

Key

Name _____ Date _____ Period _____

Equations Equalizer

Solve each equation. Show all of your work and place the correct solution(s). Check when appropriate.

1. $|m + 2| = 3$

$(-5, 1)$

2. $14 - (2n + 5) = -2n + 9$

all real numbers

3. $x^2 - 20x + 32 = 0$

$10 \pm 2\sqrt{17}$

4. $\sqrt{d-3} = 5-d$

4
7 is extraneous

5. $2x^2 + 4x - 7 = 0$

$\frac{-2 \pm 3\sqrt{2}}{2}$

6. $-3|y - 3| = 9$

no solution

7. $4x^2 = 2x$

$(0, \frac{1}{2})$

8. $\frac{3x-4}{4} = \frac{2x+5}{-1}$

$(-\frac{16}{11})$

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A Little of This a Little of That

1. Subtract. $(15x^3y^2 + 8xy^2 + 3xy) - (6x^3y^2 + 4xy^2 - 2xy)$

$$15x^3y^2 + 8xy^2 + 3xy - 6x^3y^2 - 4xy^2 + 2xy$$

$$9x^3y^2 + 4xy^2 + 5xy$$

Factor completely.

2. $51a^3b^2 - 42a^2b + 90ab$

$$3ab(17a^2b - 14a + 30)$$

3. $n^8 - 1$

$$(n^4 + 1)(n^2 + 1)(n + 1)(n - 1)$$

4. $n^4 - 16p^2$

$$(n^2 + 4p)(n^2 - 4p)$$

5. Find the equation for the line containing the points (4, -1) and (-3, 4)

$$\frac{-1 + 1}{-3 - 4} = \frac{-5}{7}$$

$$y - 4 = \frac{-5}{7}(x + 3)$$

$$y - 4 = \frac{-5}{7}x - \frac{15}{7}$$

$$y = \frac{-5}{7}x + \frac{13}{7}$$

Simplify.

6. $(3n^4)^2$

$$9n^8$$

7. $2n + 12y - (6n + 9y)$

$$2n + 12y - 6n - 9y$$

$$-4n + 3y$$

8. 6^{-3}

$$\frac{1}{6^3} = \frac{1}{216}$$

Divide.

9. $\frac{8a^5 - 12a^3 - 28a^2 + 36a}{2a}$

$$4a^4 - 6a^2 - 14a + 18$$

10. $\frac{\sqrt{3}}{\sqrt{98}} = \frac{\sqrt{3}}{\sqrt{49 \cdot 2}} = \frac{\sqrt{3}}{7\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}}$

$$\frac{\sqrt{6}}{14}$$

Write an equation in slope-intercept form that is...

11. perpendicular to the line $2y + 5x = 10$

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

$\perp y = \frac{2}{5}x + \text{any number}$

12. Parallel to the line $4x - 2y = 20$

$$-2y = -4x + 20$$

$$y = 2x - 10$$

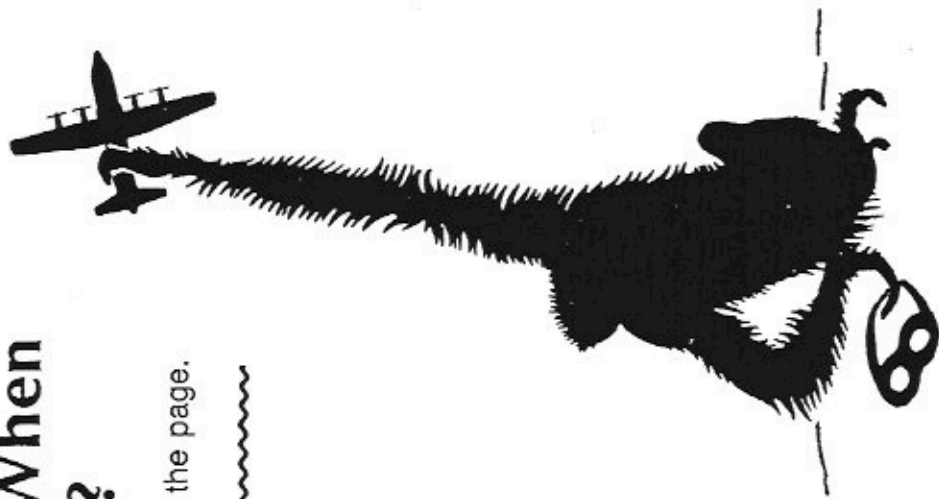
$$y = 2x - 10$$

11 $y = 2x + \text{any number except } -10$



What Do You Call King Kong When He Dresses Up Like a Pilot?

