Date:

TSW find the line of best fit for scatterplots.

QRQ:

Translate each expression into an algebraic expression.
a.) "nine less than the total of a number and two"
$$(x+2)-9$$

b.) If the length of a football field is "30 yards more than its width", how can you express the length of the field algebraically?
$$\ell = w + 30$$

c.) "three times a number increased by 17"
$$3x + 17$$

d.) "eight less than one-fourth a number"
$$\frac{1}{4}x - 8$$

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2   What is the solution to
$$3(x - 7) = 2(x + 6) \quad ?$$
$$3x - 21 = 2x + 12$$
$$-2x \qquad -2x$$
$$x - 21 = 12$$
$$+21 \quad +21$$
$$x = 33$$

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3   What values of x make the following inequality true?
$$-3(x + 2) \geq 21$$
$$-3x - 6 \geq 21$$
$$+6 \quad +6$$
$$\frac{-3x \geq 27}{-3} \quad \frac{}{3}$$
$$x \leq -9$$

Algebra 1 HW
Equations of Lines

1   Write an equation of a line with a slope of -3 and a y-intercept of 8.
m   b
$$y = mx + b$$
$$y = -3x + 8 \quad (SI)$$
$$+3x \qquad +3x$$
$$\frac{}{3x + y = 8 \quad (SF)}$$

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2   Write an equation of a line with a slope of -1/5 and passing through (0, 9).
M   b
$$y = mx + b$$
$$y = -\frac{1}{5}x + 9 \quad (SI)$$
$$+\frac{1}{5}x \quad +\frac{1}{5}x$$
$$5\left(\frac{1}{5}x + y\right) = (9)5$$
$$x + 5y = 45 \quad (SF)$$

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3   Write an equation of a line that passes through the origin with a slope of -4.
(0,0)
m   b
$$y = -4x \quad (SI)$$
$$+4x \qquad +4x$$
$$4x + y = 0 \quad (SF)$$

4 Write an equation of a line with a slope of 8 that passes through (-3, 1).

m x_1, y_1

$$y - y_1 = m(x - x_1)$$

(PSF) $y - 1 = 8(x + 3)$

$$y - 1 = 8x + 24$$
$$\underline{+1 \qquad\qquad +1}$$
$$y = 8x + 25 \text{ (SI)}$$
$$\underline{-8x \qquad -8x}$$
$$-1(-8x + y) = (25)(-1)$$
$$8x - y = -25 \text{ (SF)}$$

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5 Write an equation of a line with a slope of 5 that passes through (6, -2).

m x_1, y_1

$$y - y_1 = m(x - x_1)$$

(PSF) $y + 2 = 5(x - 6)$

$$y + 2 = 5x - 30$$
$$\underline{-2 \qquad\qquad -2}$$
$$y = 5x - 32 \text{ (SI)}$$
$$\underline{-5x \qquad -5x}$$
$$-1(-5x + y) = (-32)(-1)$$
$$5x - y = 32$$

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6 Write an equation of a line with a slope of -2/3 that passes through (9, -4).

m x_1, y_1

(PSF) $y - y_1 = m(x - x_1)$

$$y + 4 = \frac{-2}{3}(x - 9)$$
$$y + 4 = \frac{-2}{3}x + 6$$
$$\underline{-4 \qquad\qquad -4}$$
$$y = -\frac{2}{3}x + 2 \text{ (SI)}$$
$$\underline{+\frac{2}{3}x \qquad +\frac{2}{3}x}$$
$$3\left(\frac{2}{3}x + y = 2\right)3$$
$$2x + 3y = 6 \text{ (SF)}$$

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7 Write an equation of a line with a slope of 6 that passes through (3, -10).

m x_1, y_1

(PSF) $y - y_1 = m(x - x_1)$

$$y + 10 = 6(x - 3)$$
$$y + 10 = 6x - 18$$
$$\underline{-10 \qquad\qquad -10}$$
$$y = 6x - 28 \text{ (SI)}$$
$$\underline{-6x \qquad -6x}$$
$$-1(-6x + y) = (-28)(-1)$$
$$6x - y = 28 \text{ (SF)}$$

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8 Write an equation of a line that passes through the points (-4, 5) and (4, -1).

x_1, y_1 x_2, y_2

$$M = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-1 - 5}{4 - -4} = \frac{-6}{8} = \frac{-3}{4}$$

(PSF) $y - y_1 = m(x - x_1)$

$$y - 5 = \frac{-3}{4}(x + 4)$$
$$y - 5 = -\frac{3}{4}x - 3$$
$$\underline{+5 \qquad\qquad +5}$$
$$y = -\frac{3}{4}x + 2 \text{ (SI)}$$
$$\underline{+\frac{3}{4}x \qquad +\frac{3}{4}x}$$
$$4\left(\frac{3}{4}x + y\right) = (2)4$$
$$3x + 4y = 8 \text{ (SF)}$$

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9 Write an equation of a line that passes through the points (-2, 5) and (4, 11).

