Midterm Test Review
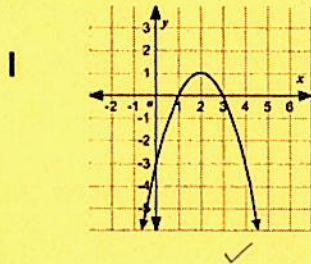## Sure to Please Extras - Mixed Review

Which representations of relations are functions?

I

II

x	y
2	6
3	-12
4	7
5	5
2	7

III $y = 2x + 1$

IV { (1,1), (2,1), (3,2), (4,3), (5,5), (6,18), (1,13)}
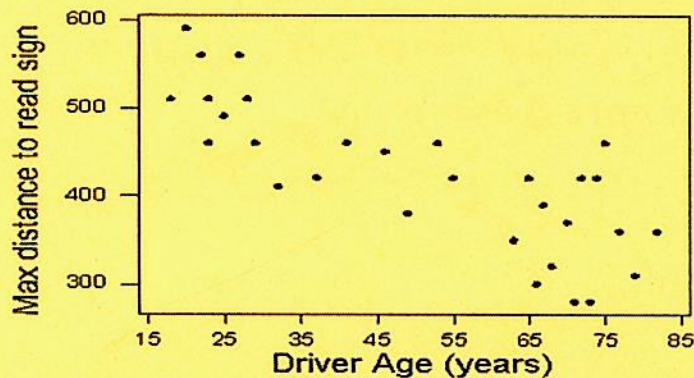
(1) I and III   (2) II and IV   (3) I only   (4) III only

2) Describe the type of correlation (positive, negative or no correlation) and determine if it is causal.
   a) The number of blank pages left in a notebook after pages of notes are written.
   b) The number of treats a dog gets and the number of walks it goes on.
   c) Give your example of a positive correlation that is not causal

Would a point on the trend line that helps predict the distance needed for a 60 year-old be an interpolation or extrapolation? Would that point on the line represent exact data or approximate data?

The following table shows the number of goals scored and the number of wins for some National Hockey League (NHL) teams for the 2009-2010 season.

4.

Goals Scored	318	222	235	257	214	216	219	208	225	222
Wins	54	48	45	47	27	32	38	32	40	38

   a. What is the equation of the line of best fit? b. What is the correlation coefficient? What does it suggest?
       (if necessary, round answers to the nearest tenth)

5. Arrange the correlation coefficients in order from least to greatest

   -0.54   0.17   -0.93   0.78   -0.67   -1

Midterm Review
Sure to Please Extras

1. (1) I and III

choice II has input 2 with
two different outputs
choice IV has input 1 with
two different outputs

2. a) negative and causal
(cause/effect)

as # of pages are written on
increases, the # of pages
that are blank decrease

b) no correlation

c) answers will vary

3. a) interpolation, 60 is between 15 and 84
↗   ↑
lowest   highest
data point   data point

b) points on the trend line are only
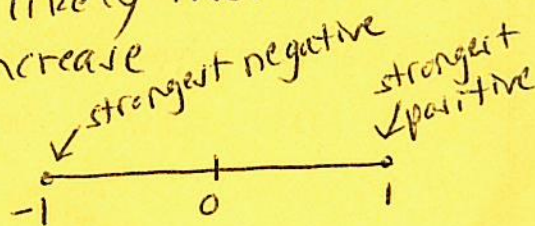predictions, approximations

4. a) $y = 0.2x - 6.5$

b) $r = .8$
suggests the data has a positive, moderate
correlation (the trend line can be used
to make predictions that are fairly accurate)

* suggests that as the number of goals
scored increases, it is likely that the
number of wins will increase

strongest negative ↘   strongest ↘ positive

5) least to greatest

$0.17, -0.54, -0.67, 0.78, -0.93, -1$

Midterm Test Review
Intermezzo – Applications with Equations

(1) <u>Write the equation</u> to represent the given solution (in one variable)
Tara runs 3 miles less than twice the amount of miles, *m*, that Aaron does.
If together they ran 18 miles, how many miles did Tara run?

(2) Zach has 20 coins, nickels and quarters. If he has q = quarters, write the equation to find out how many coins he has of each when his total amount is $2.00.

(3)

m	12	15	17	23	45	51	63	64	72
f	1.4	1.6	2.3	2.8	5.7	7.4	8.1	8.3	8.9

The table of values shows the number of minutes , m, it takes a person to dig and how many feet^3 of dirt, f, is put in the truck to cart it away. Find the *average rate of change* between 17 and 45 minutes, to the nearest tenth.

(4) Spotlight is selling trail mix for a fundraiser. They need to buy popcorn, M'M-s and Skittles. If they buy 2 parts popcorn, 1 part M&M's, and 3 parts Skittles and spend $148 total on the items, how many pounds of Skittles did they buy?

(5)
Michael has $27 saved and will earn $15 a week running errands. Tyler has $3 now and will earn $21 a week as an assistant coach. They agree that they will visit an amusement park when they each have the same amount of money saved. In how many weeks will they go? How much money will they have? Write and solve a system of equations to find the answers.

