# Exam Review

Relations and Trends in Data

1. Predict the correlation for the following examples:

    a) amount of gas left in the car versus the distance driven

    b) push ups you can do versus the number of socks you own

    c) how long you study for an exam versus the mark on the exam

2. Using the following data, make a scatter plot on the graph paper provided. Make sure the label your axis, include a title and draw a line of best fit.

Speed (km/h)	40	50	60	70	80	90	100	120	140	160
Stopping Distance (m)	12	14	21	35	41	51	62	84	122	159

a) Describe the correlation between speed and stopping distance.

b) What are the independent and dependent variables?

c) Use the graph to determine the stopping distance for a speed of 85 km/h
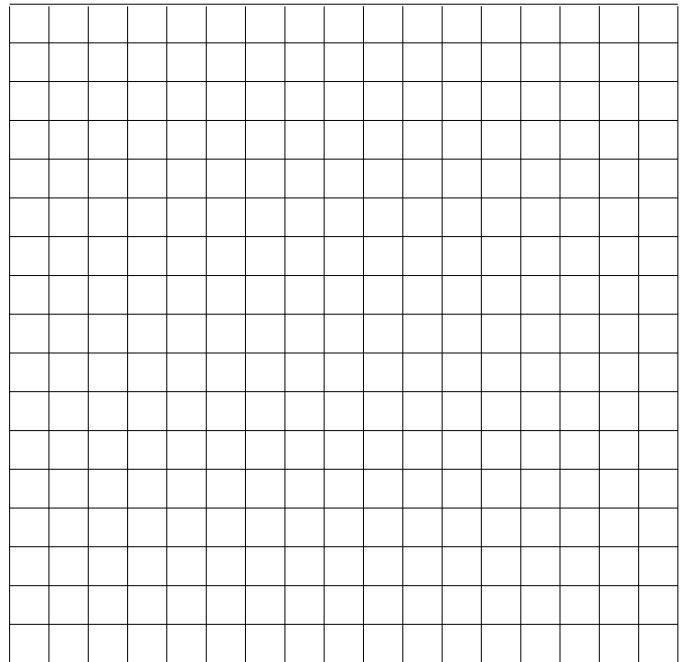
3. Complete the following table:

Volume of pop (mL)	Amount of sugar (g)	First Difference
250	20	
300	30	
350	40	
400	50	
450	60	

Is the volume of pop and amount of sugar a linear or non-linear relationship? Explain how you know.

Powers, Polynomials and Equations

4. Solve and answer in lowest terms.

   a) $2\dfrac{1}{6}+3\dfrac{3}{12}$ b) $4\dfrac{1}{3}-2\dfrac{5}{6}$ c) $4\dfrac{1}{5}\times2\dfrac{4}{15}$ d) $\dfrac{4}{9}+\left(\dfrac{5}{6}\times-\dfrac{1}{3}\right)$

5. Simplify the following expressions using power laws and express as a positive power. Do not evaluate.

   a) $(4^2)(4^6)(4^{-3})$ b) $(n^3)^{-2}$ c) $\dfrac{(8^6)(8^{-3})}{(8^4)}$ d) $(x^2y^3)(x^4y^5)$

6. Simplify and evaluate (if possible). Show all steps.

   a) $\left(\dfrac{2^4\times2^5}{2^7}\right)^2$ b) $\left(\dfrac{1}{3}\right)^{-2}-3^0$ c) $(-2a^3)^4$ d) $(2x^2y^4)(4x^4y^5)$

7. Simplify the following

   a) $5x^2-2x+1-3x^2-6x-8$ b) $2x^2y-6xy^2+4x^2y-(-3xy^2)$ c) $\dfrac{(3x^2+7x)-(x^2-x)}{2x}$

8. Expand and simplify if possible

   a) $x^2(x+y)+2y(x-3x^2)$ b) $2x(3x-2)-(2x^2-3)+5x^2$

9. Factor the following polynomials completely.

   a) $8abc - 12ab$ b) $15a^2b^5 - 12a^3b$ c) $6x^2y^3z + 12xy^2z$
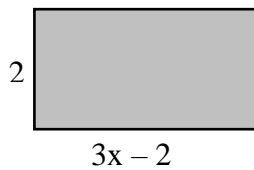
10. Solve the following equations and show work.

