11.17 Quiz: Function transformations

1. The standard form of a linear equation is $ax + by = c$, where x and y are variables and a, b, and c are parameters (fixed numbers).

   For example if the equation of a line is $3x + 2y = 5$, write down the value of each parameter.

   (a) $a =$

   (b) $b =$

   (c) $c =$

2. The slope-intercept form of a linear equation is $y = mx+b$. The parameter m quantifies the slope and b the y-intercept.

   For the equation $y = \frac{1}{2}x - 7$, write down the value of each parameter..

   (a) $m =$

   (b) $b =$

3. The point-slope form of a linear equation is $y - k = m(x - h)$. Again, the parameter m represents the slope. The parameters h the h are the coordinates of a point that the line passes through.

   For the equation $y - 3 = -\frac{3}{5}(x - 7)$, write down the value of each parameter..

   (a) $m =$

   (b) $h =$

   (c) $k =$

   (d) Write down a point that the line passes through as a coordinate pair.

4. Rewrite each equation in the required form.

   (a) $y = 5x - 3$ in the form $ax + by = c$ (b) $y + 3 = 2(x + 1)$ in the form $y = mx + b$

5. (a) Find the slope m of the line $2x + 4y = 12$.

   (b) Write down the slope perpendicular to the line, $m_\perp$.

6. Write down the slope perpendicular to the given slope.

   (a) $m = \frac{1}{2}$ $\quad m_\perp =$ $\quad$ (b) $m = -6$ $\quad m_\perp =$

7. Write down the equation of the line through $(1, -3)$ with a slope of 4.

8. The line segment $\overline{AB}$, $A(2, 1)$ and $B(8, 3)$, is shown below.

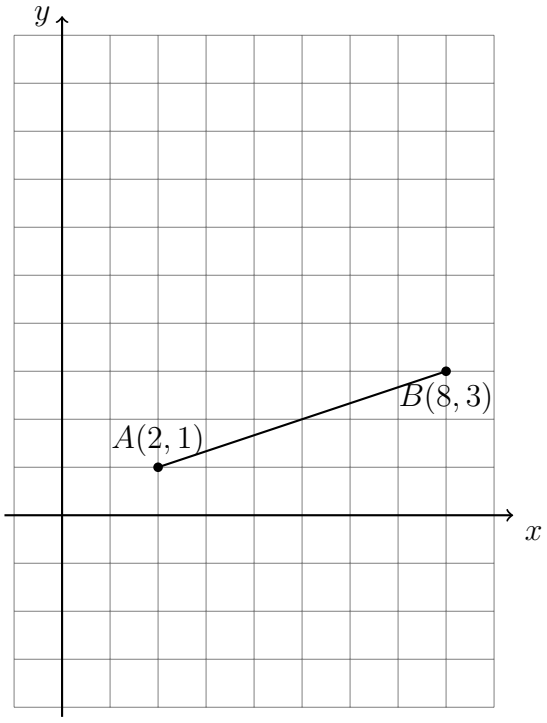
   (a) Mark the midpoint M of $\overline{AB}$. Label it as an ordered pair.

   (b) Find the slope of $\overline{AB}$.

   (c) Write down the slope perpendicular to $\overline{AB}$.

   (d) Write down the equation of the perpendicular bisector of $\overline{AB}$.

   (e) Draw the perpendicular bisector on the graph.

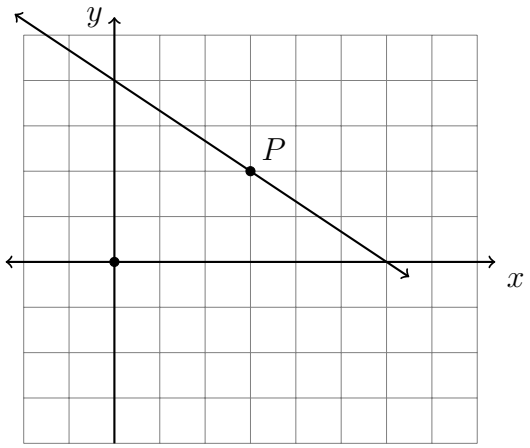


9. The line l having the equation $y - 2 = -\frac{2}{3}(x - 3)$ is shown below.

   (a) Write down coordinates of P.