x_2, y_2 x_1, y_1

$$M = \frac{y_2 - y_1}{x_2 - x_1} = \frac{11 - 5}{4 - -2} = \frac{6}{6} = 1$$

(PSF) $y - y_1 = m(x - x_1)$

$$y - 5 = 1(x + 2)$$
$$y - 5 = x + 2$$
$$\underline{+5 \qquad\qquad +5}$$
$$y = x + 7 \text{ (SI)}$$
$$\underline{-x \qquad -x}$$
$$-1(-x + y) = (7)(-1)$$
$$x - y = -7 \text{ (SF)}$$

10   Write an equation of a line that passes through the points (-2, 9) and (4, -3).

$$x_1\ y_1 \qquad x_2\ y_2$$

$$M = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-3-9}{4--2} = \frac{-12}{6} = -2$$

(PSF) $\quad y - y_1 = m(x - x_1)$

$\qquad y - 9 = -2(x + 2)$

$\qquad y - 9 = -2x - 4$

$\qquad\quad +9 \qquad\quad +9$

$\qquad\overline{\qquad y = -2x + 5}$ (SI)

$\qquad +2x \qquad +2x$

$\qquad\overline{\quad 2x + y = 5}$ (SF)

Complete Quiz on Writing Equations

After Quiz:

Read Scatterplot Notes

A **SCATTER PLOT** is a graph that relates two different sets of data by plotting the data as ordered pairs. You can use a scatter plot to determine a relationship between the data sets.

Weak, positive correlation

Strong, positive correlation

Weak, negative correlation

Strong, negative correlation

No correlation

A **TREND LINE** (or **Line of Best Fit**) is a line that approximates the relationship between the data sets of a scatter plot. You can use a trend line to make predictions.

Example #1 If there were only two points on this graph, you could draw ONE line through those two points. This graph has many points. There are many lines you could draw through these points. You want to draw a line that "best fits" the data.

A.) Do the following points have a positive or negative correlation? _Negative_
(Now you know whether the slope is positive or negative)

B.) Lay your pencil through the data. Does your pencil cross the y-axis above the origin or below? You now have an approximation for "b". Is "b" positive or negative? _Negative ≈ (0,-2)_

C.) Which equation below has the same slope and a y-intercept that is approximately the same as yours?

a. y = x + 2   b. 4x - 3   c. y = -8x - 2   d. ⟨ y = -1/2 x - 2 ⟩

Ex2

A.) Do the following points have a positive or negative correlation? _Positive_
(Now you know whether the slope is positive or negative.)

B.) Lay your pencil through the data. Does your pencil cross the y-axis above the origin or below? You now have an approximation for "b". _Positive ≈ (0,4)_

C.) Which equation below has the same slope and a y-intercept that is approximately the same as yours?

a. y = x - 6   ⟨ b. y = x + 4 ⟩   c. y = -x + 6   d. y = x - 1

Ex3

A.) Do the following points have a positive or negative correlation? _Negative_
(Now you know whether the slope is positive or negative.)

B.) Lay your pencil through the data. Does your pencil cross the y-axis above the origin or below? You now have an approximation for "b". _Positive (0,3)_

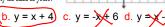C.) Which equation below has the same slope and a y-intercept that is approximately the same as yours?

⟨ a. y = -2x + 3 ⟩   b. y = 4x + 5   c. y = -1/2x + 2   d. y = 2x + 5

You can also use a trend line (or line of best fit) to make predictions from scatterplots.

Stat
1
X's = L₁
Y's = L₂
Stat
→, calc
4

NORMAL FLOAT AUTO RADIAN MP

LinReg
y=ax+b
a=2
b=5

$Y = 2x + 5$

Ex4   Which equation fits the pattern in the table?

x	-3	-1	1	3
y	-1	3	7	11

a.) $y = -3x + 10$ b.) $y = 2x + 5$ c.) $y = 3x + 8$ d.) $y = \frac{1}{2}x + 3$

What is the value of y when x = 6?

$Y = 2x + 5$
$Y = 2(6) + 5$
$Y = 17$

enter
enter
enter
enter
enter

What is the value of x when y = -9?

$Y = 2x + 5$
$-9 = 2x + 5$
$\underline{-5 \qquad -5}$
$\dfrac{-14}{2} = \dfrac{2x}{2}$
$-7 = X$

NORMAL FLOAT AUTO REAL RADIAN MP

L1	L2	L3	L4	L5	2
-3	-1	-----	-----	-----	
-1	3				
1	7				
3	11				
-----	-----				

L2(1)= -1

Ex5   Write an equation that fits the pattern in the table?

x	-2	0	2	4	6
y	13	1	-11	-23	-35

Equation: $Y = -6x + 1$

What is the value of y when x = -5?

$y = -6(-5) + 1$
$y = 30 + 1$
$y = 31$

What is the value of x when y = -5?

$-5 = -6x + 1$
$\underline{-1 \qquad\quad -1}$
$\dfrac{-6}{-6} = \dfrac{-6x}{-6}$
$1 = X$

NORMAL FLOAT AUTO REAL RADIAN MP

L1	L2	L3	L4	L5	2
-2	13	-----	-----	-----	
0	1				
2	-11				
4	-23				
6	-35				

L2(6)=

NORMAL FLOAT AUTO REAL RADIAN MP

LinReg
y=ax+b
a= -6
b=1