Name: KEY

Honors Math Midterm Study Assignment

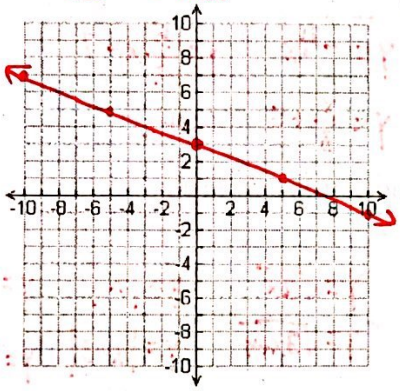
Complete each problem. Show ALL work. No calculator allowed!

**********What can I do if I don't remember how to do one???**********

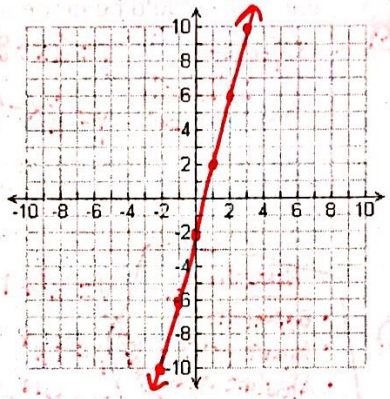
- Look in your notes
- Look up old lessons on my website (these questions are in the order we learned them this year)
- Have a friend help you
- Find time to ask Mr. Lischwe
- Whatever your solution, find a way to re-learn it. Do not just guess and move on!

Graph each equation.

1) $y = -\frac{2}{5}x + 3$ down 2, right 5 (0,3)



2) $y = 4x - 2$ 4 up 4, right 1 (0,-2)

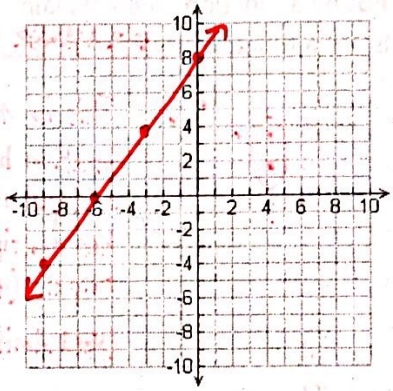


3) $-4x + 3y = 24$

Find numbers that work: (-3, 4) (-6, 0) (0, 8)

OR SOLVE FOR Y:

$-4x + 3y = 24$
$+4x \quad +4x$
$\frac{3y}{3} = \frac{24+4x}{3}$
$y = 8 + \frac{4}{3}x$



Find the slope of the line between the two points or from the table. Simplify if possible. $\left(\frac{y_2-y_1}{x_2-x_1}\right)$

4) (-3, 7) and (6, 5) (x_1 y_1 x_2 y_2)

$\frac{5-7}{6-(-3)} = \boxed{\frac{-2}{9}}$

OR: +9 (-3,7) (6,5) -2 → $\boxed{\frac{-2}{9}}$

5) (3, 6) and (-1, 12) (x_1 y_1 x_2 y_2)

$\frac{12-6}{-1-3} = \frac{6}{-4} = \boxed{-\frac{3}{2}}$

OR -4 (3,6) (-1,12) +6 → $\frac{6}{-4} = \boxed{-\frac{3}{2}}$

6)

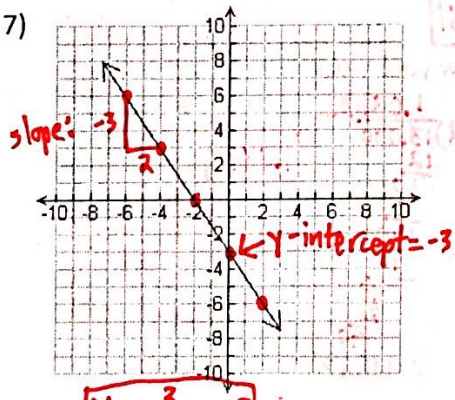
x	0	3	6	9	12
y	14	8	2	-4	-10

+3 +3 +3 +3
-6 -6 -6 -6

$-\frac{6}{3} = \boxed{-2}$

Write an equation in slope-intercept form. (y = mx + b)

7)



$\boxed{y = -\frac{3}{2}x - 3}$

8)

x	y
-2	-3
-1	1
0	5
1	9
2	13

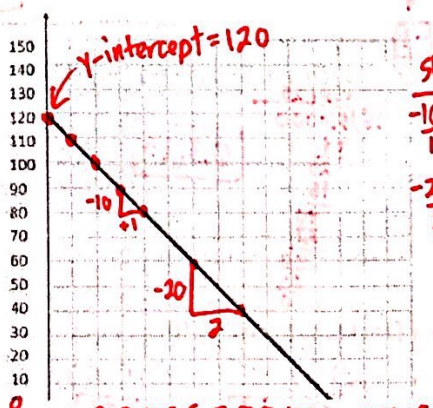
+1 +1 +1 +1
+4 +4 +4 +4

slope $\frac{4}{1} = 4$

y-intercept = 5

$\boxed{y = 4x + 5}$

9)



(Remember, go by the numbers, not the boxes! Making a table might help.)

