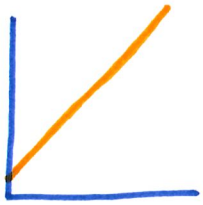
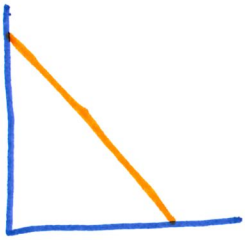
Line of Best Fit Practice

Name: Solutions

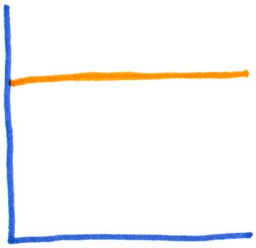
1. Roughly sketch
   a. A line with positive slope



   b. A line with negative slope



   c. A line with 0 slope



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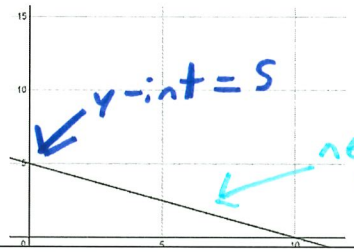
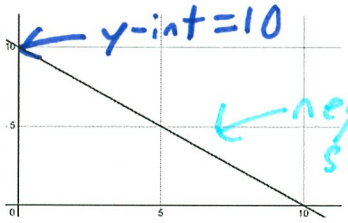
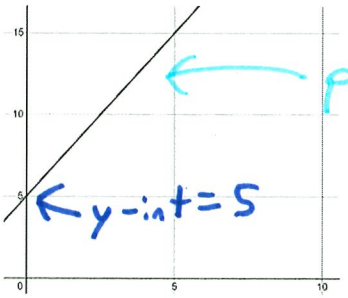
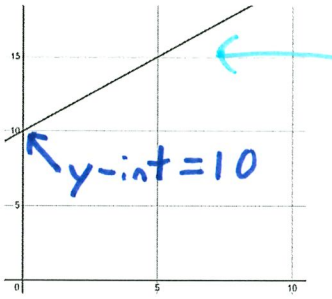
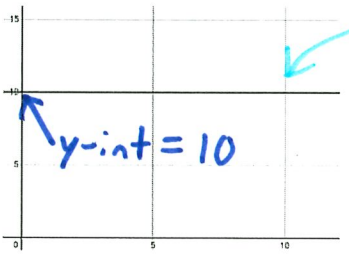
2. Match

a. A line with positive slope and y intercept of 5. C	A: 
b. A line with negative slope and y intercept of 5. A	B: 
c. A line with positive slope and y intercept of 10. D	C: 
d. A line with zero slope and y intercept of 10. E	D: 
f. A line with negative slope and y intercept of 10. B	E: 

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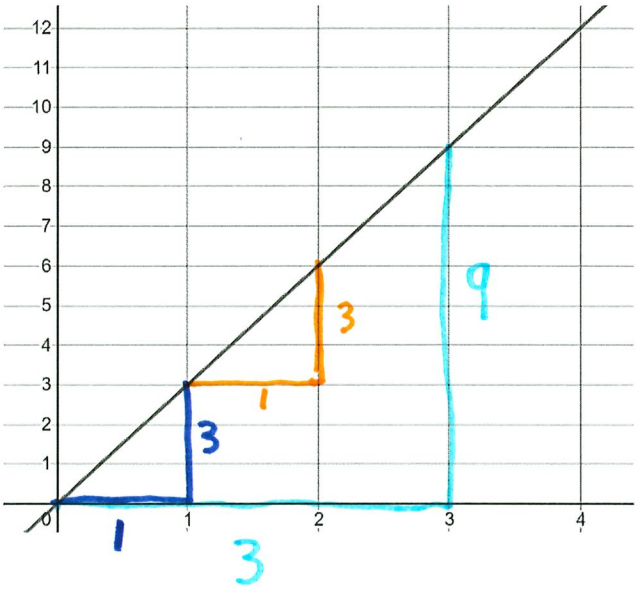
3. Determine the slope of each of the following lines (remember slope= $\frac{rise}{run}$), write as a fraction.

a.