    a) $7x - 4x = x - 10$ b) $4(x - 2) - (x + 3) = x - 1$ c) $\dfrac{b+1}{3} = \dfrac{b-2}{2} + 1$

11. Solve for x if the area is 14.

2 | 3x − 2 |

Slope and Modeling Linear Equations
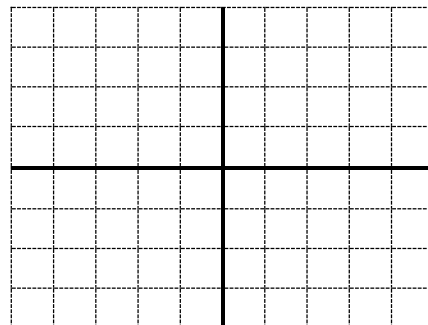
12. Use the formula to find the slope of a line that passes through the points
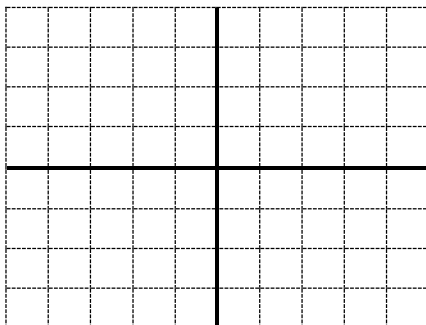
    a) A (2, 7) and B (-2, -5)   b) C (8, -6) and D (3, 4)

13. Graph the line from the information provided below. Write the equation of each line
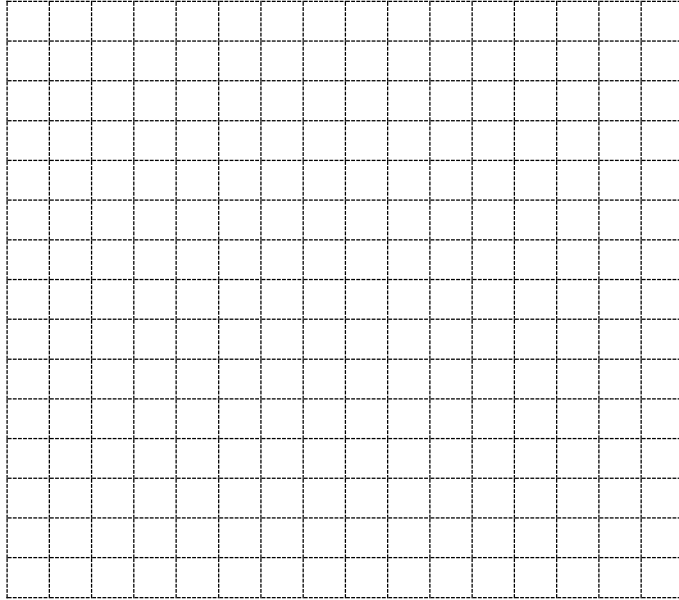
    a) point A (-2, -1) and m = ½   ❷   b) x-intercept = 1 and m = -2   ❷

14. A t-shirt company charges a flat fee of $60.00 to set up the print machine plus $20.00 per t-shirt.

a) Graph the relationship described above. Remember to label your axis with units and include a title.

b) Calculate the slope of this line and state the equation for the line (use 'C' for total cost and 'n' for number of t-shirts). Show all calculations.

c) Explain what y-intercept represents in terms of the given problem?

d) If the initial cost stayed the same and the cost per t-shirt increased by $5.00 per t-shirt, compare the new graph with the original graph? Explain what would change or stay the same about the slope and the y-intercept and why.