Slope
$\frac{-10}{1} = -10$
$\frac{-20}{2} = -10$

$\boxed{y = -10x + 120}$

10) Laura got a new puppy, which grew the same number of pounds per year. The puppy was originally 8 pounds. After 4 years, it was 20 pounds. Write an equation that gives the weight y of the dog x years after she bought it.

→ y-intercept

Year 0 = 8 lbs
Year 4 = 20 lbs
+12 lbs in 4 years → 3 lbs per year (slope)

$y = 3x + 8$

Scanned with CamScanner

Say whether each is: A) Not a function; B) A function but nonlinear; C) A function and linear

11)

x	y
1	22
2	24
1	26
2	28
3	30

The input "1" has more than one output. (So does the input "2")

A) Not a function
B) A function but nonlinear
C) A function and linear

12)

x	y	
3	8	
4	11	+1
5	14	+1
6	21	+3
7	25	+1
		+1
		+3
		+7
		+4

Each input has 1 output, but it's not a constant rate of change.

A) Not a function
B) A function but nonlinear
C) A function and linear

13)

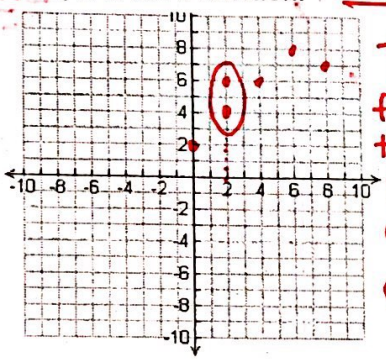
x	y	
-2	-7	
-1	-2	+1
0	3	+1
1	8	+1
2	13	+1
		+5
		+5
		+5
		+5

A) Not a function
B) A function but nonlinear
C) A function and linear

Need to remember 2 different rules – what makes something a function? And what makes something linear?

Each input has 1 output and it does have a constant rate of change.

14) Draw six points on the graph that would **not** be a function. Then explain why it is not a function. YOUR ANSWER MAY VARY



This is not a function because the input of "2" has multiple outputs (4 + 6)

(Need similar idea)

15) Create two equations that would be nonlinear. Each equation should be in the form y = _____.

$y = mx + b$ is linear!

$y = 2x + 8$ $\quad y = -4x$ $\quad y = \frac{5}{2}x - 7$

$y = \frac{1}{2}x - 4$ $\quad y = \frac{x}{3} + 8$ $\quad$ etc.

16) Create two equations that would be linear. Each equation should be in the form y = _____.

NONLINEAR
- Exponents
- Square roots
- Absolute value
- Variable in denominator

$y = x^3 + 1$ $\quad y = \sqrt{2x}$ $\quad y = |x|$ $\quad y = \frac{2}{x}$

$y = 4x^2$ $\quad y = \sqrt{3x+4}$ $\quad y = |x-3|$ $\quad y = \frac{-5}{x} + 1$

$y = x^{12} + 7x$

For 17-19, use the following functions: $g(x) = (2-x)^2$ $\quad h(x) = \frac{x-8}{4}$

17) Find h(4). ← means use function "h" and plug in 4 for x.

$h(4) = \frac{4-8}{4}$
$= \frac{-4}{4}$
$= \boxed{-1}$

18) Find g(6).

$g(6) = (2-6)^2$
$= (-4)^2$
$= \boxed{16}$

19) Find g(-7).

$g(-7) = (2-(-7))^2$
$= (2+7)^2$
$= 9^2$
$= \boxed{81}$

20) Convert to a decimal. Show your work: $\frac{5}{16}$

0.3125
16)5.0000
48
20
16
40
32
80
80
0

$\boxed{0.3125}$

21) Convert to a decimal. Show your work: $\frac{13}{12}$

1.0833...
12)13.000
12
10
0
100
96
40
36
40

$\boxed{1.08\overline{3}}$

Convert to a fraction. Simplify if necessary.