Key



Simplify each expression below and find your answer at the bottom of the page. Print the letter of that exercise in the box above the answer.

- (S) $\sqrt{\frac{3}{7}}$ (E) $\sqrt{\frac{2}{3}} \cdot \sqrt{\frac{3}{4}}$ (T) $\sqrt{\frac{2}{3}} \cdot \sqrt{\frac{1}{15}}$ $\frac{4\sqrt{5}}{5}$
 (E) $\sqrt{\frac{5}{12}}$ (A) $\sqrt{\frac{10}{3}} \cdot \sqrt{\frac{9}{5}}$ (S) $\sqrt{\frac{1}{8}} \cdot \sqrt{\frac{1}{33}}$ $\frac{\sqrt{15}}{2}$
 (I) $\sqrt{\frac{9}{20}}$ (F) $\sqrt{\frac{5}{6}} \cdot \sqrt{\frac{5}{2}}$ (M) $2\sqrt{\frac{5}{24}}$ $\frac{\sqrt{30}}{6}$
 (O) $\sqrt{\frac{8}{27}}$ (R) $\sqrt{\frac{3}{5}} \cdot \sqrt{\frac{1}{10}}$ (K) $5\sqrt{\frac{7}{10}}$ $\frac{3\sqrt{30}}{2}$
 (S) $\sqrt{\frac{18}{5}}$ (E) $\sqrt{\frac{3}{7}} \cdot \sqrt{\frac{7}{12}}$ (D) $4\sqrt{\frac{3}{16}} \cdot \sqrt{\frac{1}{5}}$ 7

M	a	s	t	e	r	o	f	d	e	s	k	i	e	s
$\frac{\sqrt{30}}{6}$	$\frac{\sqrt{21}}{7}$	$\frac{\sqrt{2}}{2}$	$\frac{2\sqrt{2}}{5}$	$\frac{5\sqrt{3}}{6}$	7	$\frac{\sqrt{3}}{10}$	$\frac{3\sqrt{30}}{2}$	$\frac{1}{2}$	$\frac{3\sqrt{5}}{10}$	$\frac{\sqrt{15}}{2}$	$\frac{3\sqrt{10}}{5}$			
$\sqrt{6}$	$\frac{4\sqrt{5}}{5}$	$\frac{\sqrt{6}}{10}$	$\frac{2\sqrt{6}}{9}$	$\frac{15}{2}$	$\frac{\sqrt{15}}{6}$									

Master of disguise

Why Does the President Put Vegetables in His Blender?

Answers 1-6:

(4, 2)	LD
(6, -1)	NG
(1, 2)	TR
(4, 8)	HE
(1, -3)	HO
(6, -3)	NT
(5, 3)	FO
(9, 2)	PI
(7, 3)	TH
(5, 2)	IS

Solve each system of equations. Show all work on paper. Find the solution in the nearest answer column and notice the two letters next to it. Print these letters in the two boxes at the bottom of the page that contain the number of that exercise.

① $y = 2x$ $(4, 8)$
 $x + y = 12$

② $x = 3y - 1$ $(5, 2)$
 $x + 2y = 9$

③ $y = 2x - 5$ $(1, -3)$
 $4x - y = 7$

④ $2x - 3y = 12$ $(9, 2)$
 $x = 4y + 1$

⑤ $y = -x + 5$ $(6, -1)$
 $x - 4y = 10$

⑥ $x - y = 2$ $(5, 3)$
 $4x - 3y = 11$

⑦ $-2x + 3y = 14$ $(-1, 4)$
 $x + 2y = 7$

⑧ $6x - y = -4$ $(\frac{1}{2}, 7)$
 $2x + 2y = 15$

⑨ $x + y = 1$ $(-\frac{1}{2}, \frac{3}{2})$
 $2x - y = -2$

⑩ $5x - 3y = -11$ $(-4, -3)$
 $x - 2y = 2$

⑪ $x - y = 3$ $(\frac{5}{6}, -\frac{1}{2})$
 $6x + 4y = 13$

⑫ $2x - y = 16$
 $-x + 2y = -8$

Answers 7-12:

