

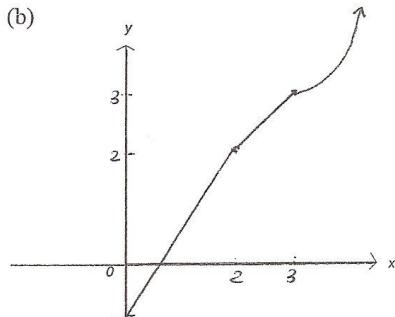
## REVISION FOR T2W1 ASSESSMENT TASK

### Real Functions

1. If  $f(x) = \begin{cases} 3x - 4, & x < 2 \\ x, & 2 \leq x \leq 3 \\ x^2 - 6, & x > 3 \end{cases}$
- (a) find: (i)  $f(1.5)$  (ii)  $f(2)$  (iii)  $f(2.5)$   
 (iv)  $f(3)$  (v)  $f(5)$
- (b) hence sketch the curve  $y = f(x)$
2. (a) Show that  $f(x) = x^3 + x$  is an odd function.  
 (b) What type of symmetry is there in the graph of this function?
3. Given that  $F(x) = x^2 - 2x$ , find an expression for  $\frac{F(x+h) - F(x)}{h}$ . Your answer must be in simplest form.
4. Find the domain and range for each function:
- (a)  $y = x^2 + 9$  (b)  $y = \sqrt{25 - x^2}$  (c)  $y = \frac{1}{2-x}$  (d)  $y = -2^{-x}$
5. Draw separate sketches of the following functions:
- (a)  $y = 5 - x$  (b)  $xy = -1$  (c)  $y = 9 - x^2$   
 (d)  $y = |x + 3|$  (e)  $y = -\sqrt{25 - x^2}$  (f)  $y = (9 - x)^2$
6. Sketch  $f(x) = \begin{cases} 5 - x^2, & x \leq 1 \\ x^2 - 3, & x > 1 \end{cases}$
7. Sketch the function  $y = \frac{1}{x^2 - 1}$
8. Find the equations of the circles with:  
 (a) centre  $(0, 0)$  and radius 5 units (b) centre  $(-3, 5)$  and radius  $\sqrt{7}$  units
9. By completing the square, find the centre and radius of the circle  $x^2 + y^2 - 4x + 10y + 20 = 0$
10. Draw a clear sketch of the region which satisfies the inequalities  $x^2 + (y-1)^2 \leq 16$ ,  $y \geq x$ ,  $x < 1$

### ANSWERS

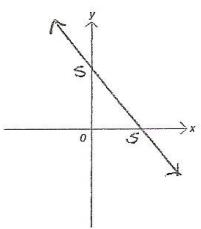
- (1) (a) (i) 0.5 (ii) 2 (iii) 2.5 (iv) 3 (v) 19



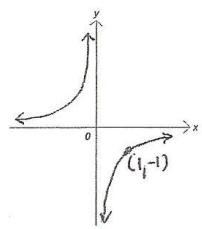
- (2) (b) Point symmetry about the origin.  
 (3)  $2x + h - 2$   
 (4) (a) D: all real  $x$ , R:  $y \geq 9$  (b) D:  $-5 \leq x \leq 5$ , R:  $0 \leq y \leq 5$   
 (c) D: all real  $x$ ,  $x \neq 2$ , R: all real  $y$ ,  $\neq 0$  (d) D: all real  $x$ , R:  $y < 0$

5.

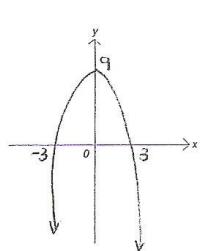
(a)



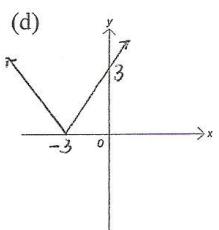
(b)



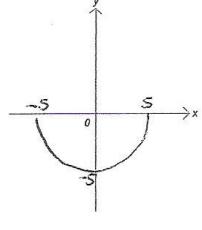
(c)



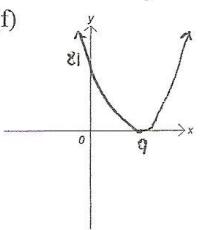
(d)



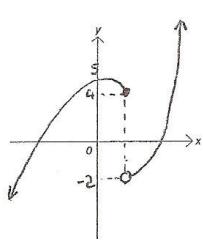
(e)



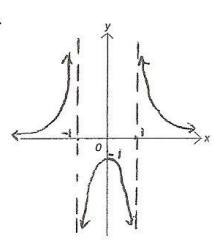
(f)



6.



7.



8. (a)  $x^2 + y^2 = 25$

9. centre (2, -5) and radius 3 units

10.