$slope = \frac{rise}{run} = \frac{3}{1} = 3$

$= \frac{9}{3} = 3$

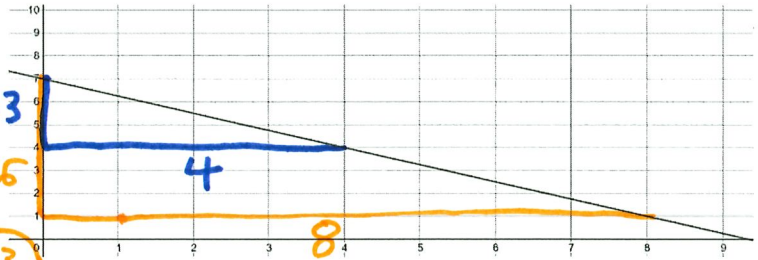
$= \frac{3}{1} = 3$



b.

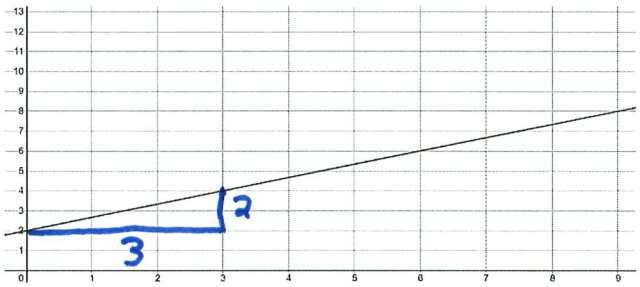
$Slope = \frac{rise}{run} = \frac{-3}{4}$

$= \frac{-6}{8} = \frac{-3}{4}$



c.

$Slope = \frac{rise}{run} = \frac{2}{3}$



* Any calculation of $\frac{rise}{run}$ between 2 points gives the same slope

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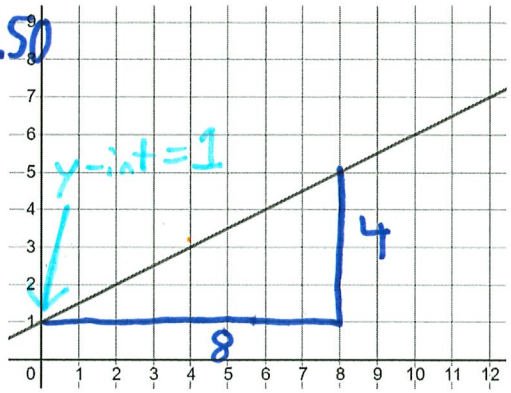
4. Determine the equation for each of the following lines in the form $y = mx + b$. Remember the m parameter is the slope and the b parameter is the $y-$ intercept. (Round slope to 2 sig figs)

*** NOTE that the way the graphs are cropped the grid lines may the y-values look like they have negatives in front of them, all the y-values are positive.

a. $\text{Slope} = \frac{\text{rise}}{\text{run}} = \frac{4}{8} = \frac{1}{2} = 0.50$

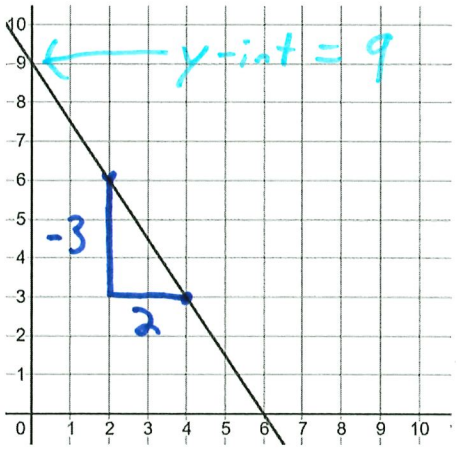


$y = 0.50x + 1$

slope y-intercept

b.