$(\frac{1}{2}, -3)$	IN
$(8, -\frac{1}{2})$	VE
$(-\frac{1}{3}, \frac{4}{3})$	RL
(8, 0)	AS
(-3, 4)	TE
$(\frac{1}{2}, 7)$	HI
$(\frac{5}{2}, \frac{4}{3})$	LO
(-1, 4)	RW
$(\frac{5}{2}, -\frac{1}{2})$	PE
(-4, -3)	ED

1	2	3	4	5	6	7	8	9	10	11	12										
H	I	S	P	I	N	G	F	O	R	W	H	I	T	R	L	E	D	P	E	A	S

(He is 'hoping for world peace')

Name _____

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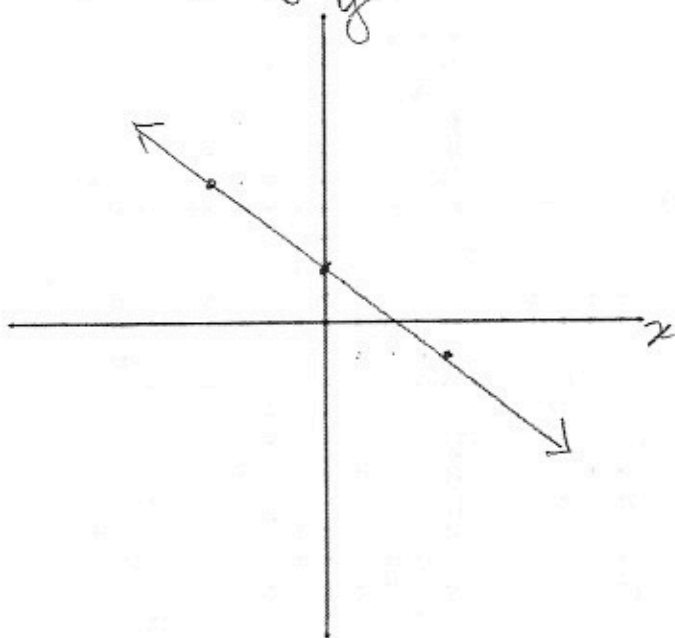
Honors: End of Year Review Activity

What's My Graph?

As appropriate, use the slope and y-intercept or x and y-intercepts to graph each equation.

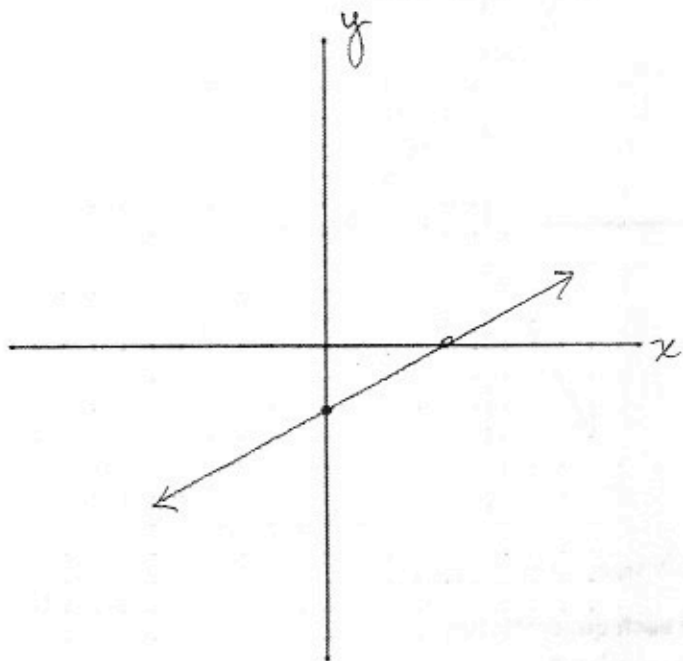
1. $y = -\frac{3}{4}x + 2$

slope $-\frac{3}{4}$ y-int. $(0, 2)$



2. $x - 2y = 4$

$(4, 0)$
 $(0, -2)$



Write the equation of a line parallel to #1.

