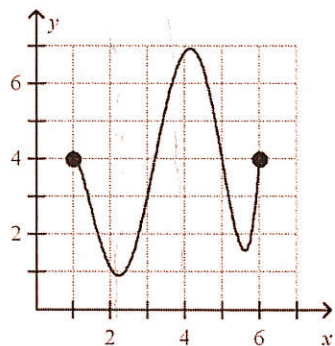
13. _Yes_____
Explain:

Passes the
vertical line test

14. Which of the following relations is NOT a function?
   a. {(4, 1), (1, 1), (5, 5), (10, 7)}
   b. {(4, 1), (1, 1), (10, 4), (6, 5)}
   c. {(2, 1), (4, 3), (6, 5), (3, 7)}
   d. {(4, 1), (3, 2), (5, 5), (4, 3)}

14. _D_____
Explain:

$X = 4$ Repeats

15. Give the domain and range of the relation below   15. ___A___

x	2	9	0	-4
y	6	36	0	-7

  a. D: {-4, 0, 9, 2}; R: {-7, 0, 36, 6}
  b. D: {-7, 0, 36, 6}}; R: {-4, 0, 9, 2}
  c. D: {-7, -4, 0}; R: {2, 6, 9, 36}
  d. D: {0}; R: {2, 9, -4, 6, 36, -7}

5.1 Understanding Linear Functions *Essential Learning*	Score:

16. Identify the linear functions. (Choose all that apply).

16. Solution:

	Linear	Not-Linear
$2x + 3y = 10$	X	
$-y + \frac{1}{3} = \frac{4}{5}x^2$		X
$\sqrt{x} + 3y = 2$		X
$-3x = 2 + y$	X	
$\frac{2}{x} + 3y = 10$		X

17. Create your own linear equation.   17. _____

5.2 Using Intercepts *Essential Learning*	Score:

18. Kristi rides her bike to school and has an odometer that measures the distance traveled. She subtracts this distance from the distance to the school and records the distance that remains between her and the school. Find the intercepts. What do the intercepts represent?

18. _____a_____

x

Time traveled (min)	Distance remaining (ft)
0	12,800
2	9,600
4	6,400
6	3,200
8	0

y

a. x-intercept = 8; y-intercept = 12,800. The x-intercept represents the time traveled when Kristi arrived at school. The y-intercept represents the distance remaining when Kristi began her bike ride.
b. x-intercept = 12,800; y-intercept = 8. The x-intercept represents the time traveled when Kristi began her bike ride. The y-intercept represents the distance remaining when Kristi arrived at school.
c. x-intercept = 12,800; y-intercept = 8. The x-intercept represents the distance remaining when Kristi began her bike ride. The y-intercept represents the time traveled when Kristi arrived at school.
d. x-intercept = 8; y-intercept = 12,800. The x-intercept represents the time traveled when Kristi began her bike ride. The y-intercept represents the distance remaining when Kristi arrived at school.

19. Find the x- and y-intercepts of $6y - 3x = 24$

19.

a. x-intercept: $(8, 0)$

b. y-intercept: $(0, 4)$

x-int: $y = 0$

$6(0) - 3x = 24$

$\dfrac{-3}{-3} \quad \dfrac{-3}{-3}$

$x = 8$

y-int: $x = 0$

$6y - 3(0) = 24$

$\dfrac{6y}{6} \qquad \dfrac{24}{6}$

$y = 4$

5.3 Interpreting Rate of Change and Slope *Essential Learning*	Score:

20. Find the slope of the line that goes through the points (4, 2) and (8, 9).

$x_1 \ y_1 \quad x_2 \ y_2$

20. $m = 7/4 = 1.75$

$$m = \frac{9-2}{8-4}$$

$$= \frac{7}{4}$$

21. Explain what the slope means for the following situation:

21. C

Time (hours)	Distance (miles)
4	260
6	390
8	520
10	650

$(4, 260)$

$(10, 650)$

$$m = \frac{650-260}{10-4}$$

$$= 65$$

A 10; Your car travels for 10 hours.
B 260; Your car travels 260 miles.
C $\frac{65}{1}$; Your car travels 65 miles every 1 hour.