$\text{Slope} = \frac{\text{rise}}{\text{run}} = \frac{-3}{2} = -1.5$

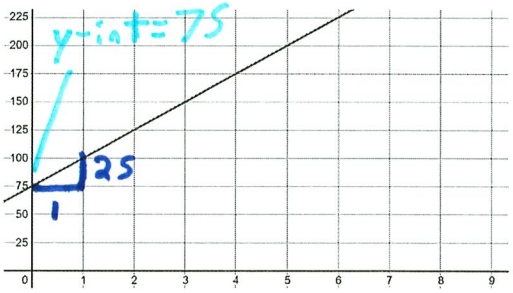


$y = -1.5x + 9$

Slope y-intercept

c.

$\text{Slope} = \frac{\text{rise}}{\text{run}} = \frac{25}{1} = 25$



$y = 25x + 75$

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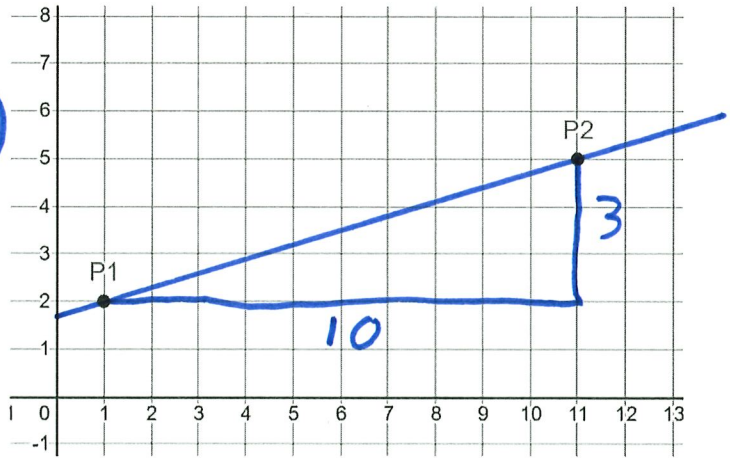
5. For each graph, two points are shown, what is the slope of the line connecting those two points? (Round to 2 sig figs)

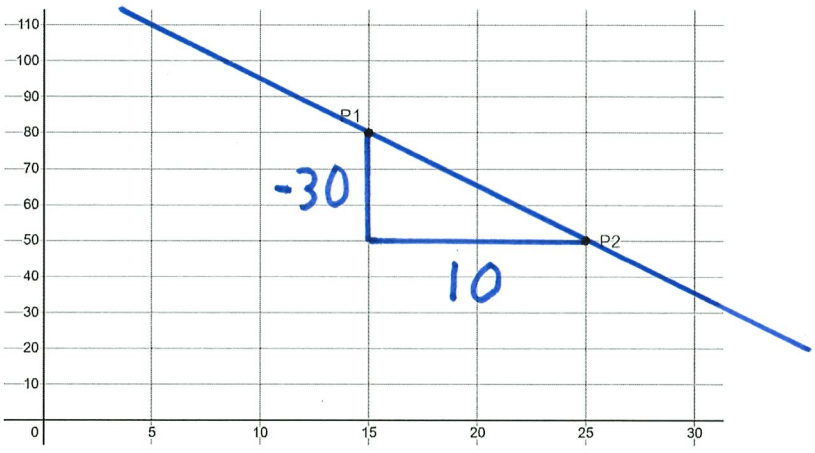
a.

$$\text{Slope} = \frac{\text{rise}}{\text{run}} = \frac{3}{10} = 0.30$$



b.