Graph the parallel line.

Answers will vary
same slope
different y-int.

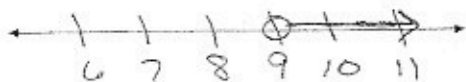
Solve and graph each inequality.

3. $3(n-4) > 15$

$3n - 12 > 15$

$3n > 27$

$n > 9$



Write the equation of a line perpendicular to #2.

Graph the perpendicular line.

Answers will vary
slope is -2
any y-int.

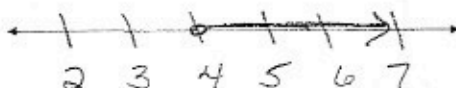
$-2y = -x + 4$
 $y = \frac{1}{2}x - 2$

4. $-4(2n-6) \leq n-12$

$-8n + 24 \leq n - 12$

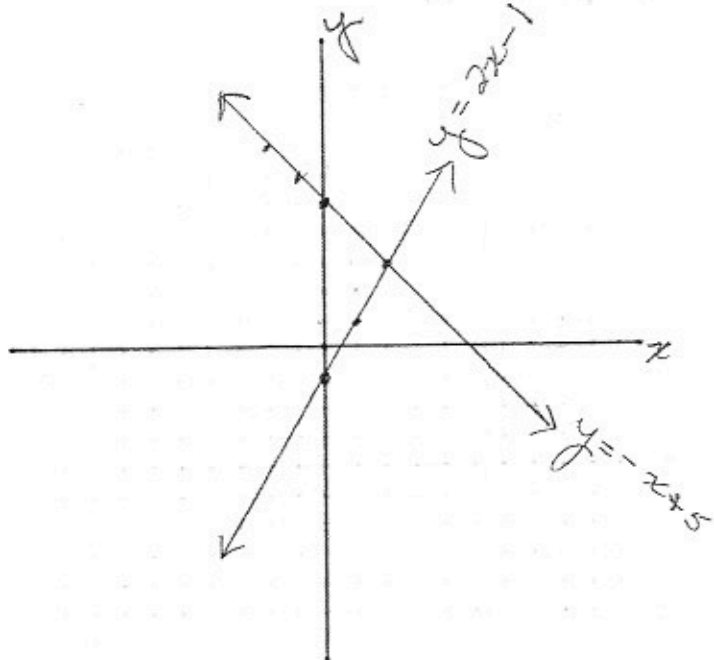
$-9n \leq -36$

$n \geq 4$



Solve each system by graphing. Check your answer.

5. $y = 2x - 1$ slope 2 y-int. (0, -1)
 $y = -x + 5$ slope -1 y-int. (0, 5)



Solution is (2, 3)

Graph each quadratic function.

7. $y = -x^2 + 2$

Axis of Symmetry:

$$x = \frac{0}{2(-1)}$$

$$x = 0$$

Vertex:

$$y = -(0)^2 + 2$$

$$y = 2 \quad (0, 2)$$

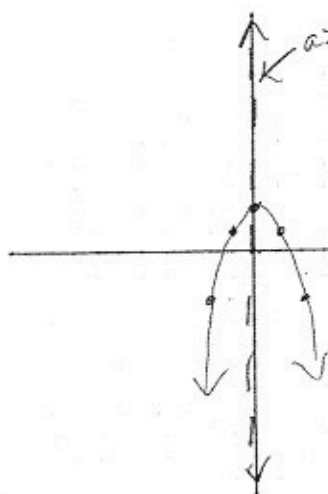
y-intercept: (0, 2)

let: $x = 1$
 $y = -(1)^2 + 2$
 $y = -1 + 2$
 $y = 1$
 Reflection (1, 1)

