Name: KEY Period: _____

Solve for x.

1. $-4x + 5 = 1$

$-5 \quad -5$

$\frac{-4x}{-4} = \frac{-4}{-4}$ → $x = 1$

2. $\frac{-4(x+5)}{-4} = \frac{24}{-4}$

$x + 5 = -6$

$-5 \quad -5$

$x = -11$

OR

$-4x - 20 = 24$

$+20 \quad +20$

$\frac{-4x}{-4} = \frac{44}{-4}$

$x = -11$

3. $\frac{x+4}{5} = 2$ $\cdot 5$

$x + 4 = -10$

$-4 \quad -4$

$x = -14$

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

$x - 12 = 4$

$+12 \quad +12$

$x = 16$

OR

$\frac{x}{4} - 3 = 1$

$+3 \quad +3$

$\frac{x}{4} = 4 \cdot 4$

$x = 16$

Graph the lines. Label the x- and y-intercepts

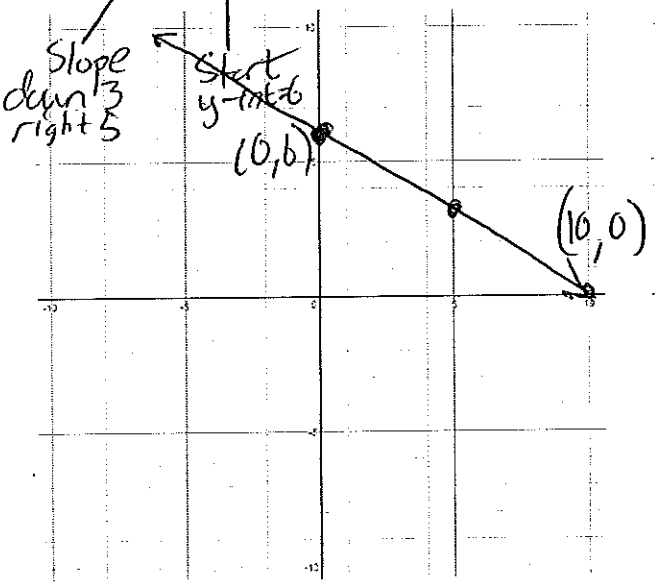
5a. $y = \frac{-3}{5}x + 6$

Slope down 3 right 5

start y-int 6

(0,6)

(10,0)



b. $4x - 6y = 24$

$-6y = 24$

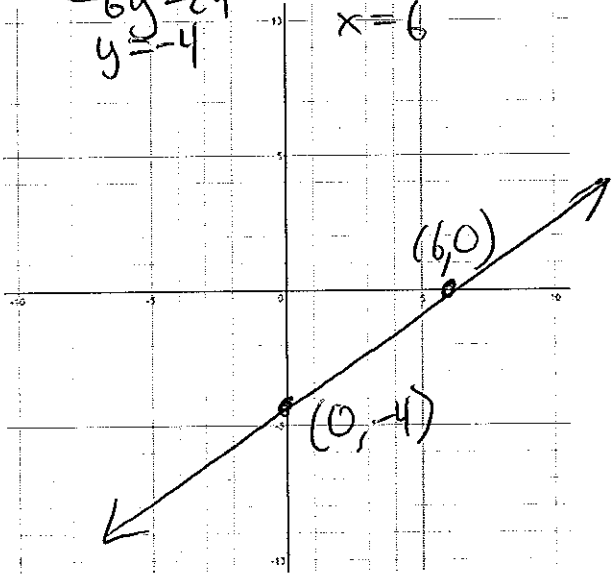
$y = -4$

$4x = 24$

$x = 6$

(6,0)

(0,-4)



Use the information in the problem to answer the following questions.

6. You own a vintage clothing store and you have been keeping track of the value of several items since the year 2000. Some items get more expensive over time while others depreciate. The following equations give the price of your items over time. y=price ($), x=years (since 2000)..