$$\text{Slope} = \frac{\text{rise}}{\text{run}} = \frac{-30}{10} = -3.0$$



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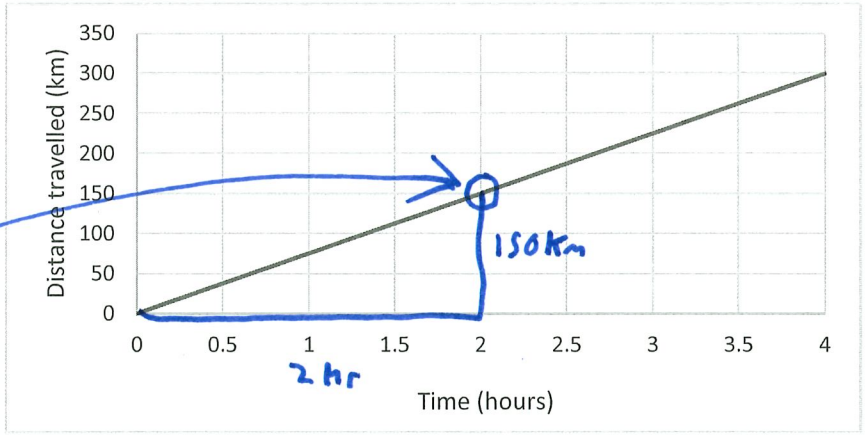
6. The distance a person has driven is graphed below.



a. What is the independent variable, and what units are used for it?

Independant is on x-axis: Time, hours are the units

b. What is the dependent variable, and what units are used for it?

Dependant is on y-axis: Distance, km are the units

c. How far has the person travelled after 2 hours? Be sure to include units.

150 km

d. What is the equation for this relation with units included? Use the variable d for distance travelled and t for time.

Slope $= \frac{150\text{ km}}{2\text{ hr}} = \frac{75\text{ km}}{\text{hr}}$

y-int $= 0$

$d = 75\frac{\text{km}}{\text{hr}}t$

e. Use your equation to determine how far the person would have travelled after 6.25 hours.

$d = \left(75\frac{\text{km}}{\text{hr}}\right)(6.25\text{ hr})$

$= 468.75\text{ km} \approx 470\text{ km}$

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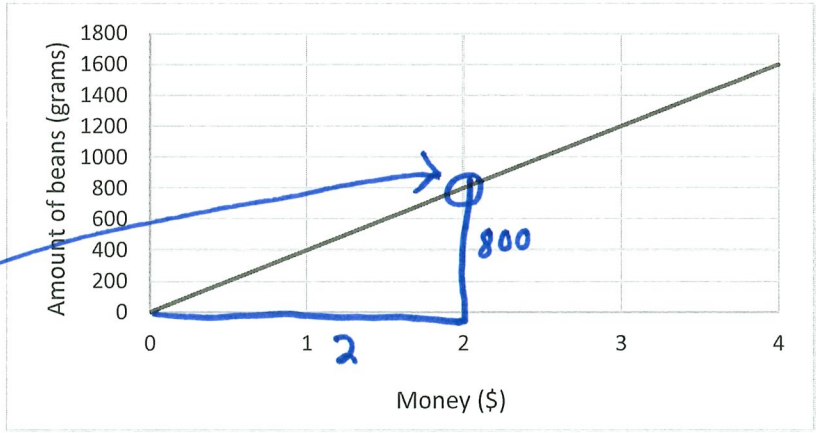
7. The amount of beans a person can buy with x amount of money is graphed below:



a. How much beans can they buy with $2?

800 grams

b. Determine an equation for this relation with units. Use the variable B for amount of beans and m for money.

$\text{Slope} = \frac{\text{rise}}{\text{run}} = \frac{800\text{g}}{\$2} = \frac{400\text{g}}{\$}$

$y\text{-int} = 0$

$B = \frac{400\text{g}}{\$} m$

c. Rearrange the equation so that money is the subject.

$B = \frac{400\text{g}}{\$} m \rightarrow B\,\$ = 400\text{g}\,m \rightarrow \frac{B\,\$}{400\text{g}} = m$

d. Use the equation from c to determine the cost of 6.3×10^6 grams of beans.