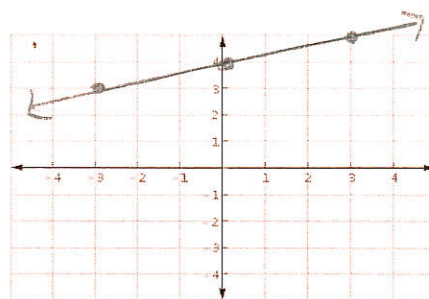D $\frac{1}{65}$; Your car travels 65 miles every 1 hour.

6.1 a/b Slope-Intercept *Essential Learning*	Score:

22. Graph the line $y = \frac{1}{3}x + 4$

↗ ↖start @
up 1   y=4
Right 3

22.

23. Choose the correct graph for the equation $-7x + 7y = -49$.

+7x   +7x → $\frac{7y}{7} = \frac{7x}{7} - \frac{49}{7}$

23. _____A_____

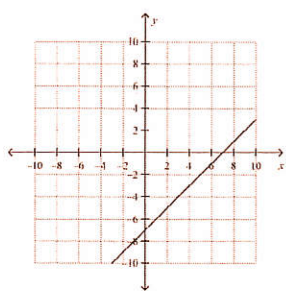↳ $y = x - 7$

positive↗ ↖ y-intercept
slope
↗

a. (circled)

b.

c.

d.
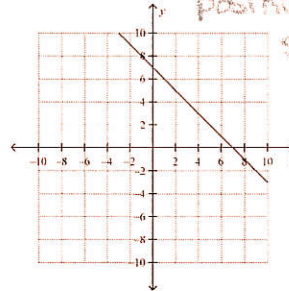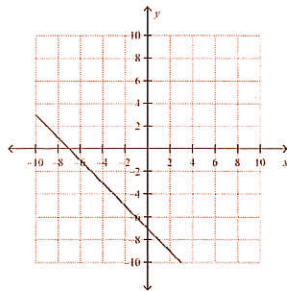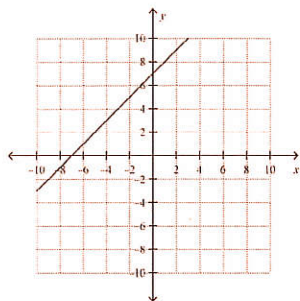
24. Write the equation of the line graphed below.

24. _____A_____

A $y = 3x - 1$ (circled)

B $y = -3x - 1$

C $y = \frac{1}{3}x + 1$

D $y = \frac{1}{3}x - 1$

25.

Which equation represents the line that passes through the points $(-3, 7)$ and $(3, 3)$?

$x_1 \, y_1 \quad x_2 \, y_2$

a. $y = \dfrac{2}{3}x + 1$

b. $y = \dfrac{2}{3}x + 9$

c. $y = -\dfrac{2}{3}x + 5$

d. $y = -\dfrac{2}{3}x + 9$

$m = \dfrac{3-7}{3(-3)} = \dfrac{-4 \div 2}{6 \div 2} \quad m = -\dfrac{2}{3}$

$y = mx + b$

$7 = -\dfrac{2}{3}(-3) + b$

$7 = 2 + b$

$5 = b$

25. ___C___

26.

The amount of a person's paycheck p varies directly with the number of hours worked t. For 16 hours of work, the paycheck is \$124.00. Write an equation for the relationship between hours of work and pay.

A $\quad p = 77.50t$ B $\quad p = t + 77.50$ C $\quad p = 7.75t$ D $\quad p = t + 7.75$

$124 \div 16 = 7.75$ per hour

26. ___C___

27.

Which equation represents the line that passes through the point $(1, 5)$ and has a slope of -2?

a. $y = 2x + 3$

b. $y = -2x + 7$

c. $y = -2x + 11$

d. $y = 2x - 9$

$y = mx + b$

$5 = (-2)(1) + b$

$5 = -2 + b$

$+2 \qquad +2$

$7 = b$

27. ___B___

SUPPORTING LEARNING TARGETS

2.2 Creating and Solving Equations

28. Latisha is on page 40 of her book and reads 6 pages every night. Sal is on page 50 of the same book and reads 5 pages every night. **How long will it take Latisha to be further in the book than Sal?**

    a. 10 nights
    b. 11 nights
    c. 8 nights
    d. 9 nights

Latisha $40 + 6x = 50 + 5x$ Sal

$ -5x \qquad -5x$

$40 + x = 50$

$-40 \qquad -40$

$x = 10$

29. Jennifer, Luis, Robert, Anna, and Tonya are figuring out how to split the check for lunch. The total bill, with tax and tip, is \$65.45. Anna puts in \$15, and Tonya puts in \$8. The rest of the group splits the rest of the bill equally. **Which equation and solution represent the amount that each of the remaining people pay?**