22) 0.1 $\quad \boxed{\frac{1}{10}}$

23) 0.12 $\quad \frac{12}{100} \rightarrow \boxed{\frac{3}{25}}$

24) 0.123 $\quad \boxed{\frac{123}{1000}}$

25) $0.\overline{1}$ $\quad \boxed{\frac{1}{9}}$

26) $0.\overline{12}$ $\quad \frac{12}{99} \rightarrow \boxed{\frac{4}{33}}$

27) $0.\overline{123}$ $\quad \frac{123}{999} \rightarrow \boxed{\frac{41}{333}}$

REGULAR DECIMALS: THE PLACE VALUE IS THE DENOMINATOR

REPEATING DECIMALS: THE DENOMINATOR HAS ALL DIGITS OF "9" BASED ON HOW MANY DIGITS ARE REPEATING

Scanned with CamScanner

Rational: anything that can be written as a fraction

Write each letter in the correct box, according to whether it is rational or irrational.

Rational	Irrational
A B C D G H	E F

A: $\frac{6}{11}$ Fraction = automatically rational

B: 0.4285 Terminating decimal = rational $\left(\frac{4285}{10000}\right)$

C: $0.\overline{3}$ Repeating decimal = rational $(3/9)$

D: $0.878787\ldots$ Repeating decimal = rational $(87/99)$

E: $2.846672\ldots$ Not terminating or repeating = irrational

F: $\sqrt{8}$ Non-exact root = irrational

G: $\sqrt{36}$ Exact root (6) = rational

H: $\sqrt[3]{125}$ Exact root (5) = rational

29) Estimate the value of $\sqrt{58}$. Do not use a calculator. Explain your reasoning in words.

$\sqrt{49}=7$ so between 7 + 8. 58 is closer to 64 (6 away) than 49 (9 away), so $\sqrt{58}$ should be closer

$\sqrt{64}=8$ to 8 than 7. $\boxed{\text{A good estimate is between 7.5 and 8.0.}}$ ← Anything in that range

(Closest 1 decimal estimate is 7.6)

Solve each equation. Find ALL possible solutions.

30) $x^2 = 64$ $+\cdot+=+$ $-\cdot-=+$

$\boxed{x=8 \text{ or } x=-8}$

31) $x^2 = -121$ Nothing × itself = negative

$\boxed{\text{No Solution}}$

32) $x^3 = -27$ $-\cdot-\cdot-=-$

$\boxed{x=-3}$

Solve each equation. (2 of them are "weird" ones – no solution or infinite solutions)

33) $3(2x+4)+3x=-x+72$

$6x+12+3x=-x+72$

$9x+12=-x+72$

$+x \quad +x$

$10x+12=72$

$-12 \quad -12$

$\frac{10x}{10}=\frac{60}{10}$

$\boxed{x=6}$

34) $8x-4=-10+8x$

$-8x \quad -8x$

$-4=-10$

$\boxed{\text{No Solution}}$

35) $6x+3=12x+3$

$-6x \quad -6x$

$3=6x+3$

$-3 \quad -3$

$\frac{0}{6}=\frac{6x}{6}$

$\boxed{0=x}$

36) $-2(3x-8)+7x=19-5x+6x-3$

$-6x+16+7x=1x+16$

$x+16=x+16$

$\boxed{\text{Infinite Solutions}}$

Solve each system of equations:

37) (Substitution) $\begin{cases} y=2x-3 \\ 4x+2y=34 \end{cases}$

$4x+2(2x-3)=34$

$4x+4x-6=34$

$8x-6=34$

$+6 \quad +6$

$\frac{8x}{8}=\frac{40}{8}$

$x=5$

Find y

$y=2(5)-3$

$y=10-3$

$y=7$

$\boxed{(5,7)}$

38) (Elimination) $\begin{cases} 6x-3y=3 \\ -3(2x+5y=19) \end{cases}$

$6x-3y=3$

$-6x-15y=-57$

$\frac{-18y}{-18}=\frac{-54}{-18}$

$y=3$

Find x

$6x-3(3)=3$

$6x-9=3$

$+9 \quad +9$

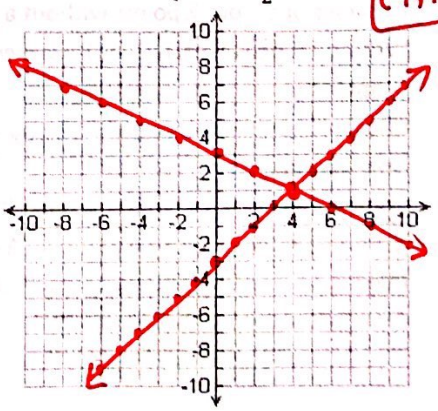
$\frac{6x}{6}=\frac{12}{6}$

$x=2$

$\boxed{(2,3)}$

39) (Graphing) $\begin{cases} y=x-3 \\ y=-\frac{1}{2}x+3 \end{cases}$ slope is 1

$\boxed{(4,1)}$



Scanned with CamScanner