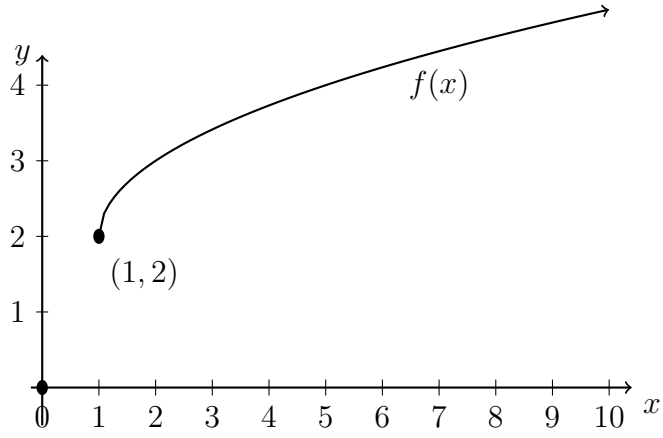
   (b) Point P is mapped to the origin by
   $x \to x - h$
   $y \to y - k$
   Write down h and k.

   (c) Plot the image of l after the translation.

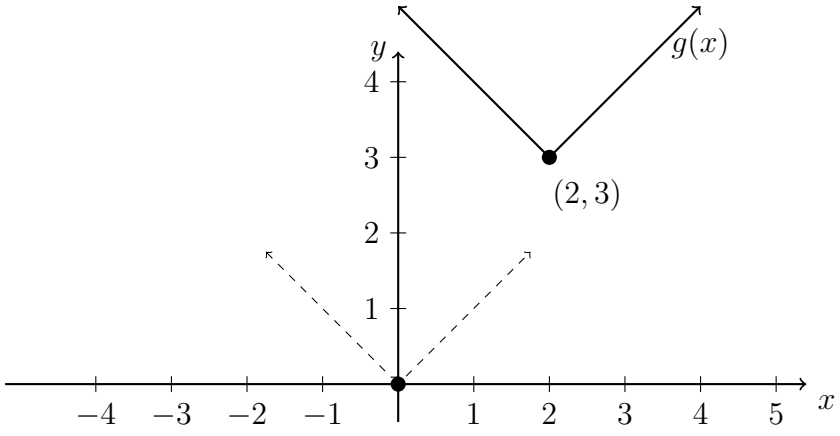


10. The function f is plotted below for $x \geq 1$. Identify the equation represented by the graph.

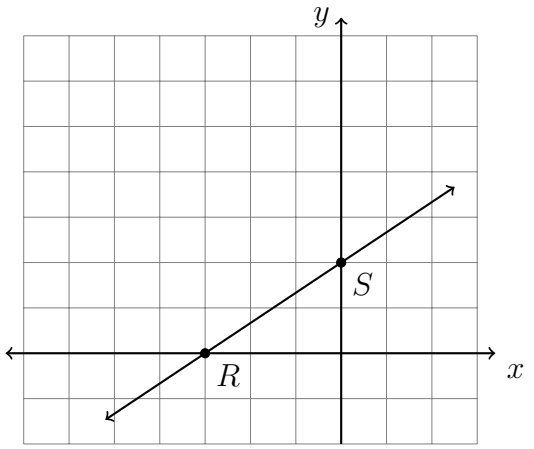
    (a) $f(x) = \sqrt{x - 1} + 2$



11. The function $g : y = |x - 2| + 3$ is plotted below as a solid line. What translation would map g onto the parent function (dotted)? State your answer in the form $x \to x - h$, $y \to y - k$.