   a. $3a + 23 = 65$; $a = \$14.15$

   b. $5a = 65.45 + 15 + 8$; \$17.69

   c. $3a = 88.45$; $1 = \$29.49$

   d. $5a + 23 = 65.45$; $a = 8.49$

   $65.45 = 15 + 8 + 3a$

   $65.45 = 23 + 3a$

30. **Solve for x:** $3x + 2 = 6x - 3$

   a. $x = -2.3$

   b. $x = 0.4$

   c. $x = 2.3$

   d. $x = -0.4$

   $3x + 2 = 6x - 3$

   $-3x \quad | \quad -3x$

   $2 = 3x - 3$

   $+3 \quad | \quad +3$

   $\dfrac{5}{3} \quad | \quad \dfrac{3x}{3}$

   $X \approx 1.7$

2.3 Solving Literal Equations

31.

$P = a + b + c$

$-a -b \qquad -a -b \qquad \rightarrow \qquad P - a - b = c$

$= a + b + c$ for c

A) $c = a + b - P$ B) $c = P - a - b$ C) $c = P + a - b$ D) $c = P + a + b$

2.4 Creating and Solving Inequalities

32. A parking lot holds 43 cars. There are 29 cars in the lot already. Which inequality can be solved to show all the numbers of cars c that can still park in the lot?

   a. $29 + c < 43$

   b. $29 + c \leq 43$

   c. $29 + 43 < c$

   d. $29 + 43 \leq c$

33. **Solve for x:** $-20x \geq 20$

   a. $x \geq -1$ $\dfrac{-20}{-20} \Big| \dfrac{-20}{-20}$ $X \leq -1$

   b. $x \geq 400$ flip

   c. $x \leq -1$

   d. $x \leq 400$

3.3 Modeling with Functions

34. A video club costs $36 to join. Each video that is rented costs $1.50. Let v represent the number of videos. **Identify the independent and dependent variables. Then, write a rule in function notation for the situation.**
    a. Independent: videos rented; Dependent: total cost; $f(x) = 1.5v - 36$
    b. Independent: videos rented; Dependent: total cost; $f(x) = 1.5v + 36$
    c. Independent: videos rented; Dependent: total cost; $f(x) = 36v - 1.5$
    d. Independent: total cost; Dependent: videos rented; $f(x) = 36v - 1.5$

35. Brian has 67 flowers for a big party decoration. In addition, he is planning to buy some flower arrangements that have 19 flowers each. All of the arrangements cost the same. Brian is not sure yet about the number of flower arrangements he wants to buy, but he has enough money to buy up to 5 of them. **Write a function to describe how many flowers Brian can buy. Let x represent the number of flower arrangements Brian buys. Find a reasonable domain and range for the function.**
    a. $f(x) = 19x + 67$; D: {0, 1, 2, 3, 4}; R: {67, 86, 124, 118, 143}
    b. $f(x) = 19x + 67$; D {0, 1, 2, 3, 4, 5}; R: {67, 88, 124, 118, 143, 210}
    c. $f(x) = 67x + 19$; D: {1, 2, 3, 4}; R: {86, 153, 220, 287}
    d. $f(x) = 67x + 19$; D: {5}; R: {354}

36. When Janet bought a car, she paid $1500 for a down payment and makes a payment of $245 each month, starting one month after the down payment.
    Write a function that represents the amount A of money she has paid on her car after m months and determine how much has she paid on the car after 3 months.
    a. $A(m) = -245m - 1500$; $2235
    b. $A(m) = -245m + 1500$; $765
    c. $A(m) = 245m - 1500$; $765
    d. $A(m) = 245m + 1500$; $2235

