Midterm 2 Items to Review

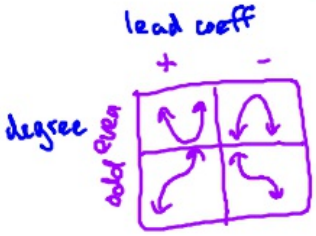
look for highest power

Section 2.2

End Behavior – 134: 19 – 30; 192: 13 – 16

Multiplicity (repeated zeros) – 134: 55 – 74; 192: 17 – 18

$f(x)=(x-2)^2(x+3)(x-1)^3$



even $(x-2)^2$ touch/bounce

odd through (twist)

L. as $x \to -\infty$, $f(x) \to$ ____

R. as $x \to \infty$, $f(x) \to$ ____

Section 2.3

Long Division – 144: 11 – 25; 192: 23 – 24

Synthetic Division – 144: 27 – 46; 192: 25 – 26

Factoring a Polynomial – 145: 47 – 54; 192: 27 – 28

* Remember placeholders (0 terms)

$$x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$$

Section 2.4

Complex Numbers – 152: 11 – 60; 192: 29 – 36

Conjugate pairs are both roots

$\sqrt{-1}=i$

$\sqrt{-4}=2i$

$i^2=-1$

$a+bi$ (real, imaginary)

Section 2.5

Possible Rational Zeros – 164: 15 – 18, 33 – 36 (a)

$\pm \frac{\text{factors of constant}}{\text{factors of leading coeff.}}$

Zeros of a Polynomial Function – 164: 19 – 28, 63 – 80; 193: 41 – 44

Section 2.6

Rational Functions – 177: 5 – 44, 49 – 62; 194: 47 – 56

EBA

$\frac{x+3}{x^2-4}$ → =0 x-int. → domain/V.A.

hole when a term cancels

$\frac{1}{x}$ $y=0$

$\frac{2x^3}{3x^3}$ $y=\frac{2}{3}$

$\frac{5x^4\ldots}{2x^3\ldots}$ $y=mx+b$ long division to find

Section 3.1

Evaluating Exponential Functions – 208: 23 – 26, 51 – 54; 252: 17 – 16

Graphing Exponential Functions – 208: 13 – 16, 27 – 30; 252: 7 – 10

$y=0$

D: $(-\infty,\infty)$

R: $(0,\infty)$

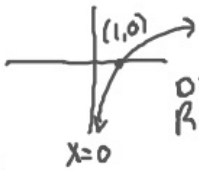
Section 3.2

Logarithms to Exponential – 218: 7 – 10; 282: 33 – 36

Exponential to Logarithm – 218: 11 – 14; 37 – 40

Evaluating Logarithms – 218: 15 – 20, 25 – 32; 282: 41 – 44, 49 – 52

Graphing Logarithms – 218: 33 – 48, 65 – 68; 252: 45 – 48, 53 – 56



D: $(0,\infty)$

R: $(-\infty,\infty)$

$\log_a x=y$ iff $a^y=x$

$\log_a 1 = 0$ $\quad \log(uv) = \log u + \log v$

$\log_a a^x = x$ $\quad \log\left(\frac{u}{v}\right) = \log u - \log v$

$a^{\log_a x} = x$ $\quad \log_a u^n = n \log_a u$

change of base

$$\log_a x = \frac{\log x}{\log a} = \frac{\ln x}{\ln a}$$

Section 3.3

Properties of Logarithms – 225: 21 – 58, 67 – 82; 253: 59 – 78

Section 3.4

Solving Equations – 235: 7 – 62; 253: 81 – 90, 93 – 100, 105

Section 3.5

Application – 245: 7 – 17; 254: 114, 116

$A = Pe^{rt}$ continuous

$A = P\left(1 + \frac{r}{n}\right)^{nt}$ compound

Graphing list intercept critical point asymptote

① $e^x = 3$

$\log_e 3 = x$

$\ln 3 = x$

$x \approx 1.099$

② $e^{3x} = 25$

$\log_e 25 = 3x$

$\frac{\ln 25}{3} = \frac{3x}{3}$

$x \approx 1.073$

③ $5^x - 3 = 29$

$+3 \quad +3$

$5^x = 32$

$\log_5 32 = x$

$x = \frac{\log 32}{\log 5}$ or $\frac{\ln 32}{\ln 5}$

$x \approx 2.153$

④ $\ln x = 4$

$e^4 = x$

$x \approx 54.598$

⑤ $\log_6 x - \log_6 3 = 2$

$\log_6 \left(\frac{x}{3}\right) = 2$

$6^2 = \frac{x}{3}$

$3 \cdot 36 = \frac{x}{3} \cdot 3$

$x = 108$

⑥ $\log(1-x) = -1$

$10^{-1} = 1 - x$

$\frac{1}{10} = 1 - x$

$-1 \quad -1$

$-\frac{9}{10} = -x$

$x = \frac{9}{10}$ or 0.9