Factoring

Always look for GCF 1st!

1. $12x^3+16$ $\quad 4(3x^3+4)$
2. $9x^3-27x^2+36x$ $\quad 9x(x^2-3x+4)$
3. $2x+5$ $\quad$ not factorable

Factoring quadratic trinomials ax^2+bx+c

1. $x^2+10x+24$

$(x+6)(x+4)$

2. $x^2-5x-14$

$(x-7)(x+2)$

3. $5x^2+35x+60 = 5(x^2+7x+12)$

$5(x+3)(x+4)$

4. $2x^2+\underline{11}x+12$

$24x^2$	$11x$
$8x \cdot 3x$	$11x$ ✓

$2x^2+\underline{8x+3x}+12$

$(2x^2+8x)+(3x+12)$

$2x(x+4)+3(x+4)$

identical

$(2x+3)(x+4)$

$a \neq 1$ so Guess + Check or rewrite middle term to use grouping method
- multiply a + c
- determine 2 #s that mult. to "ac" + add to "b"
- rewrite so you have 4 terms + use grouping method
  - group 1st 2 terms + last 2 terms
  - GCF each group
  - Rewrite (GCF)(match)

5. $8x^2+2x-3$

$(4x+3)(2x-1)$

$6x$

$-4x$

$2x$

6. $-5x^2-7x+6$

$-1(5x^2+7x-6)$

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

2 Special Binomials : Difference of Squares

$a^2 - b^2$ 2 terms, subtraction, + both terms are perfect squares (variables have even exponents)

Take squrare root of each term + write as $(a+b)(a-b)$

1. $x^2 - 25$
   $(x+5)(x-5)$
2. $4x^2 - 49y^2$
   $(2x-7y)(2x+7y)$
3. $9x^2 + 4$
   not factorable
4. $169v^8 - 1$
   $(13v^4+1)(13v^4-1)$

Special Binomials : Sum + Difference of Cubes

$a^3 \pm b^3 = (a \underset{\text{Same sign}}{\_} b)(a^2 \underset{\text{Opp sign}}{\_} ab \underset{\text{APlus Always}}{\_} b^2)$ Fill in Signs with SOAP

1. $x^3 + 125$
   $a = \sqrt[3]{x^3} = x$ $b = \sqrt[3]{125} = 5$
   $(x+5)(x^2-5x+25)$
2. $8x^3 - 27$
   $a = 2x$ $b = 3$
   $(2x-3)(4x^2+6x+9)$
3. $2x^3 + 128y^3$
   $2(x^3 + 64y^3)$
   $2(x+4y)(x^2-4xy+16y^2)$
4. $x^6 - y^6$ perfect squares + cubes
   $a = x^2$ $b = y^2$
   $(x^2-y^2)(x^4+x^2y^2+y^4)$
   $(x+y)(x-y)(x^4+x^2y^2+y^4)$

4 Terms : Grouping Method

1. $2x^3 - 8x^2 - 3x + 12$
   $(2x^3-8x^2) + (-3x+12)$
   $2x^2(x-4) - 3(x-4)$
   $(2x^2-3)(x-4)$
2. $28mn + 70m + 2n + 5$
   $(28mn + 70m)\ (2n+5)$
   $14m(2n+5) + 1(2n+5)$
   $(14m+1)(2n+5)$

4 Average Rate of Change

The average rate of change between any 2 points on the graph of f is the slope of the line between those 2 points.

The average rate of change on the interval $[x_1, x_2]$ is

$$\boxed{m = \frac{f(x_2) - f(x_1)}{x_2 - x_1} \quad \text{or} \quad \frac{y_2 - y_1}{x_2 - x_1}}$$

1. Find the avg. rate of change of $f(x) = -x^3 + 3x$ on each interval:

a. $[-2, -1]$

$f(-2) = -(-2)^3 + 3(-2) = 2$ $(-2, 2)$

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

$m = \frac{2 - -2}{-2 - -1} = -4$

b. $[0, 1]$

$f(0) = 0$ $f(1) = 2$ $m = \frac{2-0}{1-0} = 2$

$(\underset{x_1}{0}, \underset{y_1}{0})$ $(\underset{x_2}{1}, \underset{y_2}{2})$

