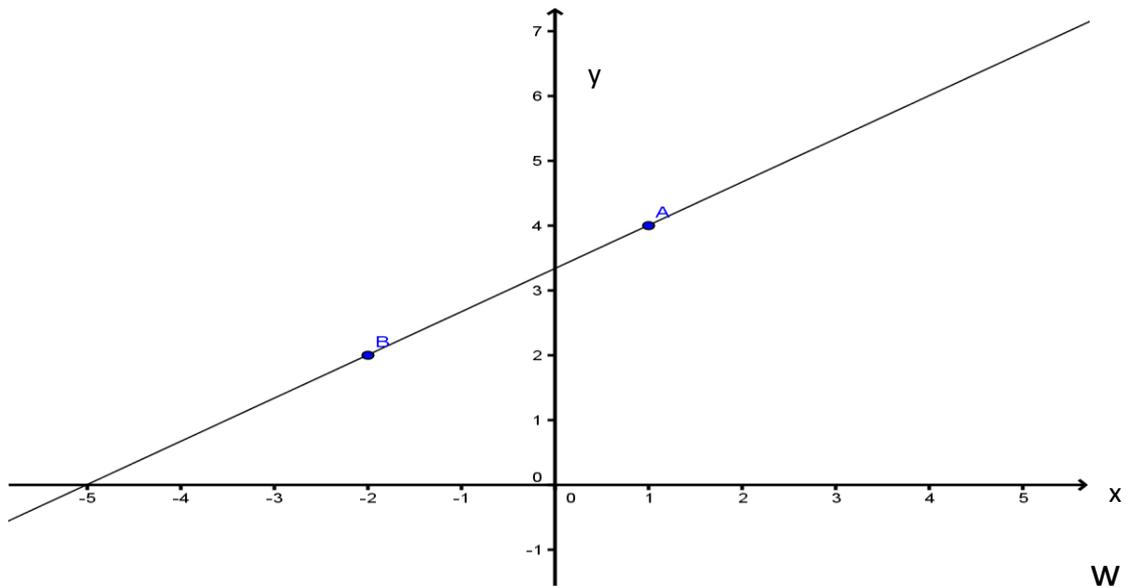


SHARP

Worksheet 2 – Graphs

Straight Line Graphs

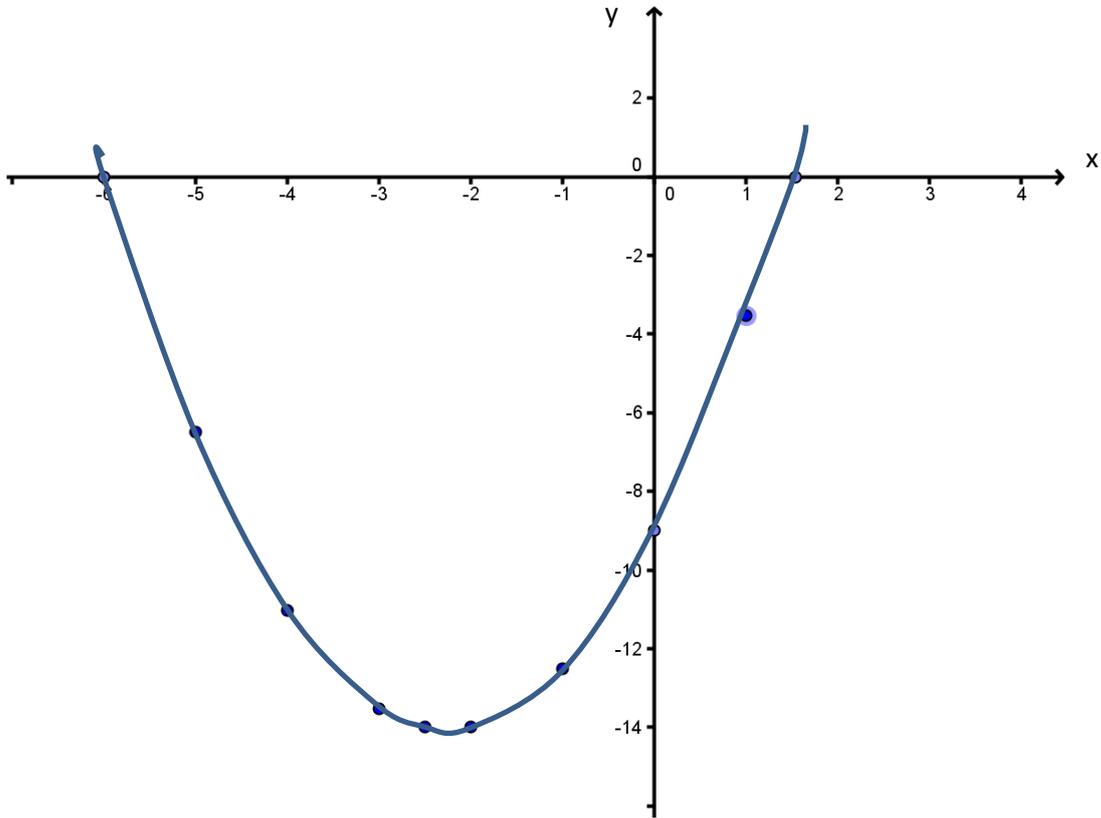
1. Given below is a straight line with the co-ordinates
 $A (1;4)$ and $B (-2;2)$.