3.4 Graphing Functions

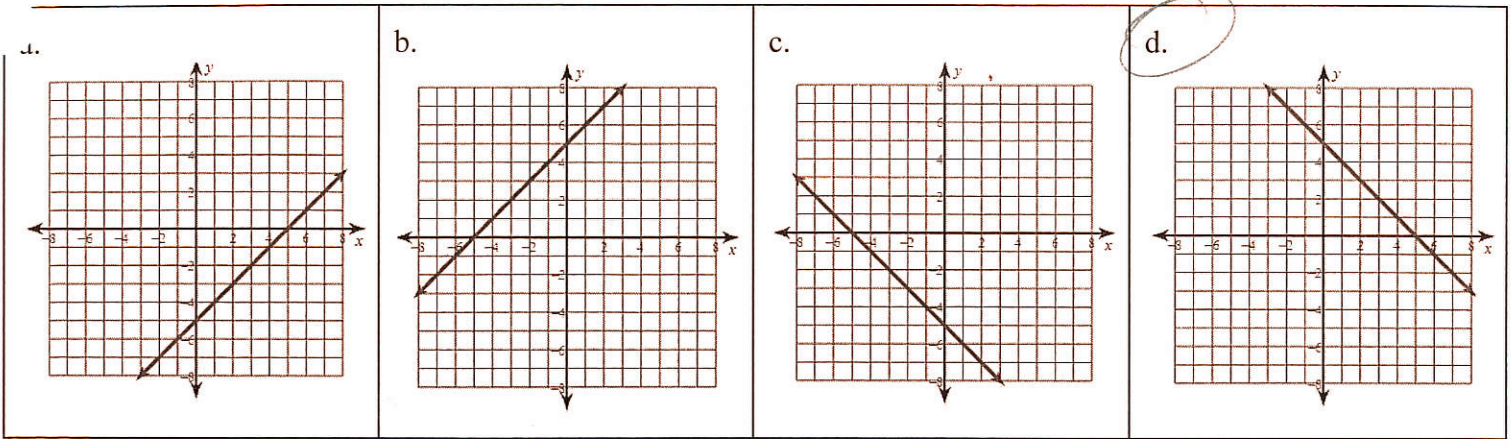37. Which equation is shown in the given table?

x	-2	-1	0	1	2
y	-5	-3	-1	1	3

a. $y = -2x + 1$
b. $y = 2x - 1$
c. $y = -2x + 2$
d. $y = 2x - 2$

+2 +2 +2 +2

y-intercept

negative slope

38. Graph $y = -x + 5$ $y = 5$

a.	b.	c.	d.

Negative slope

39. Graph $y = -\frac{1}{2}x - 2$ $y = -2$

a.	b.	c.	d.
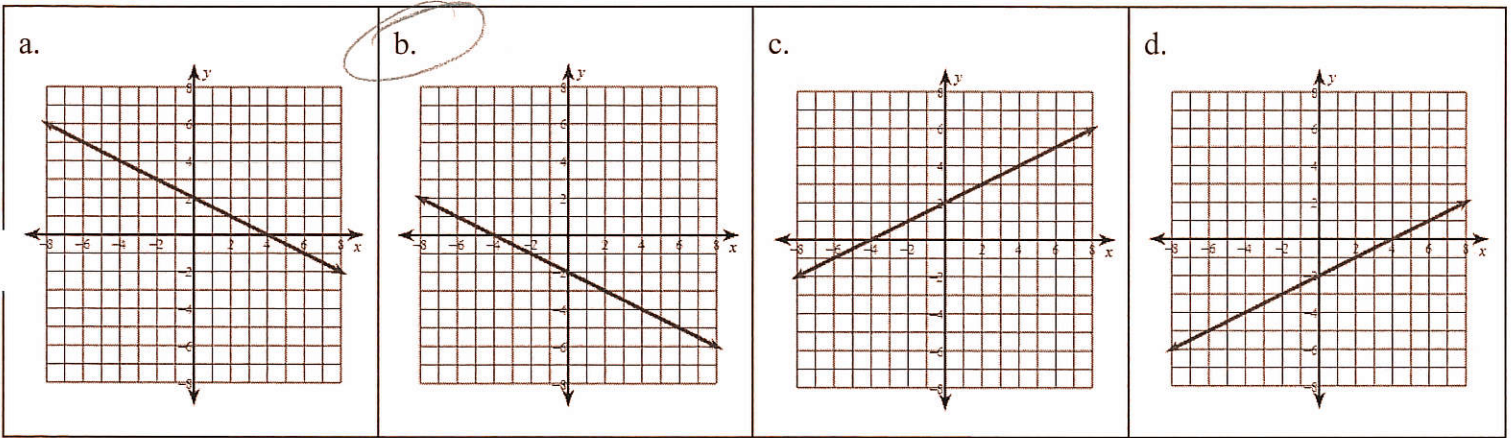
40. Find the value of f(-2) given the line.
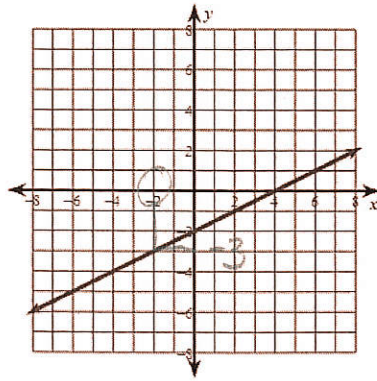
a. $f(-2) = 0$
b. $f(-2) = -2$
c. $f(-2) = -3$
d. $f(-2) = 1$