2. Find the avg. rate of change of $f(x) = \frac{x+5}{x-4}$ on the interval $[-6, 2]$

$f(-6) = \frac{-6+5}{-6-4} = \frac{1}{10}$ $f(2) = \frac{2+5}{2-4} = \frac{-7}{2}$ $m = \frac{-7/2 - 1/10}{2 - -6}$

$(\underset{x_1}{-6}, \underset{y_1}{1/10})$ $(\underset{x_2}{2}, \underset{y_2}{-7/2})$ $m = \frac{-36/10}{8}$

$m = -\frac{18}{5} \cdot \frac{1}{8} = \frac{-9}{20}$

3. $f(x) = \sqrt{x+8}$ $[-4, 4]$

$f(-4) = 2$ $f(4) = 2\sqrt{3}$ $m = \frac{2\sqrt{3} - 2}{8}$

$(\underset{x_1}{-4}, \underset{y_1}{2})$ $(\underset{x_2}{4}, \underset{y_2}{2\sqrt{3}})$

$m = \frac{\sqrt{3} - 1}{4}$

Writing an Equation of a Line

Slope-Intercept Form: Given the slope (m) + the y-intercept (b) $y = mx + b$

Point-Slope Form: Given the slope (m) + a point (x_1, y_1)

$$y - y_1 = m(x - x_1)$$

Standard Form: $Ax + By = C$ A, B, + C are integers + A is positive

1. Write the equation of the line that passes through (2, 3) & has a slope of $-1/2$.

$y - 3 = -1/2(x - 2)$ Pt. Slope Form

$y - 3 = -1/2x + 1$

$y = -1/2x + 4$ Slope-Intercept Form

$1/2x + y = 4$

$x + 2y = 8$ Standard Form

2. Passes through $(\underset{x_1}{3}, \underset{y_1}{2})$ & is perpendicular to $\underset{m = -3}{y = -3x + 2}$

$\perp m = 1/3$

$y - 2 = 1/3(x - 3)$ or $y = 1/3x + 1$

3. Passes through (3, 2) + parallel to $y = -3x + 2$

$y - 2 = -3(x - 3)$ or $y = -3x + 11$

4. Passes through $(\underset{x_1}{-2}, \underset{y_1}{-1})$ and $(\underset{x_2}{3}, \underset{y_2}{4})$

$m = \frac{4 - -1}{3 - -2} = \frac{5}{5} = 1$

$y - 4 = 1(x - 3)$

$y = x + 1$

5. Find the standard form of the equation of the line through (2, -1) + is perpendicular to the line $2x - 3y = 5$

$y + 1 = -3/2(x - 2)$

$y + 1 = -3/2x + 3$

$y = -3/2x + 2$

$3/2x + y = 2$

$3x + 2y = 4$

$-3y = -2x + 5$

$y = 2/3x - 5/3$

6 Domain of Functions

Domain - the set of all possible x-values

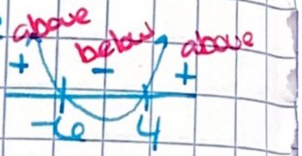
- the denominator cannot $= 0$
- the number under a square (or even) root can't be negative
- you can't take the log (or ln) of a negative # or 0

Find the domain of the following functions:

1. $f(x) = \sqrt{x-1}$ $x - 1 \geq 0$ $[1, \infty)$
   $x \geq 1$

2. $f(x) = \sqrt[3]{x+7}$ $(-\infty, \infty)$

3. $f(x) = \sqrt[4]{x^2+2x-24}$ $x^2+2x-24 \geq 0$ ← above x-axis
   $(x+6)(x-4) \geq 0$
   $x = -6$ $x = 4$ x-int.
   $(-\infty, -6] \cup [4, \infty)$



4. $f(x) = \frac{x+4}{3x-7}$ $3x - 7 \neq 0$ $(-\infty, 7/3) \cup (7/3, \infty)$
   $x \neq 7/3$