- a) Determine the equation of the straight line.
- b) What is the x-intercept of the straight line?
2. If $f(x) = \frac{2}{3}x + 5$ and $h(x) = -\frac{3}{2}x - 6$, determine:
- a) Whether the lines are perpendicular or parallel to each other
- b) And hence, the point of intersection of f and g .

Parabolas

3. Given below is $j(x) = x^2 + bx + c$, where the turning point is $M\left(-\frac{9}{4}; -14\frac{1}{16}\right)$.



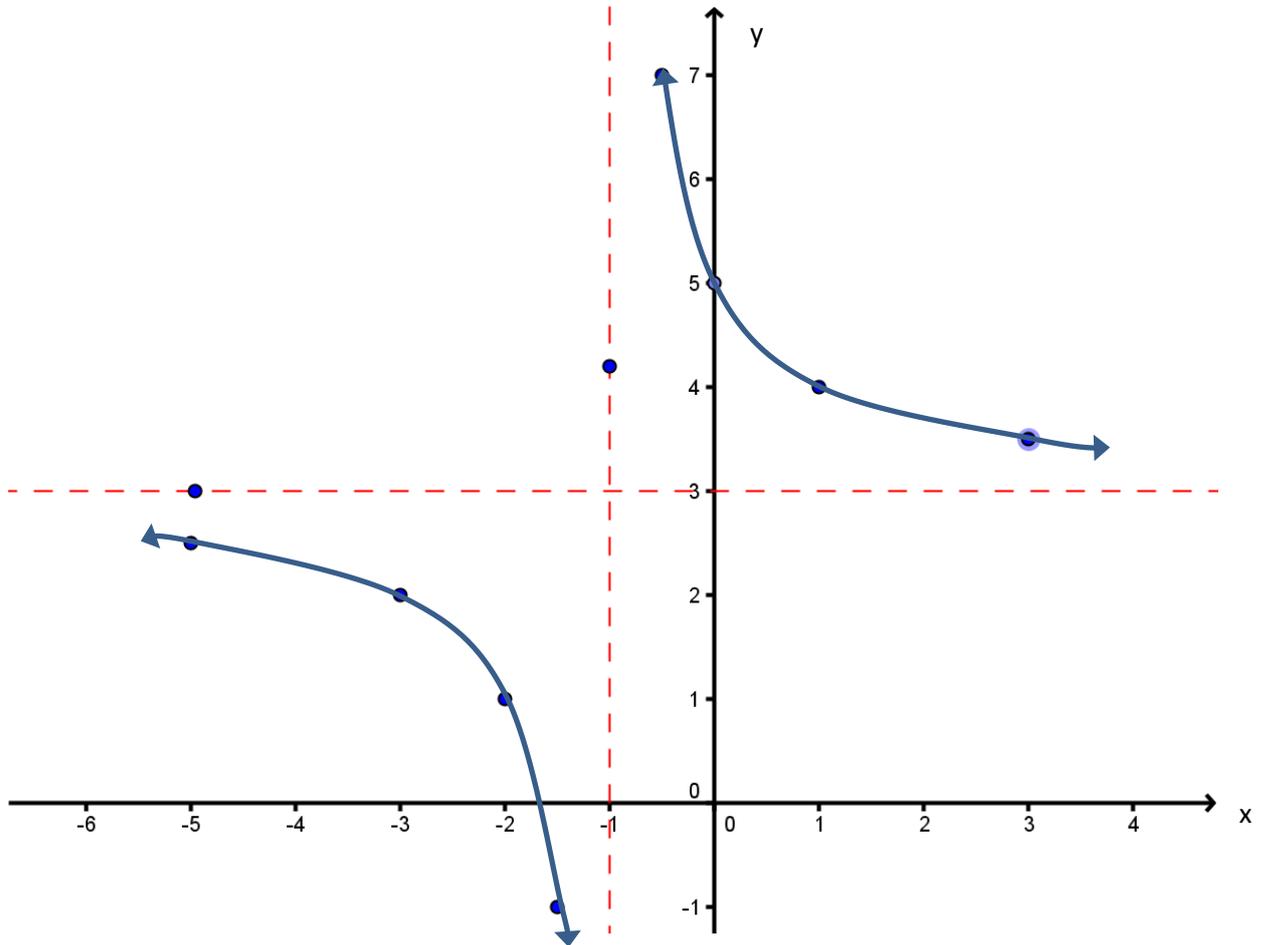
- Determine the values of b and c .
- Give the equation of the graph of $j(x)$ reflected about the y -axis.
- If the graph of $j(x)$ is shifted $2\frac{1}{4}$ to the right and $\frac{49}{16}$ units up give the new equation in the form of $y = ax^2 + bx + c$
- Determine the new x -intercepts of the graph in (c).

4. The graph $r(x) = -2(x - 3)^2 - 2$ is given.
- Draw the graph, clearly indicating the turning point and all the intercepts with the axes.
 - What is the range of this graph?
 - What is the domain of this graph.
 - Determine the inverse of this function, in the form $t(x) = \dots$
 - Is $t(x)$ a function, and if not restrict the domain of $r(x)$ so that $t(x)$ is a function.

Hyperbolas

5. Given the graph $d(x) = \frac{a}{x-2} + 1$ with point A (-1; 2) on the graph.
- Give the equations of the asymptotes.
 - Determine the value of a
 - What are the x - and y -intercepts?
 - Using the above information sketch the graph of $d(x)$.
 - Determine the two equations of symmetry.