Remember to practice telling a story from a graph. You have lots of examples in your notes.
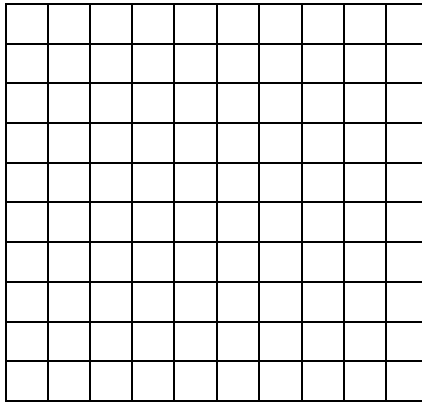
Equations of a Line

15. Given the following information graph the line a state the slope and y-intercept:
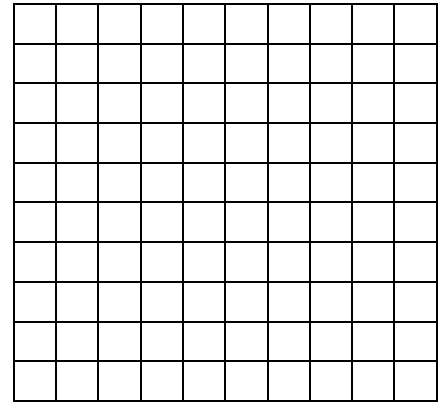
a) $m = \dfrac{3}{4}$ $b = -4$
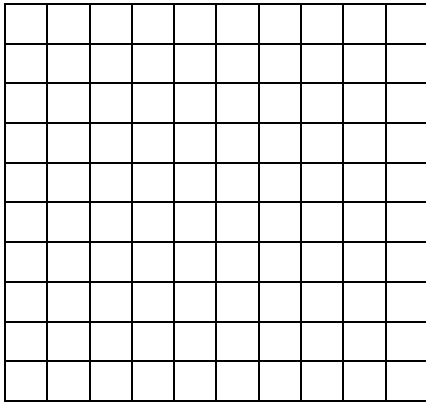
b) A (-1,-4)   B (3,4)

c) $y = 2x - 1$

Slope = _____
y-intercept = _____

Slope = _____
y-intercept = _____

Slope = _____
y-intercept = _____

16. Using the equation for line A, graph line A. Using the information for line B, graph line B on the same axis. Determine the equation for line B:
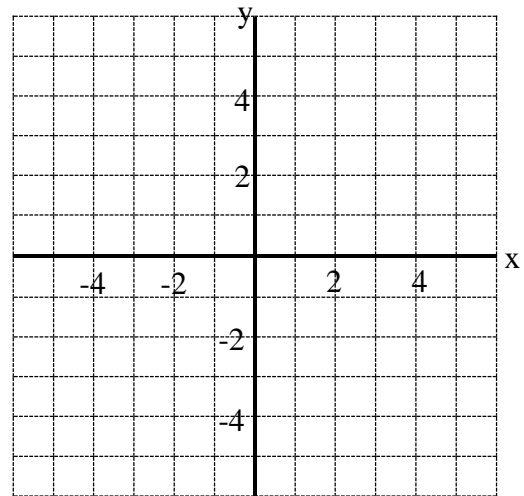
a) **Line A:** $y = 3x - 4$

   Line B: a line perpendicular to line A and passing through the point (3,-1)

   Slope of line A: _____
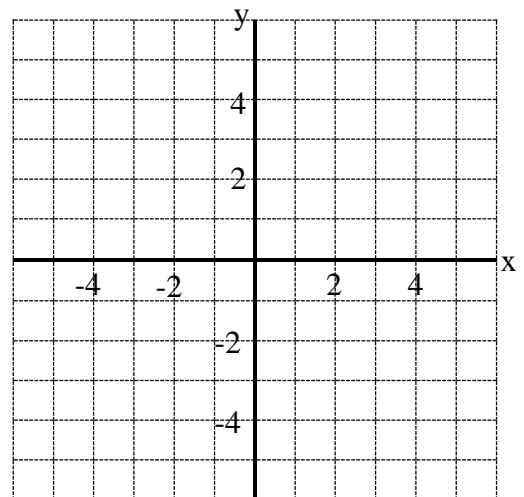
   Slope of line B: _____