5. $f(x) = \frac{4x-8}{x^2+3x-10} = \frac{4\cancel{(x-2)}}{\cancel{(x-2)}(x+5)}$ ← creates a hole $x \neq 2$ + $x + 5 \neq 0$
   $x \neq -5$
   $(-\infty, -5) \cup (-5, 2) \cup (2, \infty)$

6. $f(x) = \frac{1}{\sqrt{x-1}}$ $x - 1 > 0$ $(1, \infty)$
   $x > 1$

7. $f(x) = \sqrt{\frac{2x+5}{x+8}}$ $x + 8 \neq 0$ $\frac{2x+5}{x+8} \geq 0$
   $x \neq -8$
   $2x + 5 \geq 0$
   $x \geq -5/2$

$(-\infty, -8) \cup (-8, -5/2] \cup [-\frac{5}{2}, \infty)$

8. $f(x)=\sqrt{9-x^2}$

$9-x^2\ge 0$

$(3+x)(3-x)\ge 0$

$x=-3$ $x=3$

$[-3,3]$

9. $f(x)=\ln(x^2-4x+3)$ *must be positive

$(x-3)(x-4)>0$

$x=3$ $x=4$

$(-\infty,3)\cup(4,\infty)$

10. $f(x)=\log_5(2x+3)-4$

$(-3/2,\infty)$

$2x+3>0$

$x>-3/2$

11. $f(x)=\log_2\left(\frac{2x-1}{x-6}\right)$

$x\ne 6$

$\frac{2x-1}{x-6}>0$

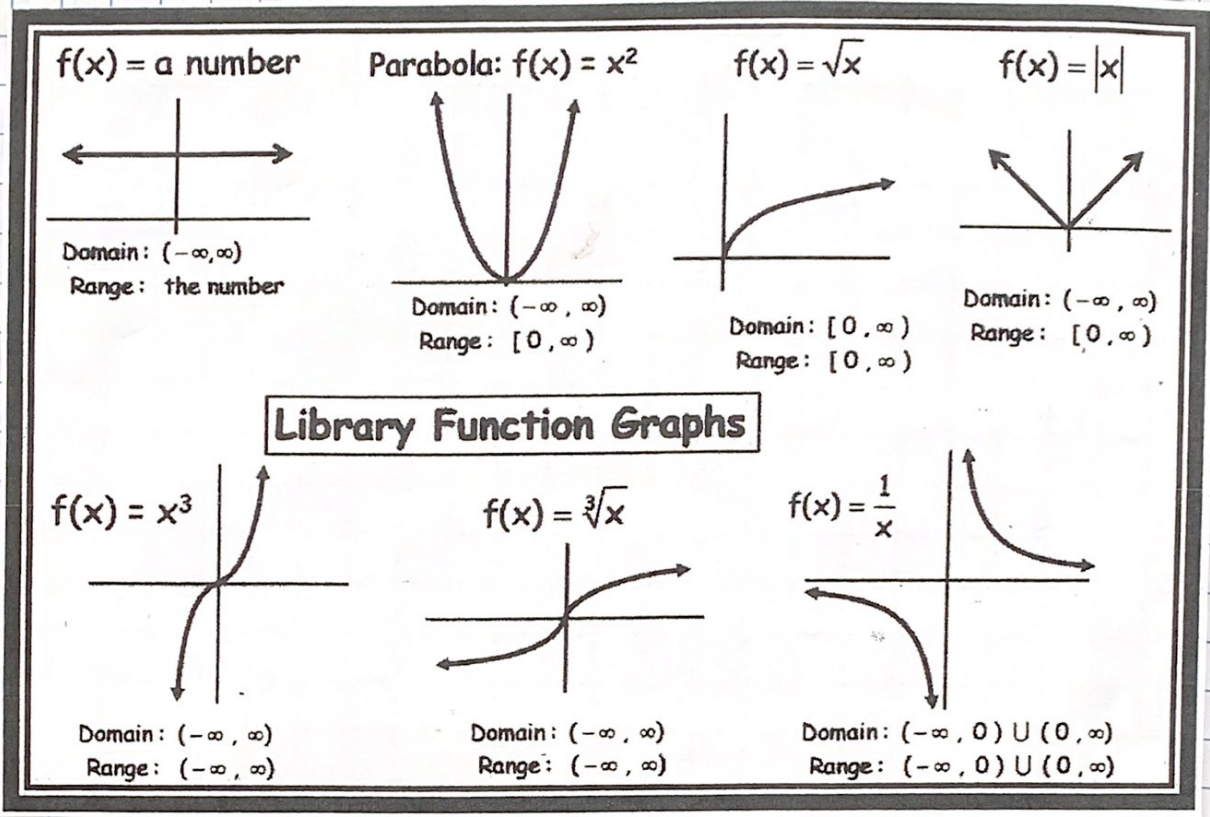
$2x-1>0$

$x>1/2$

$(-\infty,\frac{1}{2})\cup(\frac{1}{2},6)$

$\cup(6,\infty)$

Transformations of Functions



Transformation	Function	Description
Horizontal Shift *opposite sign of h	$f(x + h)$	Shift left *h* units
	$f(x - h)$	Shift right *h* units
Vertical Shift	$f(x) + k$	Shift up *k* units
	$f(x) - k$	Shift down *k* units
Reflection	$-f(x)$	Reflect across x-axis
	$f(-x)$	Reflect across y-axis
Vertical Stretch/Compress	$a\,f(x),\ a > 1$	Stretch vertically by a factor of *a*
	$a\,f(x),\ 0 < a < 1$	Compress vertically by a factor of *a*
