

Things to know for Algebra 2 Final:

Key

1. Solving quadratics by factoring and Quadratic Formula

Ex. Solve $2x^2 + 7x - 15 = 0$ solve: $x^2 + 4x + 5 = 0$

$(2x - 3)(x + 5)$ $\frac{3}{2}, -5$

$\frac{-4 \pm \sqrt{16 - 4(1)(5)}}{2} = \frac{-4 \pm 2}{2}$

$= -2 \pm i$

2. Logarithms: change of base, expand and condense, solving, graphs (key point (1,0)) e and ln

Ex: $\log_3 4$ $\log_3 3 + \log_3 x + 2\log_3 y$

$\frac{\log 4}{\log 3} = 1.2619$

$\log_3 3xy^2$

Solve: $\log 3 + 2\log x = 5$
 $\log \frac{3x^2}{3} = 5$
 $5e^{3x} + 1 = 5$
 $5e^{3x} = 4$
 $e^{3x} = \frac{4}{5}$
 $3x = \ln \frac{4}{5}$
 $x = \frac{\ln \frac{4}{5}}{3}$

3. Polynomials- write given roots, degree, synthetic div. to solve

Ex: roots 3, -2, 4
 $(x-3)(x+2)(x-4)$

solve: $x^3 + 17x^2 + 6x - 20 = 0$ roots 3, 4, $\frac{1}{3}$
 $(x-3)(x-4)(x+\frac{1}{3})$

$x^3 - 5x^2 - 2x + 24$
 $x^3 - 3x^2 + 16x - 48$
 $(x-3)(x^2+16)$
 $x = -0.07$

4. Rationals and radicals: solving and simplifying

Ex: $\frac{(x+4)(x-4)}{x^2-16} \cdot \frac{x(x-4)}{x^2-4x}$
 $\frac{(x+4)(x-4)}{x(x+3)}$
 $\frac{x^2-16}{x^2-10x+25} = \frac{3x-12}{x^2-3x-10}$
 $\frac{(x+4)(x-4)}{3(x-5)}$

5. Graphs and transformations...and behavior, domain, range

Ex: $y = -2(x-4)^2 + 3$

Vertex: (4, 3) transformations reflected, stretched, right 4 up 3
 Domain: $(-\infty, \infty)$

End behavior: $y = x^4 - 4x^2 + 1$
 range: $(-\infty, 3]$
 $x \rightarrow \infty, y \rightarrow \infty$
 $x \rightarrow -\infty, y \rightarrow \infty$

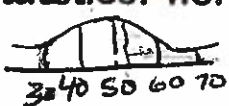
Ex: Radicals $\sqrt{3x-4} = \sqrt{2x+9}$
 Solve! sq. both sides
 $3x-4 = 2x+9$
 $x = 13$

$\sqrt{5x+1} - 6 = 0$
 $\sqrt{5x+1} = 6$
 $5x+1 = 36$
 $x = 7$

7. Complex numbers: operations, simplify within quad. Formula (#1)

Ex: $(2-3i)(4+2i) = 8+4i-12i+6i^2 = 14-8i$
 $\frac{(1-3i)(2+i)}{(2-i)(2+i)} = \frac{2+i-6i-3i^2}{4+i^2} = \frac{5-5i}{5} = 1-i$

8. Statistics: normal distribution and z-scores

Ex:  what is standard dev.? 10
 what % is above 52? 42%
 $z\text{-score} = \frac{52-50}{10} = .2$
 normal cdf(2, 99)

9. Unit Circle: degrees-radians, read sin, cos, tan

Ex: Change $\frac{3\pi}{8}$ to degrees $\frac{3\pi}{8} \cdot \frac{180}{\pi} = 67.5^\circ$ change 155° to radians $155 \cdot \frac{\pi}{180} = \frac{31\pi}{36}$
 $\sin 120^\circ = \frac{\sqrt{3}}{2}$ $\tan 45^\circ = \frac{\sqrt{2}}{2} = 1$ $\cos \frac{3\pi}{4} = \frac{-\sqrt{2}}{2}$

Cumulative Review #2

Name: Key

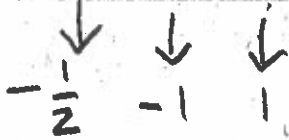
Rational Expressions and Equations: Simplify 1 - 2 and solve 3 - 4

1) $\frac{x-5}{6x^2} + \frac{2x+6}{6x^2}$ $\frac{3x+1}{6x^2}$

2) $\frac{x-5}{6x^2-54} + \frac{2x+6}{x-3}$ $\frac{x-5 + (2x+6)(6x+9)}{6(x+3)(x-3)}$

$$\frac{x-5 + 12x^2 + 36x + 36x + 108}{6(x+3)(x-3)}$$

3) Solve: $f(x) = (2x+1)(x+1)(x-1)$



4) solve: $\frac{x}{x+3} + \frac{2}{x-3} = \frac{-14}{x^2-9}$ $\frac{12x^2+73x+10}{6(x+3)(x-3)}$

$$x(x-3) + 2(x+3) = -14$$

$$x^2 - 3x + 2x + 6 = -14$$

$$x^2 - x + 20 = 0$$

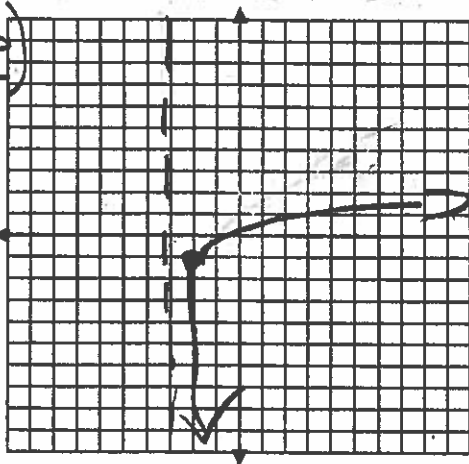
5) $f(x) = \log(x+3) - 1$

$(1, 0)$

Domain: $(-3, \infty)$

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

Asymptote: $x = -3$



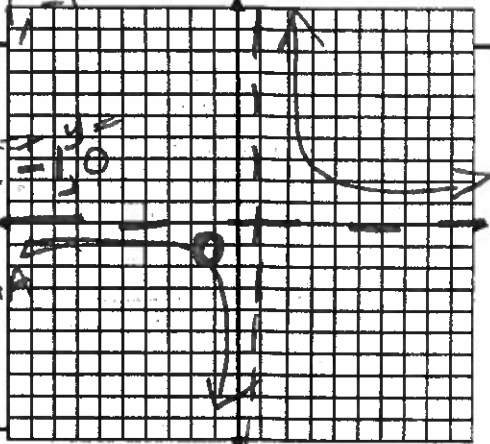
6) $f(x) = \frac{x+1}{x^2-1(x+1)}$ $\frac{(x+4)(x-5)}{-4, 5}$

Domain: $x = 1$
 $(-\infty, \infty)$ except $x = 1$

Range: $(-\infty, \infty)$ except $y = 1/2$

Asymptotes: $x = 1$ (VA), $y = 0$ (HA)

Holes: $x = -1$



7) Factor completely: $4x^2 - 36$

$$\frac{4(x^2 + 9)}{\text{or}}$$

$$4(x+3i)(x-3i)$$

8) Factor completely: $6x^2 + 13x - 5$ -30

$2x$	$3x$	-1	$(2x+5)(3x-1)$
	$6x^2$	$-2x$	
5		-5	