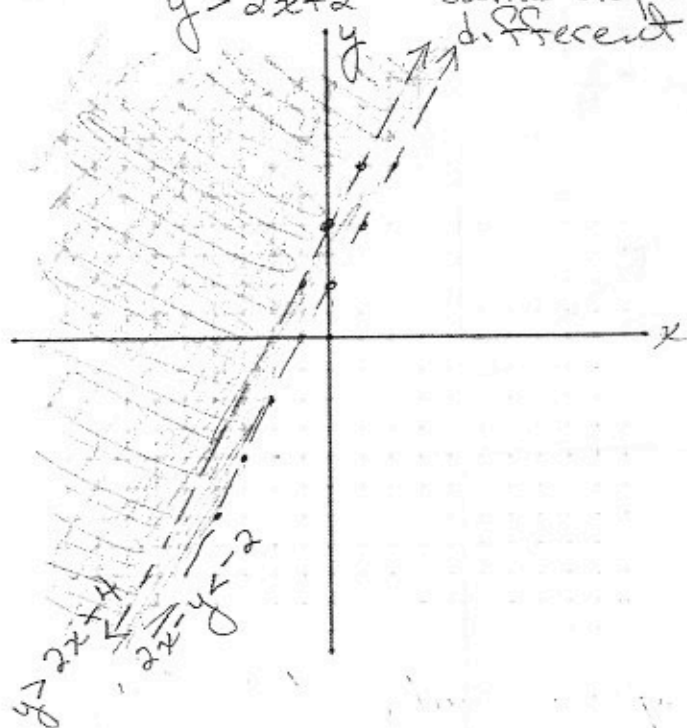
Reflection (-1, 1)

let $x = 2$
 $y = -(2)^2 + 2$
 $y = -4 + 2$
 $y = -2$
 Reflection (2, -2)

Reflection



6. $y > 2x + 4$ slope 2 y-int. (0, 4)
 $2x - y < -2$ slope 2 y-int. (0, 2)
 $-y < -2x - 2$
 $y > 2x + 2$ same slope d. diff. y-int.



8. $f(x) = x^2 + 6x + 6$

Axis of Symmetry: $x = -\frac{6}{2(1)}$
 $x = -3$

Vertex: $f(-3) = (-3)^2 + 6(-3) + 6$
 $= 9 - 18 + 6$
 $= -9 + 6$
 $= -3 \quad (-3, -3)$

y-intercept:

(0, 6)

reflection (-6, 6)

let $x = -1$

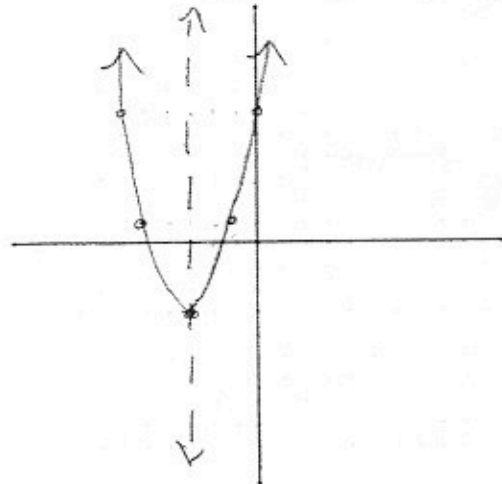
$f(-1) = (-1)^2 + 6(-1) + 6$

$f(-1) = 1 - 6 + 6$

$f(-1) = 1$

(-1, 1)

Reflection (5, 1)



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Perfect Polynomials

1. Add or subtract the following:

$$3m^3 + 8m^3 - 3 + m^3 - 2m^2$$

$$12m^3 - 2m^2 - 3$$

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

$$5x^3 - 2x^2$$

$$(-r^2 + 8pr - p) - (-12r^2 - 2pr + 8p)$$

$$11r^2 + 10pr - 9p$$

$$(c^3 - c^2 + 2c) - (-3c^3 - c^2 - 4c)$$

$$4c^3 + 6c$$

2. Multiply each of the following:

$$5x^3(4xy^2)$$

$$20x^4y^2$$

$$-2x(3x - 4)$$

$$-6x^2 + 8x$$

$$(x + 3)(x + 4)$$

$$x^2 + 7x + 12$$

$$(2x + 5)^2$$

$$4x^2 + 20x + 25$$

$$(5x + 2)(5x - 2)$$

$$25x^2 - 4$$

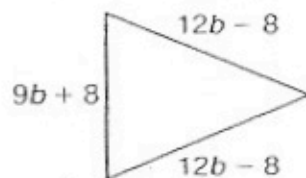
$$(m^3 + 3)(5m + n)$$

$$5m^4 + m^3n + 15m + 3n$$

3. Calculate the perimeter of the following:

$$2(12b - 8) + (9b + 8) = p$$

$$(33b - 8)_{units} = p$$



4. There are two boxes in a storage unit. The volume of the first box is $4x^3 + 4x^2$ cubic units. The volume of the second box is $6x^3 - 18x^2$ cubic units. Write a polynomial for the total volume of the two boxes.