12. The line $\overleftrightarrow{RS}$ having the equation $y = \frac{2}{3}x + 2$ is shown below.



(a) Write down the slope of $\overleftrightarrow{RS}$,

$m =$

(b) Write down the y-intercept of $\overleftrightarrow{RS}$,

$b =$

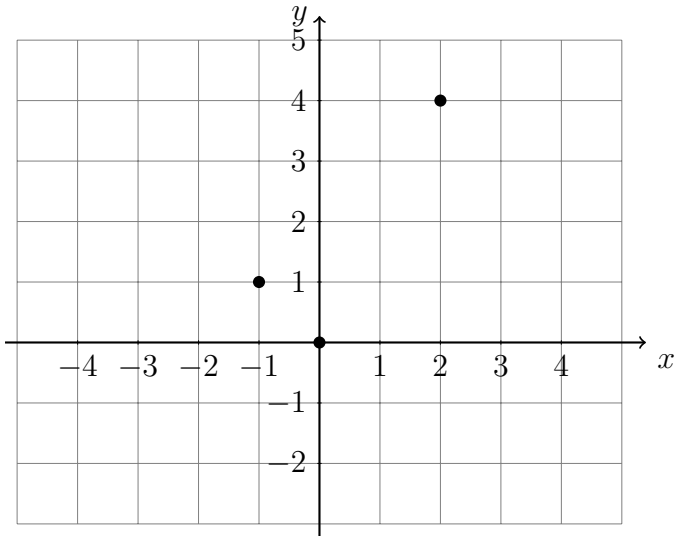
(c) Dilate $\overleftrightarrow{RS}$ by a scale factor $k = 2$ centered at the origin. Mark the images R' and S'.

(d) Write down the equation of $\overleftrightarrow{R'S'}$

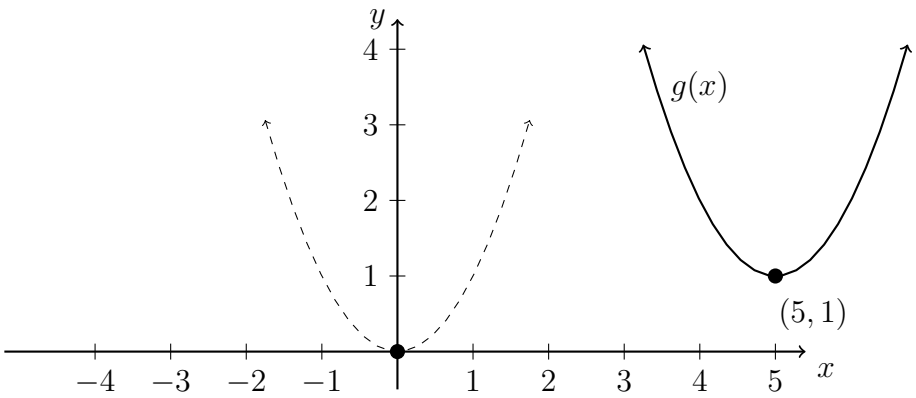
13. Complete the t-table for the parent function f: $y = x^2$, plot the points, and draw f as a smooth curve.

$f(x)$

x	x^2
-2	
-1	1
0	0
1	
2	4



14. Write down the translation that would map $g(x)$ onto the parent function $y = x^2$. State your answer in the form $x \to x - h$, $y \to y - k$.



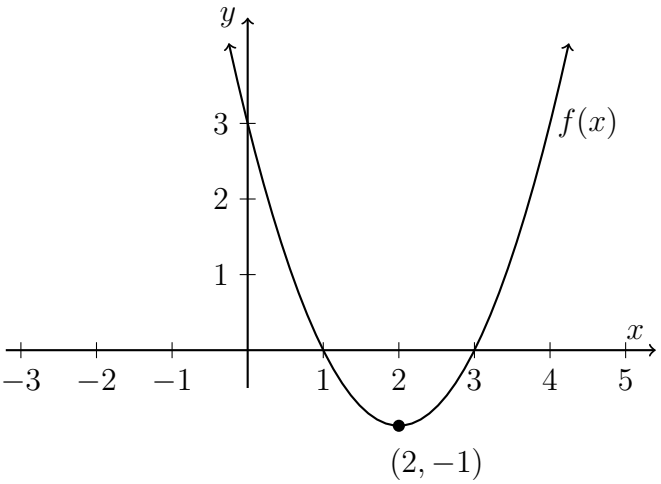
15. The parabola $y + 1 = (x - 2)^2$ graphed below.

    (a) Write down its y-intercept.

    (b) Write down its x-intercepts.

    (c) Reflect f across the y-axis.

    (d) Mark and label the image parabola's intercepts and vertex.