   Equation of line B: _____

b) **Line A:** $y = 2$

   Line B: a line parallel to line A and passing through the point (-2,-2)

   Slope of line A: _____

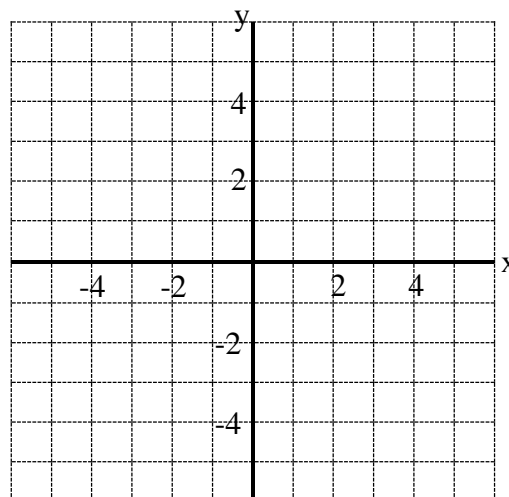   Slope of line B: _____

   Equation of line B: _____

17. Graph the following equation by determining the x and y intercepts

$4x - 2y + 12 = 0$
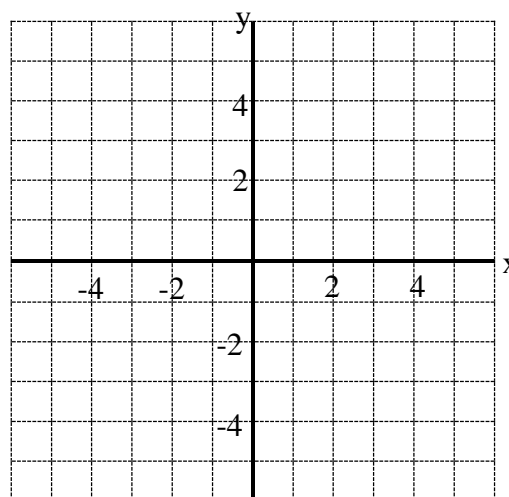
x-intercept:

y-intercept:

18. Graph the following equation by determining the slope and the y intercept

$6x - 3y - 15 = 0$

Slope =   y-intercept =

19. Write the equation of a line for the following descriptions. Show all calculations.

a) Write the equation for a line that is perpendicular to $y = 3x - 2$ and has the same y-intercept as $2x + 3y = 6$. Give your final equation in slope and y-intercept form.

b) Write the equation for a line that passes through the points (2,-4) and (3,1). Give your final equation in standard form.

20. A bowling alley has a fixed base cost and charges a variable per game rate. It costs $20.50 for five games and $28.50 for nine games.

   a) What is the variable cost (cost per game)?

   b) Write the equation of the line in the form $C = mg + b$ where C is cost and g is number of games

   c) What is the initial cost to bowl?

21. Graph each equation of a line and determine the point of intersection from the graph. Then check algebraically.

Equation A: $y = -x + 5$ **Equation B:** $3x - y = 3$

Point of intersection using your graph: _____
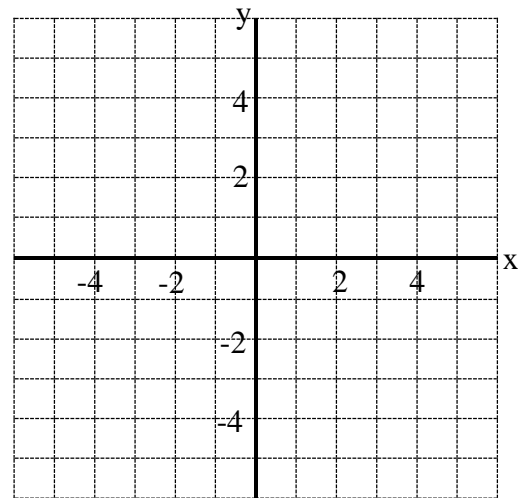
                              x = _____   y = _____

Check your answer:

Check equation A   Check equation B:
L.S. =   R.S. =   L.S. =   R.S. =

22. Josh is trying to determine which package he should use for his cell phone. Cell-u-lite offers 'Package A' that has no initial cost with a monthly fee that is $30 per month.   They also offer 'Package B' that has an initial cost of $50 and a monthly fee of $20 per month

   a) Write an equation for each situation:
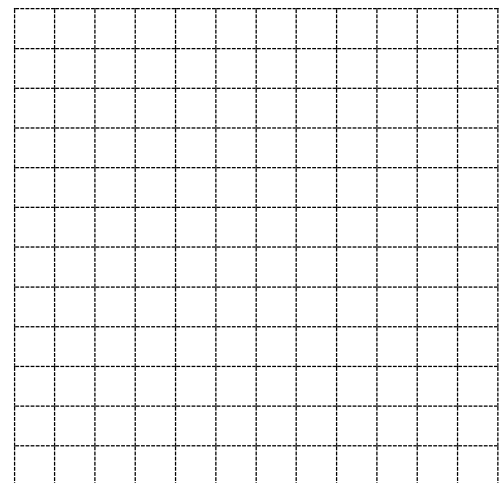
   Package A: _____   Package B: _____

   b) Graph each relationship on the same set of axis.
       Make sure you label each line.

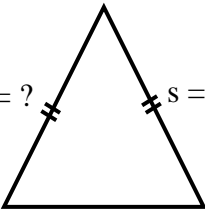   c) What is the point of intersection? _____

   d) What does the point of intersection mean?

   e) Which package would be better if Josh only plans
       to use the phone for the 2 months of summer?
       Explain.
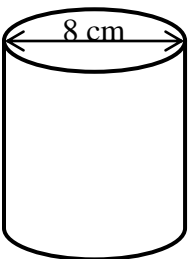
Geometry

23. Calculate the unknown dimension or value for each of the following: **Show all your calculations.**

a)   Perimeter = 36 cm   Length of side: s = _____   Area = _____

s = ?   s = ?

8 cm

b)   8 cm   Volume = 388 cm^3 Height: h = _____   Surface Area = _____

h = ?

24. Lisa is building a toy box with a lid that is the shape of a square based prism. She has 12 m^2 of plywood available to build the box (surface area equals 12 m^2). Use the table below to determine the dimensions of the toy box that will provide the maximum volume of the box.

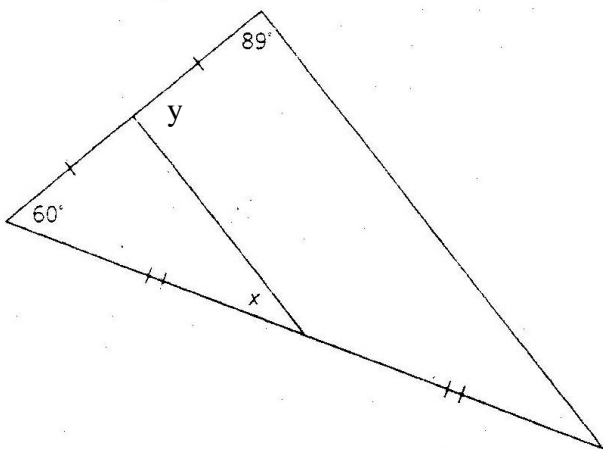**Surface Area = 2b^2 + 4bh**   **Volume = b^{2}h**

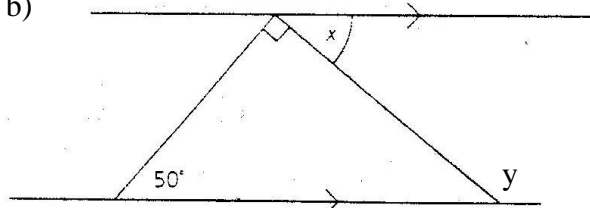| Base (b)	Height (h)	Surface Area	Volume
1 m		12 m^2	
1.2 m		12 m^2	
1.4 m		12 m^2	
1.6 m		12 m^2	

a) Dimensions of the toy box: _____

b) Maximum volume of the toy box: _____

25. Solve for x and y as required. Show your work and justify your answer.

a)

b)

c)