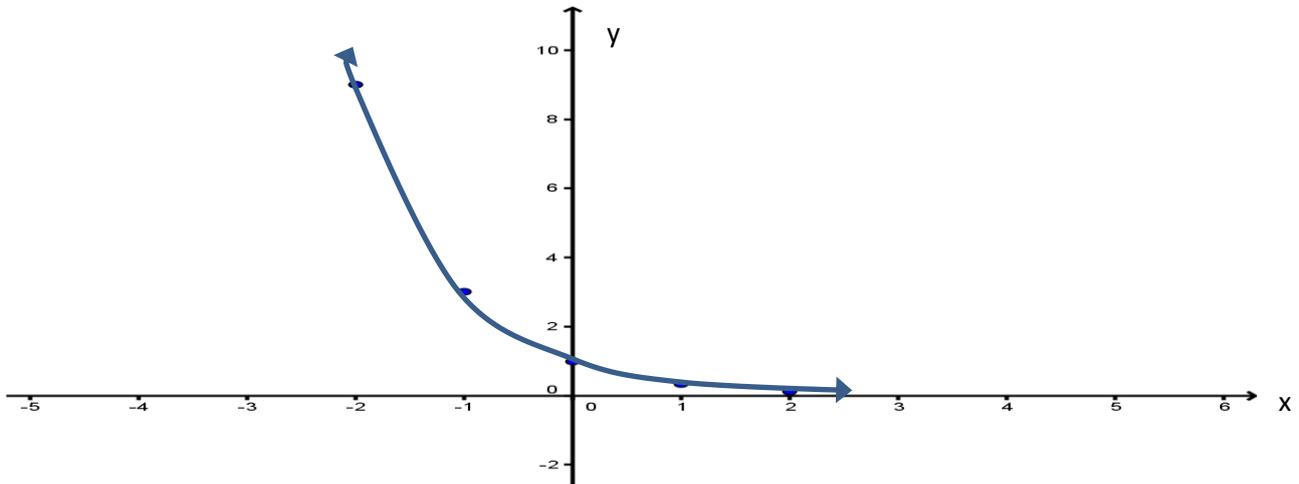
6. Below is the graph $f(x) = \frac{2}{x-p} + q$. The asymptotes intersect at the point B (-1; 3).



- Give the equations of the asymptotes and hence the equation $f(x)$.
- Determine the x - and y - intercepts
- Determine the equation of a straight line that passes through the x - and y - intercepts of $f(x)$.
- Determine the two equations of symmetry for $f(x)$.
- A straight line with a gradient of -2 passes through the graph of $f(x)$ at the point $(-2; 1)$. Determine the equation of the straight line and the other point of intersection with $f(x)$.

Exponential and Log graphs

7. Given below $k(x) = a^x$ which passes through the point $(-1; 3)$.



- Determine the value of a .
- Determine $j(x)$ if $j(x)$ is the inverse of $k(x)$.
- Give the domain and range of $j(x)$.
- Why is the coordinate of the y-intercept always $(0; 1)$ for $k(x)$?