$\frac{(6.3 \times 10^6\,\text{g})\,\$}{400\text{g}} = \$15750$

1 sig fig

$\approx \$20000$

$\approx \$16000$ or $\$2 \times 10^4$

~~$\$1.6 \times 10^4$~~

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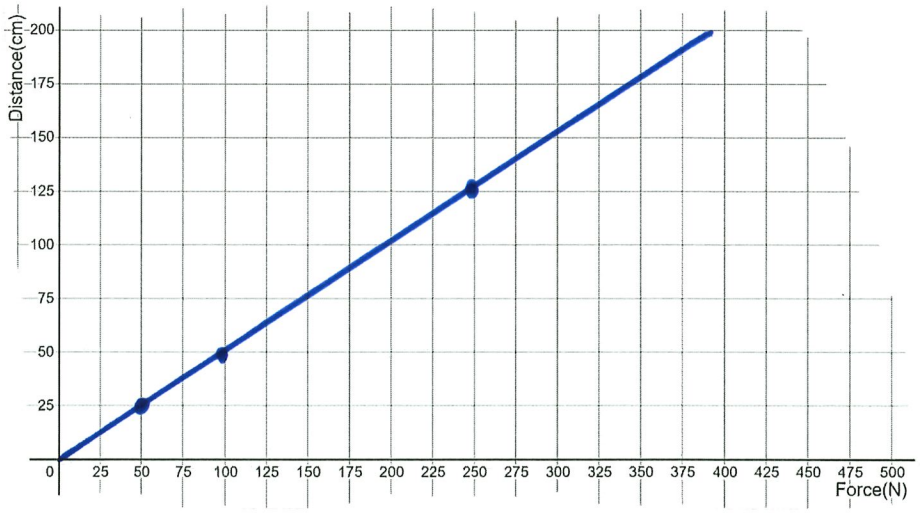
8. An experimenter measures the force they apply to a ball and the distance the ball travels before it stops. They get the following data:

Force (N)	Distance (cm)
50 N	25 cm
100 N	50 cm
150 N	75 cm
250 N	125 cm



a. Plot the points on the graph above, draw a line, and determine an equation for the relationship with units.

$\text{Slope} = \frac{\text{rise}}{\text{run}} = \frac{25\,cm}{50\,N} = 0.50\,\frac{cm}{N}$

$y\text{-int} = 0$

$d = \left(0.50\,\frac{cm}{N}\right)(F)$

b. Use your equation to determine the distance the ball would travel if you applied 572 N of force.

$d = \left(0.50\,\frac{cm}{N}\right)(572\,N) = 286\,cm$

$\approx 290\,cm$

c. Rearrange the equation so that force is the independent variable.

$d = \left(0.50\,\frac{cm}{N}\right)F \rightarrow d\,N = 0.50\,cm\,F$

Multiply by N
divide by 0.50 cm

$\rightarrow \frac{d\,N}{0.50\,cm} = F$

d. Use the equation from c to determine the force required so the ball travels 65 cm.

$F = \frac{(65\,cm)\,N}{0.50\,cm} = 130\,N$

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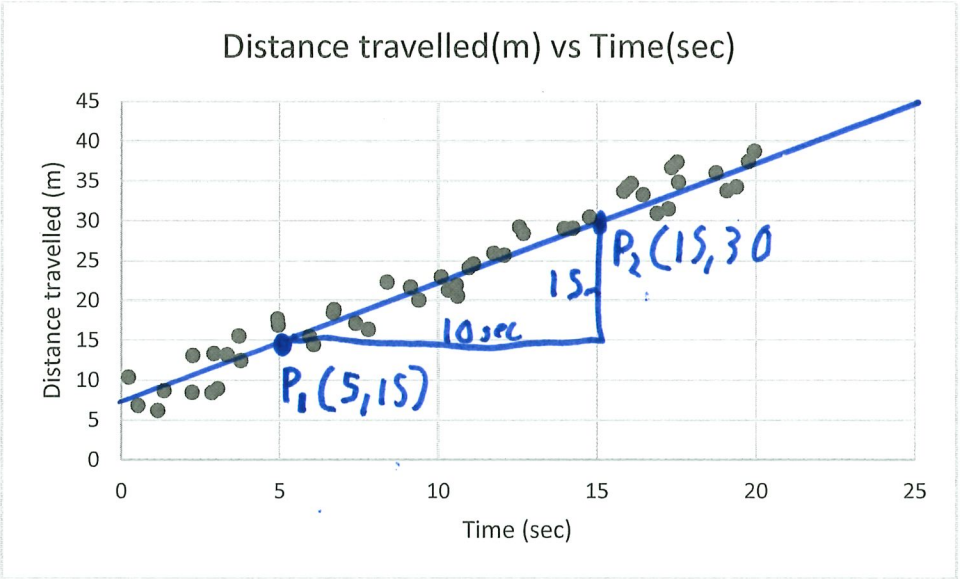
9. Below is a scatter plot of the distance an object travels as a function of time.