Horizontal Stretch/Compress multiply by reciprocal	$f(ax),\ a > 1$	Compress horizontally by a factor of $\frac{1}{a}$
	$f(ax),\ 0 < a < 1$	Stretch horizontally by a factor of $\frac{1}{a}$

cont...

Describe the transformation + sketch the graph.

1. $g(x) = \frac{2}{3}x^2 - 1$ $a = \frac{2}{3}$ $h = 0$ $K = -1$

   vertical shrink by $2/3$ + shift down 1

2. $g(x) = 2|x-1|$ $a = 2$ $h = 1$ $K = 0$

   vertical stretch by 2 + right 1

3. $g(x) = -2(x+1)^2 + 3$ $a = -2$ $h = -1$ $K = 3$

   reflect over x-axis, stretch vert. by 2, left 1, + up 3

4. $g(x) = -3x - 2$ $a = -3$ $h = 0$ $K = -2$

   reflect over x-axis, stretch vert. by 3, + down 2

Write the equations described...

1. Absolute value - vertical shift up 5, horizontal shift right 3.

   $g(x) = |x-3| + 5$

2. Linear - vertical compression by $2/5$ + shift up 2.

   $g(x) = \frac{2}{5}x + 2$

3. Quadratic - vertical stretch by 5, horizontal shift left 8, + reflected over the x-axis.

   $g(x) = -5(x+8)^2$

10

Compositions of Functions

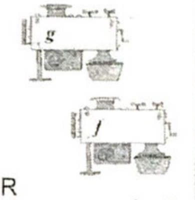
Substituting a function or it's value into another function.

$f(g(x))$

Second

First

(inside parentheses always first)



OR $f \circ g(x)$

$f(\underset{1st}{g}(x)) = f \circ \underset{1st}{g}(x)$

$g(\underset{1st}{f}(x)) = g \circ \underset{1st}{f}(x)$

Given the table, evaluate the following:

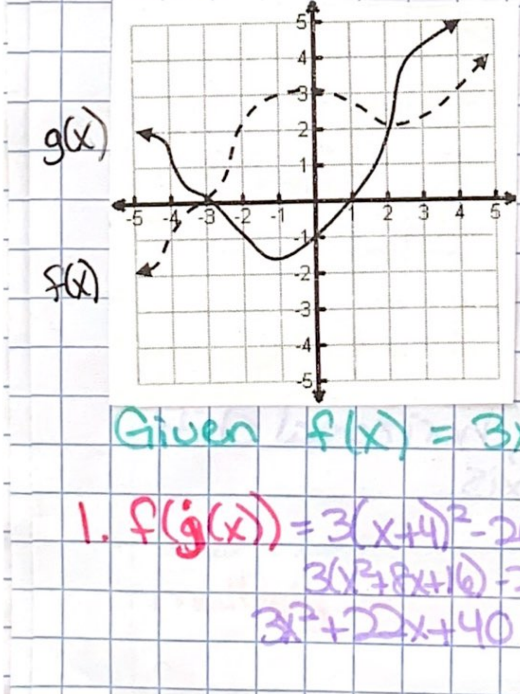
x	-2	-1	0	1	2	3
f(x)	-3	-2	1	4	-1	0
g(x)	-2	0	1	3	-1	2