4.1 Identifying and Graphing Sequences

41. Find the 19th term using the following explicit rule
    $f(n) = 3 + 5(n - 1)$

    a. 103
    b. 97
    c. 93
    d. 144

    $f(19) = 3 + 5(19 - 1)$
    $= 3 + 5(18)$
    $= 3 + 90$

42. Find the first 4 terms using the following explicit rule
    $f(n) = 8 - 3(n - 1)$

    a. 8, 5, 2, -1
    b. 8, 11, 14, 17
    c. -3, 5, 13, 21
    d. -3, 0, 3, 6

    $f(1) = 8 - 3(1 - 1) = 8$
    $f(2) = 8 - 3(2 - 1) = 5$

4.2a Constructing Arithmetic Sequences

43. Write a rule for the nth term of the arithmetic
    sequence -13, -6, 1, 8

    a. $f(n) = -16(6)^n$
    b. $f(n) = -13 + 7(n - 1)$
    c. $f(n) = -13 + 8(n - 1)$
    d. $f(n) = -13 - 7(n - 1)$

    $f(1) +7 +7 +7$
    $d = 7$

For #44 to #46, determine if each is an arithmetic sequence.

Problem #	Seqence	Yes	No
44.	1, -5, 10, -6,..		X
45.	3, 1, -1, -3,...	X	
46.	5, 13, 21, 29,...	X	

4.2b Modeling with Arithmetic Sequences

$\llcorner$ the problem below to answer #47 and #48.

Julio is training for a swimming race. The first part of his training schedule is shown.

Session	1	2	3	4	5	6
Swimming Distance (mi)	0.25	0.65	1.05	1.45	1.85	2.25

+0.4 +0.4

47. Which explicit rule represents Julio's training?

   a. $f(n) = 0.25n + 0.4$
   b. $f(n) = 0.4n + 0.25$
   c. $f(n) = 0.25 + 0.4(n - 1)$
   d. $f(n) = 0.4 + 0.25(n - 1)$

48. After how many sessions will Julio swim 2.95 miles?

$2.95 = 0.25 + 0.4(n-1)$
$-0.25 \qquad -0.25$
$2.7 = 0.4(n-1)$
$\frac{}{0.4} \qquad \frac{}{0.4}$

$6.75 = n-1$
$+1 \qquad +1$
$7.75 = n$

   a. 9
   b. 10   about 8 sessions
   c. 10.6
   d. 11.6

49. An amusement park offers the following prices on passes based on the number of people in your group. **Write the explicit rule for the sequence.**
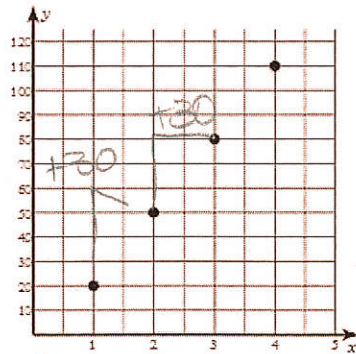
+30
+20

   a. $f(n) = 20 + 20(n - 1)$
   b. $f(n) = 1 + 20(n - 1)$
   c. $f(n) = 20 + 30(n - 1)$
   d. $f(n) = 1 + 30(n - 1)$

$f(1) = 20$

7.1 Modeling Linear Relations

50. The math club is having a fundraiser selling m mugs for $3.50 each and t T-shirts for $12 each. The club raises $1000. Which model describes the relationship between sales and money raised?

   a. $3.50m + 12t = 15$
   b. $3.50m + 12t = 1000$
   c. $12m + 3.50t = 1000$
   d. $3.50m - 12t = 1000$

$3.50m + 12t = 1000$