JUNE 2019 Final Exam Review #3
Review Questions from Ch. 8

Part 1 – No calculator

1. Identify if a function is a polynomial or not.

$f(x) = 2^x + x^2 - 1$ $\quad h(x) = \frac{x^2+2x+1}{x^2-7}$

$y = 2(x-3)(x+4)$

$g(x) = \frac{1}{4}x^2 - 7$ $\quad y = 4x$

2. Given a polynomial equation, identify the x-intercepts

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

b) $y = x(x+4)(x-5)(x-6)$

c) $y = (3x-1)^2(x+100)$

3. Identify the leading term, degree, orientation and end behavior of a polynomial

a) $y = \frac{1}{4}x^4 - 2$

b) $y = -2(x-4)(x-1)(x-5)$

c) $y = 3x - 1$

4. Sketch and label polynomials ← possible graph

$f(x) = (x+3)^2(x+2)(x-3)(x+5)$

$g(x) = .2x(x-2)^4(x-5)$ and label the y-intercept

$h(x) = -0.1 \times (x+4)^3$

5. Given the number of real and imaginary roots, sketch possible graphs.

(a) 5 real roots and 2 imaginary roots

(b) 2 complex and 2 real

(c) 2 complex and 2 real, but degree 6

6. Simplify expressions with imaginary numbers

$i^4 =$ $\quad 2 + \sqrt{-7}$ $\quad 2 + \sqrt{-9}$

$2i(5i)^2$ $\quad (6+i)(6-i)$ $\quad \frac{1+2i}{3-4i}$

Part 2 – Calculator

7. Given two or three $x-intercepts$, write a possible polynomial equation and convert it to standard form

a) $x = 5$ $\quad x = -2$

b) $x = 1$ $\quad x = \frac{2}{3}$ $\quad x = -2$

8. Given roots and an additional point (perhaps via a graph), determine an exact polynomial equation (showing work for the stretch factor).

double root of -3, single roots of 1 and 6
Additional point $(2, -75)$

9. Find all roots for a degree 2 polynomial

$y = x^2 - 2x + 9$

10. Divide Polynomials.

a) $\frac{9x^3-18x^2-x+2}{3x+1}$ ↑ b) $\frac{x^3-13x-12}{x-4}$ ↖ Practice synthetic

11. Find all roots for a degree 3 polynomial (show appropriate steps)

a) for $y = x^3 + x^2 + 3x + 27$

~~b) for $y = x^3 - 17x^2 + 81x - 65$~~

b) for $y = x^3 - 10x^2 + 33x - 34$ ← do at least one

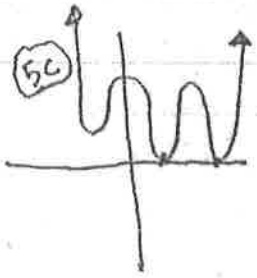
Review #3 Solutions

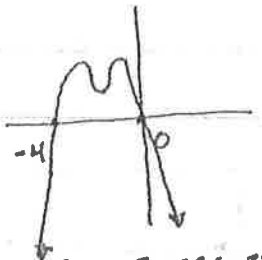
3b lead term $-2x^3$
degree 3
(−)
↑↓

2b $x=0$, $x=-4$, $x=5$, $x=6$

11a $x^3+x^2+3x+27=0$
root equation
$(x+3)(\ ??\ )=0$
$(x+3)(x^2-2x+9)=0$
↓ quad. form.
zero prod.
$-3,\ 1\pm 2i\sqrt{2}$

5c



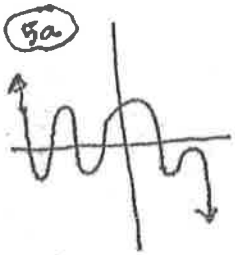


11b $x^3-10x^2+33x-34=0$
$(x-2)(\ ??\ )=0$
$(x-2)(x^2-8x+17)=0$
↓ quadr. formula
roots 2 and $4\pm i$

2c $x=\frac{1}{3}$
$x=-100$

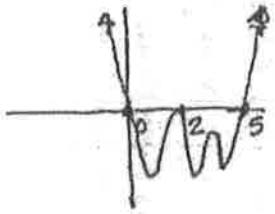
3a
Lead term $\frac{1}{4}x^4$
degree 4
+
end behav. ↑↑

5a



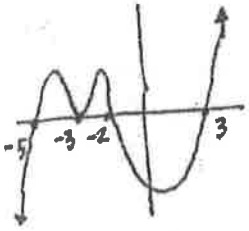
2a
$x=2$
$x=-4$

7b
$y=3x^3+x^2-8x+4$
is one possibility



9 roots $1+2i\sqrt{2}$ and $1-2i\sqrt{2}$

10b x^2+4x+3



10a $3x^2-7x+2$

3c
lead term
$3x$
degree 1
(+)
end b. ↓↑

8 $y=-\frac{3}{4}(x+3)^2(x-1)(x-6)$

7a $y=x^3-3x-10$

11c
$x^3-17x^2+81x-65=0$
$(x-1)(\ ??\ )=0$
$(x-1)(x^2-16x+65)$
↓ quadratic formula

6
1
$2+i\sqrt{7}$
$2+3i$
$-50i$
37

1
Polynomials
$y=2(x-3)(x+4)$
$g(x)=\frac{1}{4}x^2-7$
$y=4x$

5b