Name: KEY

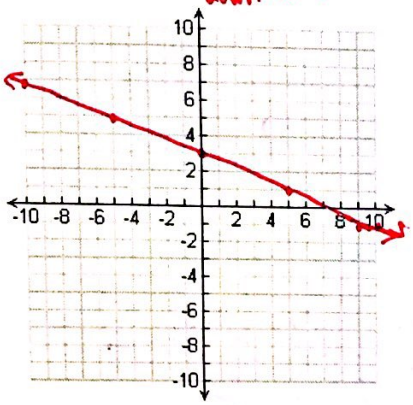
Honors Math Midterm Study Assignment

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

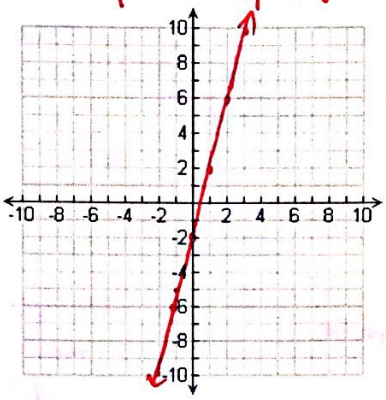
get y by itself or make a table

Graph each equation.

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



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

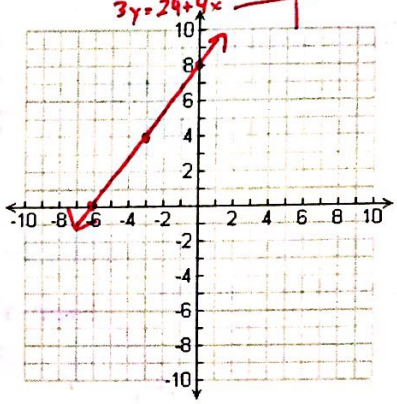


3) $-4x + 3y = 24$

$3y = 24 + 4x$

x	y
-6	0
0	8

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



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)

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

5) (3, 6) and (-1, 12)

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

6)

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

+3 +3 +3 +3

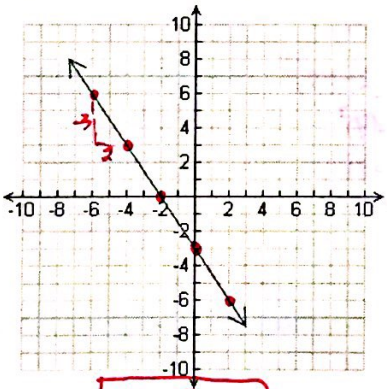
-6 -6 -6 -6

$\frac{\text{change in y}}{\text{change in x}}$

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

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

7)



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

8)

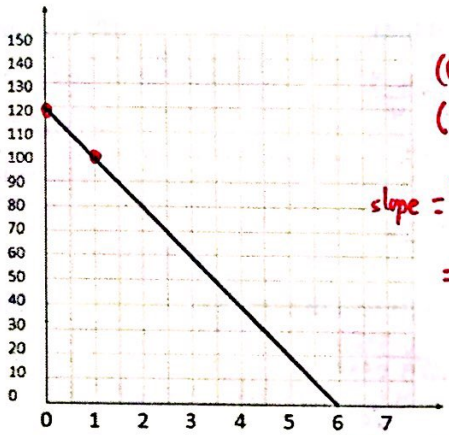
x	y
-2	-3
-1	1
0	5
1	9
2	13

+4 +4 +4 +4

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

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

9)



(0,120)

(1,100)

slope $= \frac{100-120}{1-0} = \frac{-20}{1}$

$\boxed{y = -20x + 120}$

10) Laura got a new puppy, which grew the same number of pounds per year. The puppy was originally 8 pounds. After 3 years, it was 17 pounds. Write an equation that gives the weight **y** of the dog **x** years after she bought it.

y-int → 8 pounds

17 − 8 = 9

9 lbs in 3 years

= 3 lbs per year = slope.

