Review Questions for Exam 2

Disclaimer: This is not a *practice exam.* It is meant to reflect the sort of material you will be expected to know on the exam, not to indicate the actual questions or length of the exam.

1. Write the complex numbers in standard form
(a) $(2+i)(2i^{13}+i^6+2)$, (b) $\dfrac{5-2i}{2+3i}$.

2. Solve the equation $\sqrt{x-3}+\sqrt{x+2}=5$.

3. Solve the equation $|x-3|=2x+1$.

4. Solve the equation $\sqrt[3]{x^2+2x}-x=0$.

5. Solve the inequality $5(2x-1)+2>3(x+9)-2x$.

6. Solve the inequalities
(a) $|x-3|>7$.
(b) $|2x+5|\leq 2$.

7. Solve the inequalities
(a) $x^6-4x^4\leq 0$.
(b) $x^3>6x^2-8x$.

8. Solve the inequalities
(a) $\dfrac{2}{x+2}\leq\dfrac{3}{x-1}$.
(b) $\dfrac{x+3}{x-5}\leq 2$.

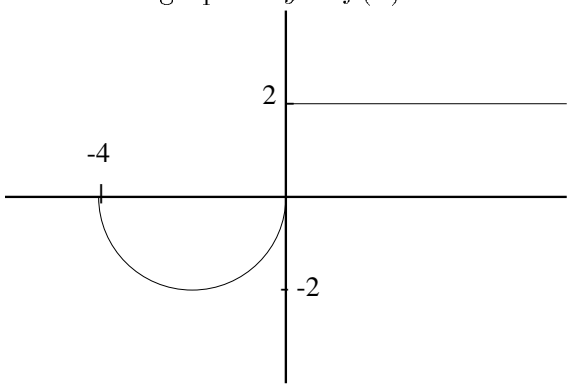
9. Give the slope-intercept form of the equation of the straight line through the point $(2,-3)$ and
(a) the point $(-1,6)$.
(b) the point $(-1,-3)$.

10. Give the slope-intercept form of the equation of the straight line through the point $(2,-3)$ and perpendicular to the line $3x-2y=5$.

11. What is the domain of $\dfrac{\sqrt{9-x^2}}{x+1}$?

12. Use your calculator to find the intervals where $f(x)=x^4-3x^2-x+3$ is increasing (give answers to 4 decimal places).

13. Given the graph of $y = f(x)$



graph (a) $f(x-2)$, (b) $f(x)+2$, (c) $f(-x)$, (d) $-f(x)$, (e) $2f(x)$, (f) $f(2x)$.

14. $f(x) = \dfrac{x}{x+1}$, $g(x) = x^3 - 1$, $h(x) = x^4 - 1$.

(a) Which of these functions has an inverse?

For those with an inverse:

(b) Sketch the graph of the function and its inverse on the same axes (use your calculator to graph the function but not for graphing the inverse).

(c) Find an explicit formula for the inverse (check that your graph of the inverse was right).

15. $f(x) = \dfrac{1}{x-3}$, $g(x) = \sqrt{x}$.

Give the following

(a) $f \circ g$, (b) $g \circ f$.

(c) Domain f, (d) Domain g, (e) Domain $f \circ g$, (e) Domain $g \circ f$.

Solutions

1. (a) $5i$, (b) $\frac{4}{13} - \frac{19}{13}i$.

2. $x = 7$.

3. $x = \frac{2}{3}$.

4. $x = -1, 0, 2$.

5. $(\frac{10}{3}, \infty)$.

6. (a) $(-\infty, -4) \cup (10, \infty)$. (b) $[-\frac{7}{2}, -\frac{3}{2}]$.

7. (a) $[-2, 2]$. (b) $(0, 2) \cup (4, \infty)$.

8. (a) $[-8, -2) \cup (1, \infty)$. (b) $(-\infty, 5) \cup [13, \infty)$.

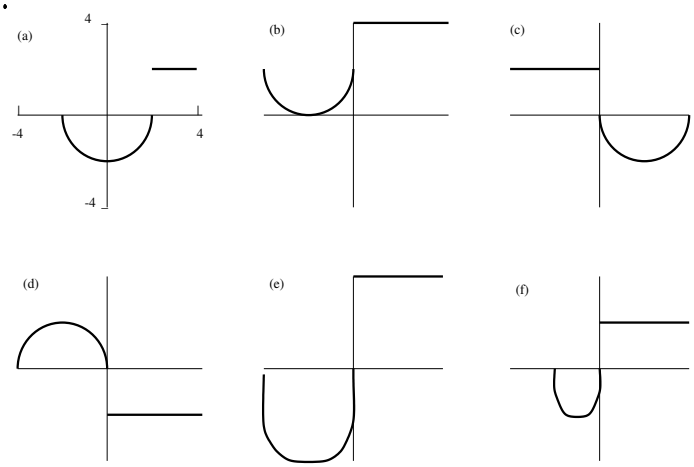
9. (a) $y = -3x + 3$. (b) $y = -3$.

10. $y = -\frac{2}{3}x - \frac{5}{3}$.

11. $[-3, -1) \cup (-1, 3]$.

12. $(-1.1309, -0.1699)$ and $(1.3008, \infty)$.

13.



14. (a) f, g. (c) $f^{-1}(x) = \dfrac{x}{1-x}$, $g^{-1}(x) = \sqrt[3]{x+1}$.

15. (a) $f \circ g(x) = \dfrac{1}{\sqrt{x} - 3}$. (b) $g \circ f(x) = \sqrt{\dfrac{1}{x-3}}$.
(c) $x \neq 3$. (d) $x \geq 0$. (e) $x \geq 0$, $x \neq 9$. (f) $x > 3$.