Puffy White Shirt: y = 15 - 0.50x

Acid-Washed Jeans: y = 12 + 0.10x

Van Halen Concert T-Shirt: y = 36 - 2x

"Back to the Future" Baseball Hat: y = 8 + 0.50x

Sundress with Flowers: y = 4 + 0.20x

Remember:
$y = mx + b$ or $y = b + mx$
b = initial value (doesn't touch x)
m = slope = growth = change (touches x)

a. Which items cost the most when you started keeping track? How do you know?

Van Halen Concert T-Shirt. The initial value is 36, which is the biggest "b."

b. Which item(s) are increasing in value? How do you know?

Acid-Washed Jeans
"Back to the Future" Baseball Hat
Sundress with Flowers
All have positive "m"

c. How much does the Puffy White Shirt cost in the year 2050? Does this answer make sense?

$15 - 0.50(50)$
$15 - 25 = -10$
No, can't cost negative.

d. Find a year where the Van Halen Concert T-Shirt is the most valuable item.

Year 2000 ($x=0$) because it has the biggest initial value.

e. Find a year when the "Back to the Future" Baseball Hat is the most valuable item.

Year 3000 ($x=1000$) because it has the biggest slope. $y = 8 + .50(1000) = 8 + 500 = 508$.

f. When will the Sundress with Flowers cost exactly the same as the Acid-Washed Jeans?

$4 + .20x = 12 + .10x$ Set equal
$-.10x \quad -.10x$
$4 + .10x = 12$
$-4 \quad -4$
$\frac{.10x}{.10} = \frac{8}{.10}$
$x = 80$. In 2080, they cost the same.

Solve for x by factoring:

7. $x^2 + 9x + 20 = 0$

	x	4
x	x^2	$4x$
5	$5x$	20

$(x+4)(x+5)=0$

$x=-4, x=-5$

8. $x^2 - x - 20 = 0$

	x	-5
x	x^2	$-5x$
4	$4x$	-20

$(x-5)(x+4)=0$

$x=5, x=-4$

9. $x^2 - 9x + 20 = 0$

	x	-5
x	x^2	$-5x$
-4	$-4x$	20

$(x-5)(x-4)=0$

$x=5, x=4$

Solve for x with the quadratic formula:

$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$

10. $5x^2 + 2x + 13 = 0$

$x = \frac{-2 \pm \sqrt{2^2-4(5)(13)}}{2(5)} = \frac{-2 \pm \sqrt{4-260}}{10} = \frac{-2 \pm \sqrt{-256}}{10}$

Error. No solutions. (can't take negatives)

11. $-3x^2 = 4x - 10$

$+3x^2 \quad +3x^2$

$0 = 3x^2 + 4x - 10$

$x = \frac{-4 \pm \sqrt{4^2-4(3)(-10)}}{2(3)} = \frac{-4 \pm \sqrt{16+120}}{6}$

$\frac{-4 \pm \sqrt{136}}{6} = 1.078 \text{ OR } -2.6$

Draw a sketch of the situation and answer the following questions:

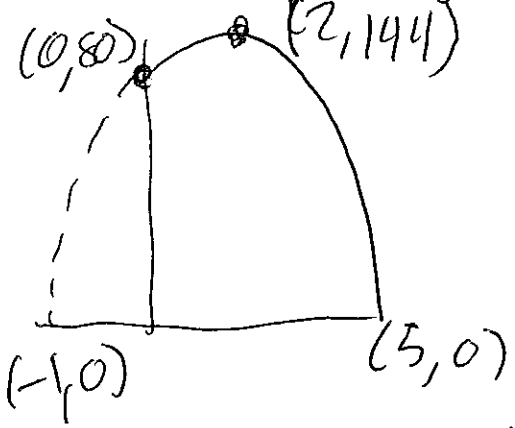
12. Mr. Maurer is on a bridge that is 80 feet above the water and he throws a small rock up with an initial speed of 64 feet per second. Assume that gravity's number applies.

a. Sketch the situation.

b. Find the time when the rock hits the water

c. Find the time when the rock reaches its maximum height

d. Find the maximum height of the rock



b) $y = -16x^2 + 64x + 80$

Find zeros: $-16(x^2 - 4x - 5)$

$-16(x-5)(x+1)$

$x=5 \quad x=-1$

Find vertex c) $h = \frac{5+-1}{2} = \frac{4}{2} = 2$

Find y-value of vertex d) Plug in h.