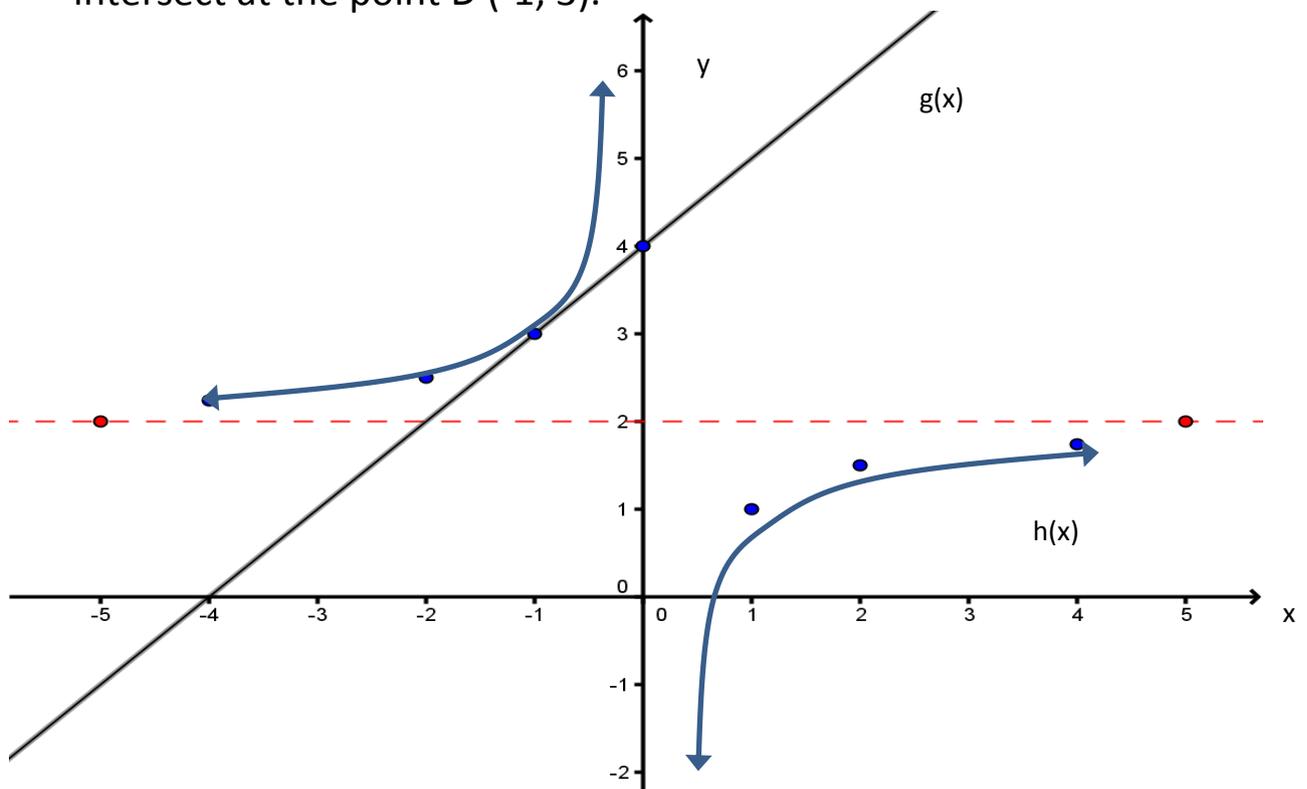
8. Given the equations $h(x) = 2^x$ and $g(x) = \log_2(x + 3)$.

- Plot the graphs of $h(x)$ and $g(x)$ on the same set of axes for $x \in [-5; 5]$.
- Determine the points where the graphs intersect graphically.
- Give the inverse of $h(x)$ in the form $f(x) = \dots$
- Sketch the graph of $f(x)$ on the same set of axes as $h(x)$.
- Determine the value(s) of x for which $h(x) \geq f(x)$
- Determine the equation of $m(x)$ if $m(x) = h(x + 2)$

Mixed Questions

9. Given the equation $f(x) = 2x^2 + bx + c$ and that the points $(-4; 38)$ and $(3; -25)$ lie on the graph. Graph $j(x)$ is a straight line with a gradient of 3 and intercepts the graph $f(x)$ at the y -axis.
- Determine the values of b and c .
 - Determine the equation of $j(x)$.
 - Determine the x -intercepts for both $f(x)$ and $j(x)$.
 - Determine the other point of intersection for the graphs $f(x)$ and $j(x)$.
 - Determine the equation(s) of the line perpendicular to $j(x)$ and intersecting $f(x)$ at the x -axis.

10. The graphs below are $h(x) = \frac{a}{x} + q$ and $g(x) = x + b$. They intersect at the point D $(-1; 3)$.



- a) Determine the equation of $h(x)$ and $g(x)$
- b) Give the inverse of $g(x)$ and state whether it is a function.
- c) Determine the x - and y -intercepts of both graphs.
- d) Determine the equations of symmetry for $h(x)$.
- e) Another straight line $f(x) = 4x + 7$ is given. Where does this line intersect with $h(x)$?

11. *The area of a rectangle with length $2(x + 2)$ and breadth $x - 7$ is given by a parabola with the equation $A(x) = 2x^2 + ax + b$.*

- a) Determine the values of a and b .
- b) Determine the x - and y -intercepts of the parabola.
- c) Determine the turning point of the parabola.
- d) Sketch the graph of the parabola.
- e) *If it is further given that the Area must be three times as big as the breadth,*
 - i) Determine this new equation in the form of a straight line.
 - ii) Determine the points of interception with the parabola.