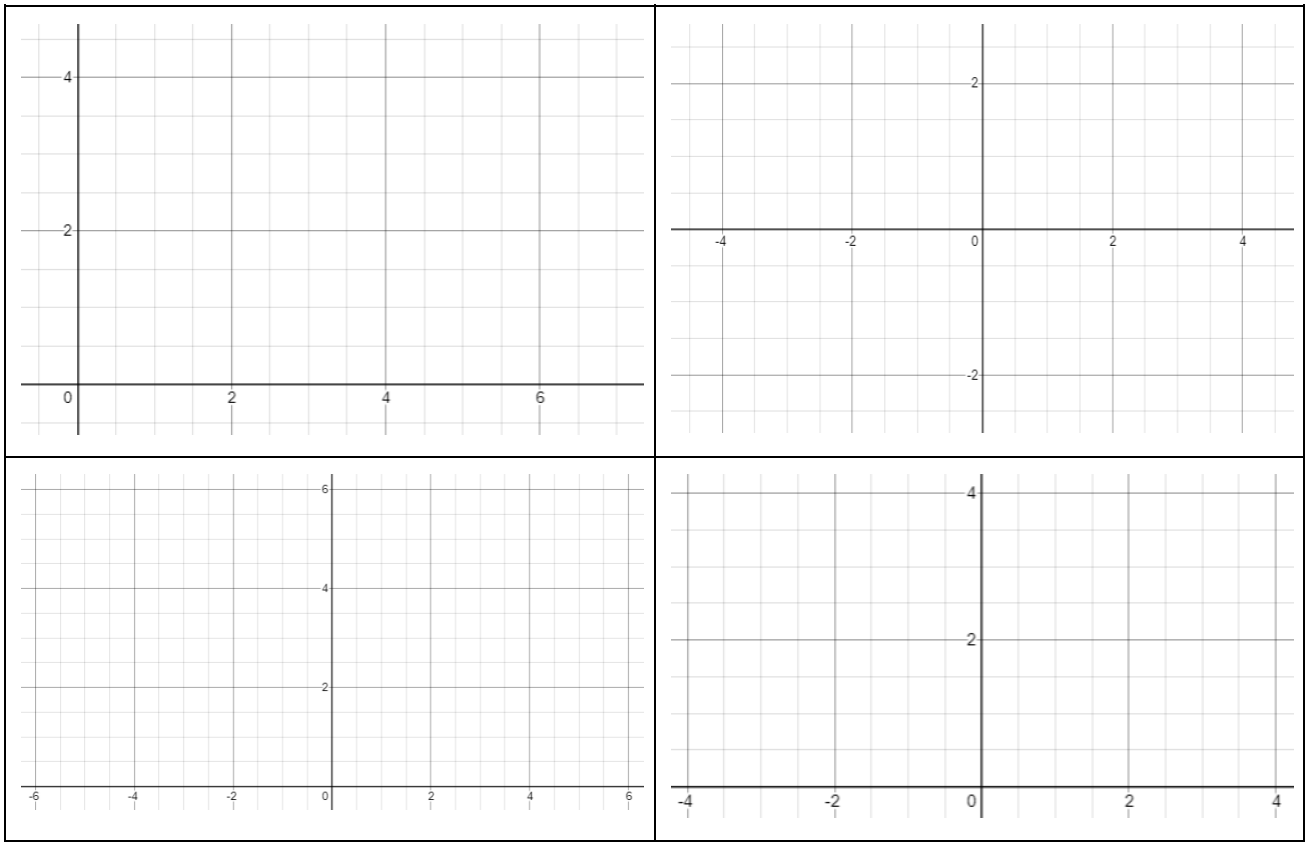
FUNCTIONS - CHAPTER REVIEW

1 State the largest possible domain for the following functions:

(a) $f(x)=\sqrt{x-1}$ **(b)** $f(x)=\dfrac{1}{x^2-4}$ **(c)** $f(x)=\sqrt{25-x^2}$ **(d)** $f(x)=|x|$

2 Sketch the graph of each function given in question **1**.



3 If $g(x)=x^4-x^2+1$, show that $g(x)$ is an even function.

7 Is the function $y = x^3 - 1$ even, odd or neither?

9 The equation of a circle is $x^2 + y^2 - 2x - 2y - 23 = 0$.

(a) Find the circle's centre and radius.

(b) Calculate the distance from the point $(7, -2)$ to the centre of the circle.

(c) Explain why the point $(7, -2)$ is outside the circle.

(d) Use Pythagoras' theorem to find the length of the tangent to the circle from the point $(7, -2)$. (Note that tangent $\perp$ radius drawn to point of contact.)

10 Show algebraically that the line $y = x - 4$ is a tangent to the circle $x^2 + y^2 = 8$ and find the coordinates of the point of contact.

11 Solve: **(a)** $|x + 7| = 11$ **(b)** $|3x - 4| \geq 5$

12 On the graph of $y = (x - 2)(x - 1)(x + 1)$, which of the following lines would you need to draw on this graph in order to solve $(x - 2)(x - 1)(x + 1) + 3 = 0$?

A $y = -1$ **B** $y = -3$ **C** $y = 1$ **D** $y = 3$

13 Solve algebraically: **(a)** $(x-3)^3=-8$ **(b)** $(x+5)^3=4$ **(c)** $(x-2)^3=81$

15 What are the equations of the asymptotes of the graph of $y=\frac{x}{x+3}$?

A $x=-3, y=-1$ **B** $x=3, y=-1$ **C** $x=-3, y=1$ **D** $x=3, y=1$

16 **(a)** On the same diagram, draw the graphs of $y=\frac{x+1}{x}$ and $y=\frac{x-2}{x}$.

(b) Do these graphs have the same asymptotes?

(c) Will these graphs ever intersect? Why?