$$4x^3 + 4x^2 + 6x^3 - 18x^2$$

$$(10x^3 - 14x^2) \text{ cubic units}$$

5. The recreation field at a middle school is shaped like a rectangle with a length of $15x$ yards and a width of $10x - 3$ yards. Write a polynomial for the perimeter of the field. Then calculate the perimeter if $x = 2$.

$$2(15x) + 2(10x - 3)$$

$$30x + 20x - 6$$

$$(50x - 6) \text{ yards}$$

$$50(2) - 6$$

$$100 - 6$$

$$94 \text{ yards}$$

6. A bedroom has a length of $x + 3$ feet and a width of $x - 1$ feet. Write a polynomial to express the area of the bedroom. Then calculate the area if $x = 10$.

$$(x + 3)(x - 1)$$

$$(x^2 + 2x - 3) \text{ sq ft}$$

$$(10)^2 + 2(10) - 3$$

$$100 + 20 - 3$$

$$117 \text{ sq ft}$$

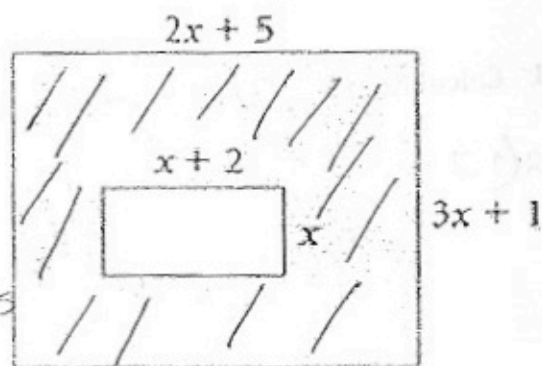
7. Calculate the area of the shaded region:

$$(2x + 5)(3x + 1) - x(x + 2)$$

$$6x^2 + 17x + 5 - (x^2 + 2x)$$

$$6x^2 + 17x + 5 - x^2 - 2x$$

$$(5x^2 + 15x + 5) \text{ sq units}$$



Did You Hear About...

Key

A	B	C	D	E	F	G
The	novice	water	polo	player	who	was
H	I	J	K	L	M	N
upset	because	his	horse	could	not	swim?

Solve each equation below. Find the solution set in one of the answer columns and notice the word next to it. Write this word in the box above that contains the letter of that exercise.

$\{-8, 4\}$ WHO
$\{0, 15\}$ COACH
$\{\frac{8}{5}, 3\}$ SWIM
$\{7, 3\}$ THE
$\{-\frac{3}{5}, 3\}$ BECAUSE
$\{0, 11\}$ POLO
$\{-\frac{1}{2}, \frac{2}{3}\}$ WON
$\{-5, 1\}$ NOVICE
$\{-\frac{5}{2}, -\frac{3}{4}\}$ HORSE

$\{-\frac{1}{5}, \frac{3}{2}\}$ NOT
$\{\frac{1}{3}, -5\}$ WAS
$\{\frac{1}{5}, -\frac{5}{2}\}$ SCORE
$\{8, -1\}$ WATER
$\{\frac{4}{5}, -6\}$ RUN
$\{0, 9\}$ COULD
$\{\frac{5}{2}, 2\}$ UPSET
$\{-6, -3\}$ PLAYER
$\{\frac{4}{3}, -\frac{4}{3}\}$ HIS