*Your line may be slightly different



a. Draw a line of best fit on the graph and use it to determine an equation for the relation. Be sure to include units in both your slope and y intercept. Use the variable d for distance and t for time.

$\text{Slope} = \frac{\text{rise}}{\text{run}} = \frac{15\,m}{10\,sec} = 1.5\frac{m}{sec}$

$y\text{-int} = 7.5\,m$

$d = \left(1.5\frac{m}{sec}\right)(t) + 7.5\,m$

b. Use your equation to determine the distance the object will travel after 79 seconds.

$d = \left(1.5\frac{m}{sec}\right)(79\,sec) + 7.5\,m$

$= 126\,m$

$\approx 130\,m$

Line of Best Fit Practice

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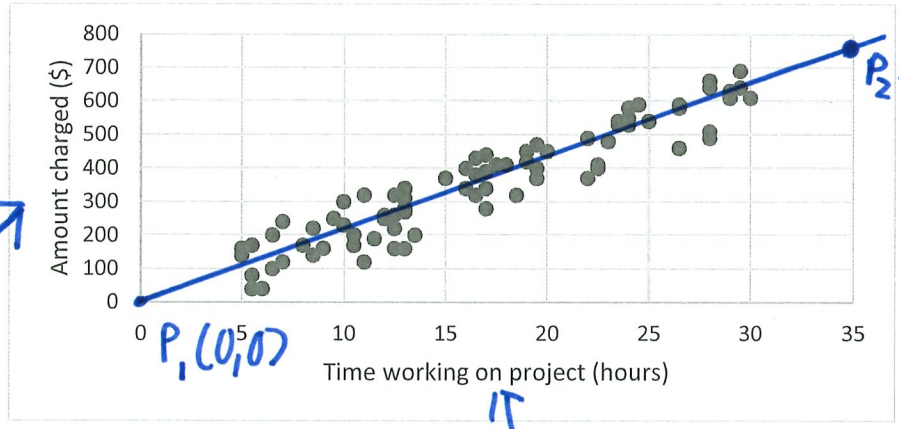
10. Sal is a handy-person and changes various amounts for different projects. They have recorded the amount they changed and the hours spent working on various projects.

*your line may be slightly different



a. Draw a line of best fit on the graph and determine an equation for it with units. Choose appropriate variables for amount charged and time working on the project.

$\text{Slope} = \frac{\$770}{35\,hr} = \frac{\$22}{hr}$ | $C = \frac{\$22}{hr}t$

b. Looking at the equation from a, about what does Sal charge per hour on average?

$22

c. Using your equation how much would you expect Sal to charge for a project that takes 56 hours?

$C = \left(\frac{\$22}{hr}\right)(56\,hr) = \$1232 \approx \$1200$

d. Rearrange your equation so that time is the subject.

$C = \frac{\$22}{hr}t \rightarrow \frac{C \cdot hr}{\$22} = t$

Multiply by hr, divide by $22

e. Use your equation from d to determine how long Sal would be expected to work on a project with cost of $850?

$\frac{\$850 \cdot hr}{\$22} = 38.636\,hr \approx 39\,hr$