$y = -16(2-5)(2+1)$

$-16(-3)(3)$

$y = 144$

b) Rock hits water in 5 sec.

c) Rock has max height at 2 sec.

d) Max height is 144 feet.

Identify the bias in each survey technique. Describe as many examples of bias that you can find.

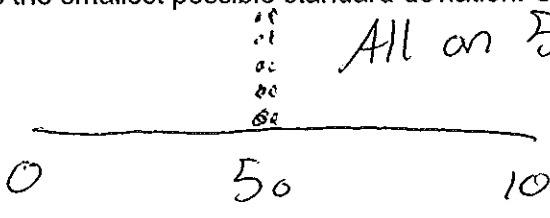
13. You want to know what CHS students are eating for lunch, so you ask the first 10 people who walk into the cafeteria

Only surveys students who eat at school. Also only asks first 10, not random.

14. You want to know how people feel about immigration in America, so you design a survey and post it on Facebook. The survey question says "More people have immigrated from the United States to Mexico than from Mexico to the United States over the last decade. Do you support the plan to build a wall?" Preface with information. Also posting on FB is not random. Only people who really want to respond will choose to.

Draw a dot plot that fits each description. Use numbers between 0 and 100. N > 10.

15. Draw a dot plot that has the smallest possible standard deviation. Calculate the mean, median, and mode.



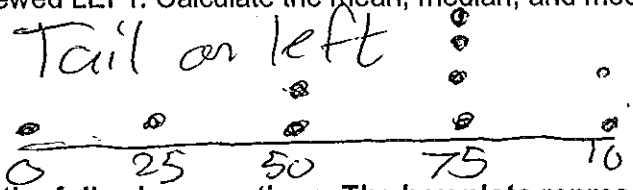
All on 50. $\sigma = 0$

$\mu = 50$

Med = 50

Mode = 50

16. Draw a dot plot that is skewed LEFT. Calculate the mean, median, and mode.

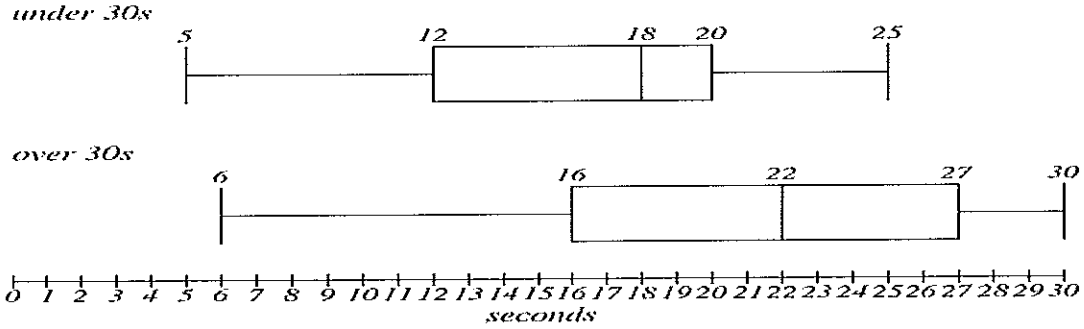


$\mu = 62.5$

Med = 75

Mode = 75

Use the box plot to answer the following questions. The box plots represent the times of how long people can balance on one leg compared to age.



17. Which age group has more individuals who can balance for longer than 16 seconds?

Over 30s, 75% vs less than 75 (but greater than 50)

18. Which age group has more individuals who can balance for less than 22 seconds?

Under 30s, more than 75% vs 50%

19. Which age group has a higher median?

Over 30s, 22 vs 18