- (A) $n^2 - 10n = -21$ $7, 3$
 (B) $x^2 + 4x = 5$ $-5, 1$
 (C) $u^2 - 8 = 7u$ $8, -1$
 (D) $m^2 = 11m$ $0, 11$
 (E) $9a = -a^2 - 18$ $-6, -3$
 (F) $h^2 = 32 - 4h$ $-8, 4$
 (G) $3y^2 + 14y = 5$ $\frac{1}{3}, -5$
 (H) $2x^2 + 10 = 9x$ $\frac{5}{2}, 2$
 (I) $12t + 9 = 5t^2$ $-\frac{3}{5}, 3$
 (J) $9y^2 = 16$ $\frac{4}{3}, -\frac{4}{3}$
 (K) $15 + 26d = -8d^2$ $-\frac{5}{8}, \frac{3}{4}$
 (L) $18n = 2n^2$ $0, 9$
 (M) $10v^2 = 13v + 3$ $-\frac{1}{5}, \frac{3}{2}$
 (N) $23p = 5p^2 + 24$ $\frac{8}{5}, 3$

Key

Name _____

Date _____

let statement
table
equation
solution
sentence that
answers the
question

End of the Year Review

Problem Solving: Motion Problems

Directions: Solve each problem by drawing a picture, defining variables, writing equations, solving equations, checking solutions, and writing the answer in a complete sentence.

1. An airplane flew for 4 hours with a 20-km/hr tail wind. The return flight against the same wind took 5 hours. Find the speed of the plane in still air.

x = still air
 d = distance

	D	R	T
w/tail wind	d	$x+20$	4
against wind	d	$x-20$	5

page 384 #8

180 km/hr

$$4(x+20) = 5(x-20)$$

$$4x + 80 = 5x - 100$$

$$180 = x$$

180 km/hr

2. Two cars leave town at the same time going in opposite directions. One of them travels 60 mi/hr and the other 30 mi/hr. In how many hours will they be 150 miles apart?

t = time

	r	t	d
car 1	60	t	150
car 2	30	t	150

page 382 ex 3

1 2/3 hr

$$60x + 30x = 150$$

$$90x = 150$$

$$x = \frac{150}{90}$$

1 2/3 hr

3. A private airplane leaves an airport and flies due south at 192 km/hr. Two hours later a jet leaves the same airport and flies due south at 960 km/hr. When will the jet overtake the plane?

page 384 #6
 $\frac{1}{2}$ hr

	r	t	D
plane	192	t	192t
jet	960	t-2	960(t-2)

$$192t = 960(t-2)$$

$$192t = 960t - 1920$$

$$-768t = -1920$$

$$t = 2.5$$

$$t - 2 = 0.5 \leftarrow \text{It will take } \frac{1}{2} \text{ hour}$$

4. A student walks and jogs to school each day. The student averages 5-km/hr walking and 9-km/hr jogging. The distance from home to school is 8 km, and the student makes the trip in 1 hour. How far does the student jog?

page 385 #74
 $6\frac{3}{4}$ km

$t = \text{time jogging}$

walks	5	1-t	8
jogs	9	t	8-d

$$\begin{array}{ccc} 5 & t & d \\ 9 & 1-t & 8-d \end{array}$$

$$9t + 5(1-t) = 8$$

$$9t + 5 - 5t = 8$$

$$4t = 3$$

or

$$5t = d$$

$$9(1-t) = 8-d$$

$$t = \frac{3}{4}$$

$$d = 5t$$

$$d = 9\left(\frac{3}{4}\right)$$

5. A canoeist paddled for 4 hours with a 6-km/hr current to reach a campsite. The return trip against the same current took 10 hours. Find the speed of the canoe in still water.

w/out	$x - 6$	10	d
w/alt	$x + 6$	4	$10(x - 6)$
			$4(x + 6)$

page 384 #7
14 km/hr

$$4(x + 6) = 10(x - 6)$$

The boat will travel 14 km/h in still water

6. To deliver a package, a courier must travel at a speed of 60 mi/hr by car and then use a ferry whose speed is 20 mi/hr in still water. The courier drives the car to a dock and then travels on a river against a current of 4 mi/hr. She reaches the destination in 4.5 hours and then returns to the starting point in 3.5 hours. How far did the courier travel by car and how far by ferry?

c = time in car
 t = time traveled on ferry to destination
 f = time traveled on ferry from destination

page 385 #17
90 mi
48 mi

car	60	c	$60c$
to	16	t	$16t$
from	24	f	$24f$

$c + t = 4.5$	$t = 4.5 - c$
$c + f = 3.5$	$f = 3.5 - c$
	$16t = 24f$