6) The equation **a = 3e + 11** represents the number of commands my dog Nala will know over the course of months of training. Identify and explain each of the following:
slope _____
y-intercept _____
variables _____

1. m = # of miles Aaron runs

    $2m-3$ = # of miles Tara runs

    $m + 2m - 3 = 18$

2. q = # of quarters

    $20 - q$ = # of nickels
    nickels

items	value per	quantity	total value
nickels	5	$20-q$	$5(20-q)$
quarters	25	q	$25q$

$$.5(20-q) + 25q = 200$$

3. average ROC $\overset{x_1 \ \ y_1}{(17, 2.3)} \ \overset{x_2 \ \ y_2}{(45, 5.7)}$

$$\frac{\Delta y}{\Delta x} = \frac{2.3 - 5.7}{17 - 45} = \frac{-3.4}{-28} = 0.1214285714$$
$$= 0.1$$

4. $2x$ = pounds of popcorn = $49\frac{1}{3}$ pounds

    $1x$ = pounds of M&M's = $24\frac{2}{3}$ pounds

    $3x$ = pounds of skittles = 74 pounds

$$2x + 1x + 3x = 148$$
$$6x = 148$$
$$x = 24\frac{2}{3}$$

5. w = # of weeks A = amount saved

    system of equations $A = 27 + 15w$ $A = 3 + 21w$

$$27 + 15w = 3 + 21w$$
$$27 = 3 + 6w$$
$$24 = 6w$$
$$w = 4$$

$$A = 3 + 21(4)$$
$$A = 3 + 84$$
$$A = \$87$$

In 4 weeks, Michael and Tyler have the same amount of money saved, $87.

6. slope = 3

    3 commands per month

    yint = 11

    initial # of commands is 11

    e: # of months

    a: total number of commands

Midterm Review
Dinner – Equations and Inequalities

For #'s 1 – 4, solve each equation to find the value of x.

(1) $8x - (3x + 4) = 6x - x + 7$	(2) $\frac{1}{2}(4x - 2) = 15$
(3) The function $y = 7x - 1$ is defined by the domain $-2 \le x \le 5$. What is its range?	(4) $\frac{x}{4} - \frac{3}{4} = 9$
(5) Solve for **m** in terms of **q** and **r**. $M = \frac{1}{3}q + r$	6) What is the largest integral value that will make the inequality statement true? $6x - 3 + 11 > \frac{1}{2}(16x + 4)$

(7) The following literal equation was solved for **m**. Name the property of equality used in each step.

$xm + r = cm$

$r = cm - xm$ _____

$r = m(c - x)$ Factor

$\frac{r}{c-x} = m$ _____

8)
For each compound inequality below, **solve** the inequality and represent the solution set **graphically** and using **interval notation**.

a. $2x + 5 > 11$ and $-3x + 3 \ge -27$

b. $4x - 1 < 7$ or $2x > 16$

9) write the symbol for each of the following: at least _____   minimum _____   no more than _____

1) $8x - (3x+4) = 6x - x + 7$
   $8x - 3x - 4 = 5x + 7$
   $5x - 4 = 5x + 7$
   no solutions

2) $\frac{1}{2}(4x-2) = 15$
   $2x - 1 = 15$
   $2x = 16$
   $x = 8$

3) $y = 7x - 1$
   $-2 \le x \le 5$

x	y
-2	-15
0	-1
1	6
3	20
5	34

   $-15 \le y \le 34$
   $[-15, 34]$

4) $\frac{\cancel{X}}{4} - \frac{3}{4} = 9$

   LCD : 4

   $\frac{4}{1}\left(\frac{x}{4}\right) - \frac{4}{1}\left(\frac{3}{4}\right) = 9(4)$

   $x - 3 = 36$
   $x = 39$

5) $m = \frac{1}{3}q + r$
   $m - r = \frac{1}{3}q$
   $3(m-r) = 3 \cdot \frac{1}{3}q$
   $3(m-r) = q$

6) $6x - 3 + 11 > \frac{1}{2}(16x + 4)$
   $6x + 8 > 8x + 2$
   $8 > 2x + 2$
   $6 > 2x$
   $3 > x \implies x < 3$
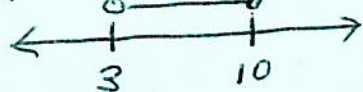   largest integral value is 2

7) $xm + r = cm$
   $r = cm - xm$ subtraction property of equality
   $r = m(c-x)$ factor
   $\frac{r}{c-x} = m$ division property of equality

8) a) $2x + 5 > 11$ and $-3x + 3 \ge -27$
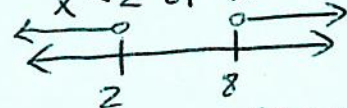 $2x > 6$ and $-3x \ge -30$
   $x > 3$ and $x \le 10$

   $(3, 10]$

   b) $4x - 1 < 7$ or $2x > 16$
   $4x < 8$ or $x > 8$
   $x < 2$ or $x > 8$

   $(-\infty, 2) \vee (8, \infty)$

9) at least $\ge$ minimum $\ge$
   no more than $\le$

Midterm Review
Small Plates – Polynomial Expressions

A) The amount of water in a pool is modeled by the equation $g = 500 + 35m$ where m is the number of minutes that the pool is being filled. Which set of numbers best describes the range?

    a)   Integers
    b)   Whole numbers
    c)   Positive rational numbers
    d)   Natural Numbers

B) Revenue from a fundraiser is $7x^2 - 5x + 2$. The expenses in running the fundraiser was $6x^2 - 4$. What was the profit?