$\boxed{y = 3x + 8}$

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

1 input = 2 outputs

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

12)

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

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

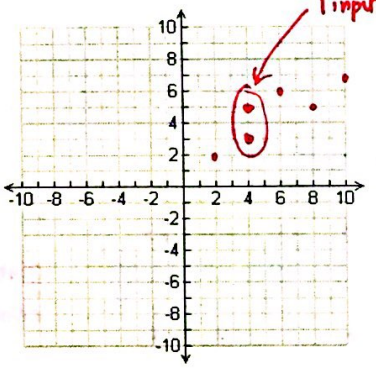
13)

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

14) Draw six points on the graph that would **not** be a function.



1 input → 2 outputs = NOT a function

15) Create two equations that would be nonlinear.

$y = x^2 + 1$ | $y = |x+3|$

$y = \sqrt{x} - 3$ | $y = \frac{6}{x}$

etc.

16) Create two equations that would be linear.

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

$2x + 4y = 10$

etc.

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

17) Find h(4).

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

$h(4) = \frac{-4}{4}$

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

18) Find g(6).

$g(6) = (2-6)^2$

$g(6) = (-4)^2$

$\boxed{g(6) = 16}$

19) Find g(-7).

$g(-7) = (2-(-7))^2$

$g(-7) = (9)^2$

$\boxed{g(-7) = 81}$

20) Convert to a decimal: $\frac{5}{16}$

$16\overline{)5.0000}$ = 0.3125

48, 20, 16, 40, 32, 80, 80, 0

$\boxed{0.3125}$

21) Convert to a decimal: $\frac{13}{12}$

$12\overline{)13.0000}$ = 1.0833...

12, 10, 0, 100, 96, 40, 36, 40, 36

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

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

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

Rational	Irrational
A	E
B	F
C	
D	
G	
H	

A: $\frac{6}{11}$ fraction = RAT

B: 0.4285 terminating dec. = Rat

C: $0.\overline{3}$ → repeating dec. = Rat

D: $0.878787\ldots$

E: $2.846672\ldots$ goes forever, doesn't repeat = Irr

F: $\sqrt{8} \approx 2.8$ non-exact root = Irr

G: $\sqrt{36} = 6$ exact root = Rat

H: $\sqrt[3]{125} = 5$

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

$\sqrt{49} = 7$

$\sqrt{58}$

$\sqrt{64} = 8$

$\boxed{\sqrt{58} \approx 7.6 \text{ (Accept between 7.5-8)}}$

$\sqrt{49} = 7$ and $\sqrt{64} = 8$, so $\sqrt{58}$ is between 7 + 8.
58 is closer to 64 than 49, so it should be over 7.5.

Solve each equation. Find ALL possible solutions.

30) $x^2 = 64$

$\boxed{x = 8, -8}$

31) $x^2 = -121$

$\boxed{\text{No solution}}$

32) $x^3 = -27$

$\boxed{x = -3}$

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

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

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

$9x + 12 = -x + 72$
$+x \quad +x$

$10x + 12 = 72$
$-12 \quad -12$

$10x = 60$

$\boxed{x = 6}$

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

$-4 = -10$

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

35) $6x + 3 = 12x + 3$
$-6x \quad -6x$

$3 = 6x + 3$
$-3 \quad -3$

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

$\boxed{x = 0}$

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

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

$1x + 16 = 1x + 16$

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

Solve each system of equations:

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

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

$4x + 4x - 6 = 34$

$8x - 6 = 34$
$+6 \quad +6$

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

$x = 5$

$y = 2(5) - 3$

$y = 7$

$\boxed{(5, 7)}$

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

$-6x - 15y = -57$

$6x - 3y = 3$

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

$y = 3$

$6x - 3(3) = 3$

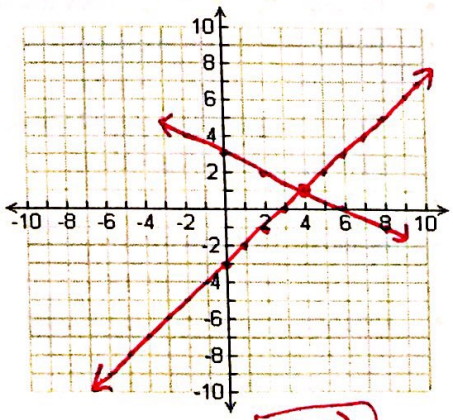
$6x - 9 = 3$
$+9 \quad +9$

$6x = 12$

$x = 2$

$\boxed{(2, 3)}$

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



$\boxed{(4, 1)}$