

1. You will work with the points A(-2,3) and B(1,-2) as illustrated on the graph included. In all solutions to this question, show necessary work to clearly communicate your solution.

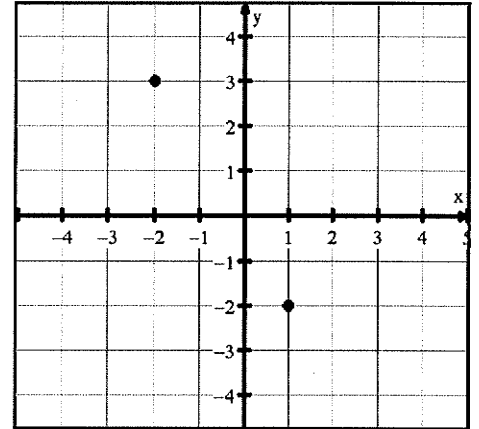
- a. Determine the equation of the line that passes through these points. The final equation may be presented in ANY form. (K3, 01)

$$m = \frac{-2 - 3}{1 - (-2)} = \frac{-5}{3}$$

pt + slope $y + 2 = -\frac{5}{3}(x - 1)$

$$y - 3 = -\frac{5}{3}(x + 2)$$

$$y + 2 = -\frac{5}{3}x + \frac{5}{3} \Rightarrow y = -\frac{5}{3}x - \frac{1}{3}$$



- b. Write the equation in standard form. (K2)

$$\left(y = -\frac{5}{3}x - \frac{1}{3}\right) \cdot 3$$

$$3y = -5x - 1$$

$$\boxed{5x + 3y = -1}$$

- c. Write the equation using function notation (HINT: $f(x) = \dots$). (K2)

$$f(x) = -\frac{5}{3}x - \frac{1}{3}$$

- d. Evaluate $f(4)$. (A2)

$$f(4) = -\frac{5}{3}(4) - \frac{1}{3}$$

$$= -\frac{20}{3} - \frac{1}{3}$$

$$= -\frac{21}{3}$$

$$= -7$$

- e. Solve $f(x) = -12$. (A2)

$$-12 = -\frac{5}{3}x - \frac{1}{3}$$

$$-\frac{36}{3} + \frac{1}{3} = -\frac{5}{3}x$$

$$\left(-\frac{35}{3} = -\frac{5}{3}x\right) \cdot 3$$

$$-35 = -5x$$

$$7 = x$$

- f. Solve $f(x) > 6$. (A2)

$$-\frac{5}{3}x - \frac{1}{3} > 6$$

$$-6 - \frac{1}{3} > \frac{5}{3}x$$

$$\left(-\frac{19}{3} > \frac{5}{3}x\right) \cdot 3$$

$$-19 > 5x$$

$$-\frac{19}{5} > x$$

2. Joseph worked two part-time jobs in the summer; one as a math tutor for elementary students and a second job as a piano teacher. He makes \$15 per hour as a math tutor and \$25 per hour as a piano teacher. In order to save money for a trip to Boracay in October, Joseph would like to earn a total of \$750 in one month of the summer.

a) Let x represent the hours he tutors math and let y represent the hours he teaches piano. On the table provided, determine 4 combinations of hours worked at his 2 jobs that will earn him \$750. **(K3)**

| | | | | |
|---------------------------------|----|----|----|----|
| Hours of math tutoring (x) | 0 | 50 | 10 | 20 |
| Hours of piano teaching (y) | 30 | 0 | 24 | 18 |

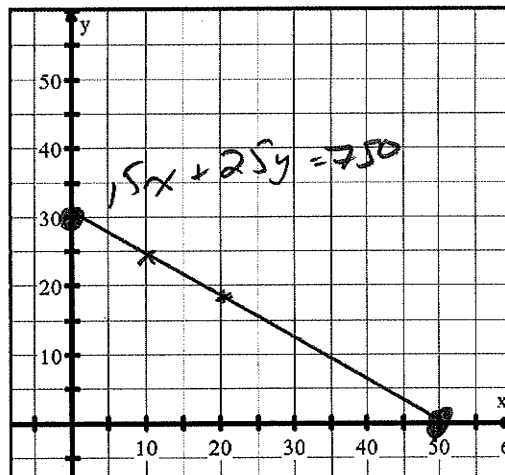
$$15x + 25y = 750$$

$$25y = 600$$

$$25y = 450$$

$$\frac{750}{15} \rightarrow \frac{750}{25}$$

b) Graph this linear function on the grid provided. Make sure your graph is PROPERLY presented! **(G2)**



c) Write the equation of this linear function in slope-intercept form. **(K2)**

$$15x + 25y = 750$$

$$25y = -15x + 750$$

$$y = -\frac{3}{5}x + 30$$

d) What is meaning of the slope in this context? **(I1, C1)**

For every 3 more hours he teaches piano, he works 5 less hours tutoring math

e) What do the x- and y-intercepts mean in this context? **(A2)**

max hours at each job if he works 0 hours at the other

f) Evaluate $f(19)$. **(A2)**

$$f(19) = -\frac{3}{5}(19) + 30$$

$$= -\frac{57}{5} + \frac{150}{5}$$

$$= \frac{93}{5} \text{ hours}$$

$$= 18.6 \text{ hours}$$

g) Joseph wants to work AT MOST 25 total hours per month. Can he earn enough money to take his trip? If not, why not? If yes, how? **(I2)**

if he works 25 total hours teaching piano (25\$/hr) He most he can make is 625 \$ - So NO