C) A fundraiser is held for Spotlight. Ads to be printed are $45 for each page and money is spent to create flyers to ask people for ads. The total amount that Spotlight would receive is modeled by $f = 45m - 73$. Describe what each part of the equation represents:

    f
    45
    m
    -73
    45m

D) Simplify the polynomial expression. Represent your final answer in standard form. What is the leading coefficient?

$3(x + 4)^2 - (7x - 3)$

E) Represent the sum of $5x - 9$ and $6x^2 + 4x - 3$ then multiply that by $\frac{1}{3}x + 5$ and write as a simplified polynomial expression written in standard form.

F) The measure of the base of a triangle is represented by $8x - 20$ and its height is represented by $10x$. Represent the area of the triangle as a polynomial expression in simplest standard form.

$A = \frac{1}{2}bh$

Midterm Review
Small Plates

A) $g = 500 + 35m$

↑
water in a pool

c) positive rational numbers (can be a fraction of a gallon)

B) Profit = Revenue − Cost
(Income − Expenses)

$7x^2 - 5x + 2 - (6x^2 - 4)$

$7x^2 - 5x + 2 - 6x^2 + 4$

$\cancel{1}x^2 - 5x + 6$

c) $f = 45m - 73$

f: final amount received from fundraising

45: cost per page

m: # of pages

-73: initial expenses (cost)

$45m$: revenue (total from ads)

d) $3(x+4)(x+4) - (7x-3)$

$3(x^2 + 8x + 16) - (7x-3)$

$3x^2 + 24x + 48 - 7x + 3$

$\underline{3x^2 + 17x + 51}$

leading co-efficient is 3

E) $5x - 9 + 6x^2 + 4x - 3$

$6x^2 + 9x - 12$

	$6x^2$	$+9x$	-12
$\frac{1}{3}x$	$2x^3$	$+3x^2$	$-4x$
$+5$	$30x^2$	$+45x$	-60

$2x^3 + 33x^2 + 41x - 60$

F) $A = \frac{1}{2}(b)(h)$

$A = \frac{1}{2}(8x-20)(10x)$

$A = (4x-10)(10x)$

$A = 40x^2 - 100x$ ← equation

$40x^2 - 100x$ expression

Midterm Review

Appetizers – The Real Number

1) Identify:
 	
  a) domain of { (7, 2) (9,3) (12, -1) }
 	
  b) range of { (3, 6) (5,12) (7, 24) }
	(2)
	
	  a) Is the sum of $\frac{3}{8}$ and $-\sqrt[3]{64}$ a rational number? Justify your answer.
	
	  b) Is the product of $\sqrt{12}$ and $\sqrt{27}$ an integer? Justify your answer.

(3) The number $\frac{2}{7}$ belongs to which of these sets? natural numbers, whole numbers, integers, rational numbers, irrational numbers, real numbers **Name all that apply.**	(4) Rewrite the following number in **simplest radical form**. $\sqrt{92}$

(5) Determine if each statement is *true* or *false*. <u>Write your chart first to refer to:</u> R + R = R   etc.

  a) The product of two rational numbers is always rational.

  b) The sum of two rational numbers is always irrational.

  c) The product of two irrational numbers is always irrational.

  d) The product of a rational number and irrational number is always irrational.

  e) The sum of a rational and irrational number is always irrational.

  f) The square root of a rational number is always rational.

Midterm Review
Appetizers

1. a. $\{7, 9, 12\}$

   b. $\{6, 12, 24\}$

3. $\frac{3}{8} + (-4) = -3\frac{5}{8}$

   Yes, rational numbers can be expressed as fractions

   $\sqrt{12} \cdot \sqrt{27} = 18$

   Yes, integers are whole numbers and their opposites

3. $\frac{2}{7}$ rational number
   $\downarrow$
   real number

4. $\sqrt{92}$

   $\sqrt{4}\sqrt{23}$

   $2\sqrt{23}$

5. Chart:

   $R + R = R$ $\qquad$ $R \circ R = R$

   $R + I = I$ $\qquad$ $\underset{(\neq 0)}{R} \circ I = I$

   $I + I = I$ or R $\qquad$ $I \circ I = I$ or R

   a) $R \circ R = R$ True

   b) $R + R = I$ False

   c) $I \circ I = I$ False

   d) $R \circ I = I$ False $\quad (R \neq 0)$

   e) $R + I = I$ True

   f) $\sqrt{R} = R$ False