

## Math 1512: Review of Prerequisites

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- R1. Diagnostic test A (page xxiv in Stewart): all  
R2. Diagnostic test B (page xxvi in Stewart): all  
R3. Diagnostic test C (page xxvii in Stewart): all  
R4. Sketch the graphs of the following functions, one graph per window. Each graph should be clearly labelled, including the axes, and any important points on the graphs, such as intercepts, vertices, local maxima.

(a)  $f(x) = 2 - 0.4x$

(b)  $f(t) = 2t + t^2$

(c)  $g(x) = \sqrt{x - 5}$

(d)  $f(x) = \sqrt{x^2}$

(e)  $f(x) = |x + 2|$

(f)  $f(x) = |x| - x$

(g)  $f(x) = \begin{cases} x + 2, & x \leq -1 \\ x^2, & x > -1 \end{cases}$

(h)  $f(x) = \begin{cases} x + 9, & x < -3 \\ -2x, & |x| \leq 3 \\ 2 - x^2, & x > 3 \end{cases}$

(i)  $f(x) = \sqrt{1 - x^2}$

(j)  $f(x) = |1 - x^2|$

(k)  $f(x) = \sin(3x)$

(l)  $f(x) = \frac{1}{2}(1 - \cos(\pi x))$

(m)  $f(x) = \tan(x)$

R5. Simplify: (a)  $\sqrt{(-2)^2} =$  (b)  $\sqrt{9} =$

- R5. Solve the following, where  $a$  is a positive constant. Make sure to correctly use the words “AND” or “OR” when appropriate.

(a)  $x^2 = 4$  (b)  $x^2 > 4$  (c)  $x^2 > a^2$  (d)  $x^2 < a^2$  (e)  $|x| > a$  (f)  $|x| < a$

- R6. Consider the function  $f(x) = \sqrt{c^2 - x^2}$  where  $c$  is a positive constant.

(a) Find the domain of  $f$ .

(b) Show that  $f$  is even

(c) Sketch a graph of  $f$ . (Hint: show that  $y = f(x)$  satisfies that  $x^2 + y^2 = c^2$  with  $y \geq 0$ .)

- R7. Sketch the graphs of the following functions, one graph per window, all clearly labelled.

(a)  $g(x) = \sqrt{x - 5}$

(b)  $f(x) = \sqrt{x^2}$

(c)  $f(x) = |x + 2|$

(d)  $f(x) = \frac{1}{2}(1 - \cos(\pi x))$