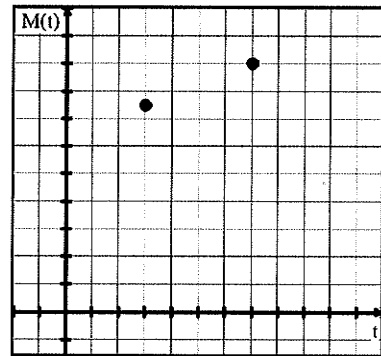
3. Mr. S. wants to explore a relationship between Grade 10 students' math quiz scores and the amount of time they spent studying for the quiz. So let the variable t represent the hours spent studying and let M represent the mark received on the quiz. Mr. S. knows that Joshua studied for 3 hours and scored 75% and that Alice studied for 7 hours and scored 90%. The points are graphed on the attached grid.

- a. Determine the slope of the linear relation and state what the slope means. **(K1/A1)**

$(3, 75)$
 $(7, 90)$

$$m = \frac{90 - 75}{7 - 3}$$

for every additional hour studied, your mark goes up by $\frac{15}{4}$ or $4\frac{3}{4}$



- b. Determine the y-intercept of the linear relation and state what the y-intercept means. **(K2/A1)**

$$y - 75 = \frac{15}{4}(x - 3)$$

$$y = \frac{15}{4}x - \frac{45}{4} + \frac{75}{1} \cdot \frac{4}{4}$$

$$y = \frac{15}{4}x + \frac{255}{4}$$

y-int = 63.75%

- d. State the domain and range of the relation and explain your reasoning for the domain and range. **(T2/C1)**

R: $\{y \in \mathbb{R} \mid 63.75 \leq y \leq 100\}$

OR
 $\{y \in \mathbb{R} \mid 0 \leq y \leq 100\}$

D: $\{x \in \mathbb{R} \mid 0 \leq x \leq 9\frac{2}{3}\}$

↑
has to get 100%

$$100 = \frac{15}{4}x + 63\frac{3}{4} \quad x =$$

- c. Solve $M(t) > 84\%$ and interpret your answer. **(K2/A1)**

$$\left(\frac{15}{4}x + \frac{255}{4} > \frac{84}{1} \right) \cdot 4$$

$$15x + 255 > 336$$

$$x > \frac{111}{15}$$

$x > 7.4$ if you study more than 7.4 hrs, your mark is

- e. Does this linear relation have an x-intercept? If yes, what is the value of the x-intercept? If no, why not? **(T2)**

no because $x \geq 0$

so we cannot have negative time to get $y=0$

NAME:

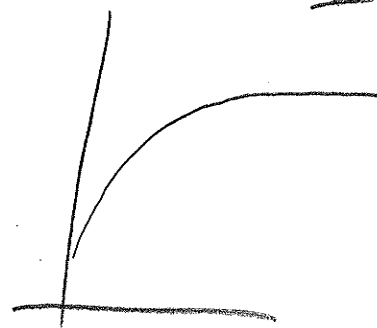
QUIZ #1 – WORKING WITH LINEAR FUNCTIONS

AUGUST 2012

3. (CONTINUED FROM PREVIOUS PAGE) Mr. S. wants to explore a relationship between Grade 10 students' math quiz scores and the amount of time they spent studying for the quiz. So let the variable t represent the hours spent studying and let M represent the mark received on the quiz. Mr. S. knows that Joshua studied for 3 hours and scored 75% and that Alice studied for 7 hours and scored 90%.
- f. Susan decides that this situation does NOT lend itself to a **FUNCTION**. Explain why Susan could be correct in this decision. **(11/01)**
- g. Betty decides that this situation does NOT lend itself to a **LINEAR** relation. Explain why Betty could be correct in this decision. **(11/01)**

because 2 students could have studied for the same amt of time and received different scores on the test

The relationship could be exponential + level off near 100%
ex.



QUIZ SCORES:

| Application (A) | Communication (C) | Knowledge (K) | Thinking/PS (T) | Overall Score |
|-----------------|-------------------|---------------|-----------------|---------------|
| <u>/13</u> | <u>/7</u> | <u>/17</u> | <u>/9</u> | |