

## Sample Problems for Exam 1

Precalculus, Mth 130, Spring 2014

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- Exam 1: Wed Feb 26th, Review: Mon Feb 24th
  - The exam will have fewer questions than here.
  - Syllabus for Exam 1: Sections 1.4, 1.7, 2.1, 2.6, 3.1,, 3.2, 3.3, 3.5, 3.6, 3.7
  - Review WebAssign problems and classwork problems.
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1. Find the domain of the following functions.

(a)  $f(x) = \sqrt{x^2 - 2x - 15}$

(b)  $f(x) = \sqrt{\frac{x+1}{x-3}}$

2. Let  $f(x) = \sqrt{x+3}$  and  $g(x) = \frac{1}{2-x^2}$ . Compute the following:

(a) Domain of  $f + g$ .

(b)  $(f+g)(1)$ ,  $(f-g)(6)$ ,  $(fg)(0)$ ,  $(f/g)(1)$ .

(c)  $f \circ g(x)$ ,  $g \circ f(x)$

3. Let  $a = 1 + 2i$  and  $b = 3 - i$ . Compute  $a + 2b$ ,  $ab$ ,  $a/b$  and  $b/a$ .

4. Find a polynomial with given degree and zeros.

(a) degree = 4, zeros =  $3 - i$ ,  $4i$

(b) degree = 6, zeros =  $2$ ,  $-3$ ,  $2 + 3i$ ,  $1 - 2i$

5. Factor the following polynomials into linear factors:

(a)  $f(x) = x^6 + 7x^4 - 18x^2$

(b)  $f(x) = x^3 + 16x$

6. For the given quadratic functions, convert them into the form  $a((x \pm h)^2 + k)$ . Find the absolute maximum or minimum.

(a)  $f(x) = x^2 + 4x + 5$

(b)  $f(x) = -2x^2 + 4x + 4$

7. Draw graphs of the following polynomial functions.

(a)  $p(x) = x^2(x-1)(x+2)$

(b)  $p(x) = (x+1)^3(3-x)(x+5)^2$

8. Find the values of  $x$  for which the following inequalities are true.

(a)  $x^2 - 7x + 12 \geq 0$

(d)  $\frac{x+1}{x-4} > 2$

(b)  $x - x^3 < 0$

(e)  $\frac{1}{x+2} + \frac{1}{x-1} \leq 0$

(c)  $x^2 + 3x \leq 18$

(f)  $|2x - 6| > 1$

9. For the functions given below find the following:

- (a) Domain      (b) Horizontal and vertical asymptotes      (c) Zeros of the function  
(d) Sketch the graph.

(i)  $\frac{2x+7}{6+3x}$       (ii)  $\frac{x+4}{x^2+3x-10}$       (iii)  $\frac{x^2-4x-12}{x^2+3x}$       (iv)  $\frac{x^3-9x}{(x+1)(x-5)(x+6)}$

10. Mix and match graphs problem like the ones on Webassign.