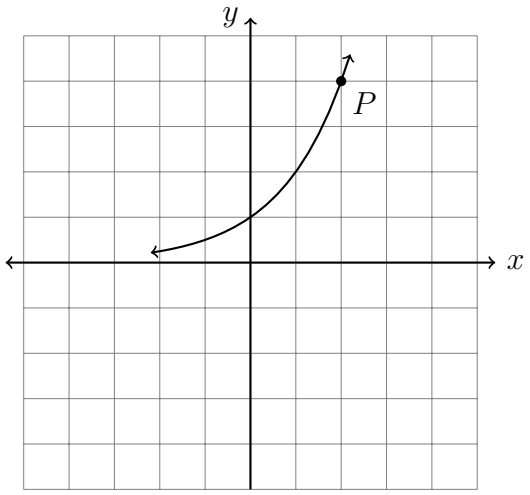


16. Part of the exponential function f: $y = x^2$, is shown below.

    (a) Reflect f across the x-axis.

    (b) Write down the coordinates of P.

    (c) Mark and label the image P' with its coordinates.

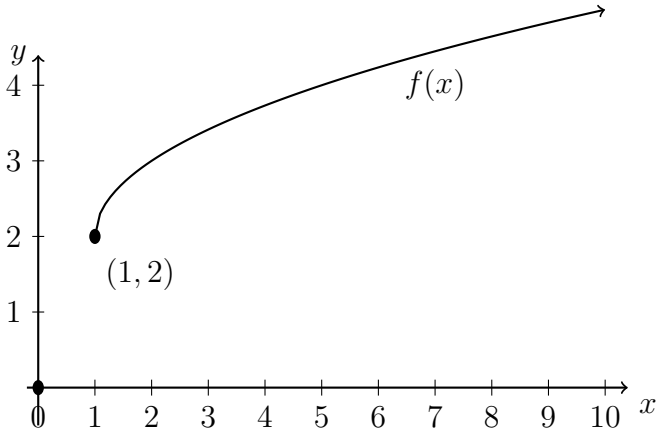


17. The function f is plotted below for $x \geq 1$. Identify the equation represented by the graph. (normal function)

(a) $f(x) = \sqrt{x-1} + 2$

(b) The Normal distribution $N(\mu, \sigma)$

(c) Reciprocal function $y = \dfrac{1}{x}$

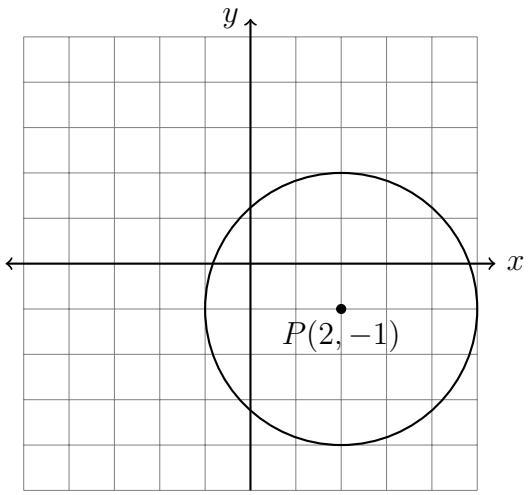


18. The circle with center P shown below can be represented by an equation of the form $(x-h)^2 + (y-k)^2 = r^2$.

(a) Reflect f across the x-axis.

(b) Write down the radius of circle P.

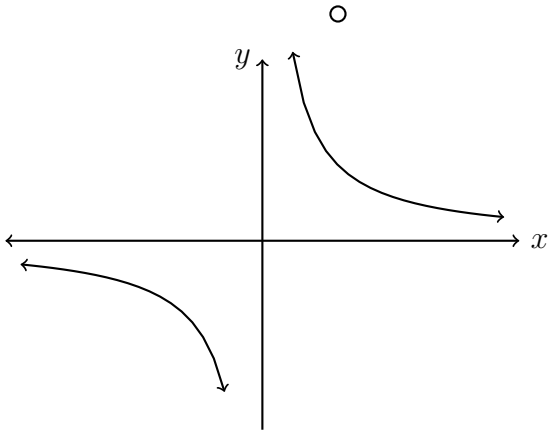
(c) Mark and label the image P' with its coordinates.



19. The reciprocal function shown below has the equation $f(x) = \dfrac{1}{x-1} - 2$. Its asymptotes are plotted as dotted lines.

(a) Write down the equation of the horizontal asymptote.

(b) Write down the equation of the vertical asymptote.



20. The sine function in the graph has the form $f(x) = k \sin x + b$, where the parameter b is the vertical translation and the coefficient k is the vertical stretch factor. f passes through the points $(90°, 3)$ and $(270°, -1)$. Write down the parameter values:

(a) $b =$

(b) $k =$