1. $f(-1) = -2$
2. $g(2) = -1$
3. $f(-3) =$ DNE
4. $g^{-1}(0)$ means inverse, so what g(x) value makes $g(x)=0$ $x = -1$
5. $f^{-1}(-2)$ $f(x) = -2$ so $x = -1$

6. $f(\overset{1st}{g(-1)})$ $f(0) = 1$

7. $(f \circ \overset{1st}{g})(3)$ $f(2) = -1$

8. $(g \circ \overset{1st}{g})(1)$ $g(3) = 2$



Given the graph of f(x) + g(x) evaluate the following:

1. $(f \circ g)(1)$ $f(0) = 3$
2. $(g \circ f)(-2)$ $g(2) = 2$
3. $(f \circ f)(-3)$ $f(0) = 3$
4. $(g \circ g)(-4)$ $g(1) = 0$

Given $f(x) = 3x^2 - 2x$ $g(x) = \ln x$ $h(x) = e^x$ $j(x) = x+4$

1. $f(j(x)) = 3(x+4)^2 - 2(x+4)$

$3(x^2+8x+16) - 2x - 8$

$3x^2 + 22x + 40$

2. $(g \circ h)(x)$

$\ln e^x$

x

3. $h(j(g(x)))$

$h(\ln x + 4)$

$e^{\ln x + 4} = x+4$

Piecewise Functions

11

A function ~~that~~ that is defined using 2 or more equations for different intervals of the domain

Evaluate given $f(x) = \begin{cases} \sqrt{20+x}, & \text{if } -8 < x < -1 \\ 3x^2-2x, & \text{if } -1 \leq x \leq 16 \\ |5-2x|, & \text{if } x > 16 \end{cases}$

a) $f(16)$
$3(16)^2 - 2(16)$
736

b) $f(-2)$
$\sqrt{20-2} = \sqrt{18}$
$3\sqrt{2}$

c) $f(28)$
$|5-2(28)|$
51

Graph the following:

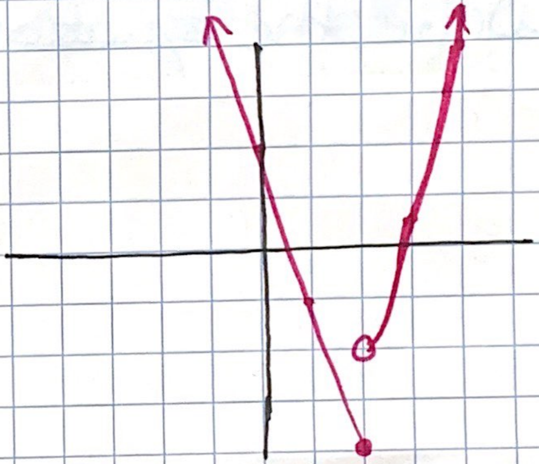
2. $f(x) = \begin{cases} -3x+2, & x \leq 2 \\ \frac{1}{2}x^2 - 4, & x > 2 \end{cases}$

$y = -3x+2$

x	y
● 2	-4
1	-1
0	2

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

x	y
○ 2	-2
3	1/2
4	4



3. $f(x) = \begin{cases} |x+1|, & \text{if } x < 1 \\ \sqrt{x+3}, & \text{if } 1 \leq x \leq 6 \\ 2/3\,x - 5, & \text{if } x > 6 \end{cases}$

$y = |x+1|$

x	y
○ 1	2
0	1
-1	0
-2	1

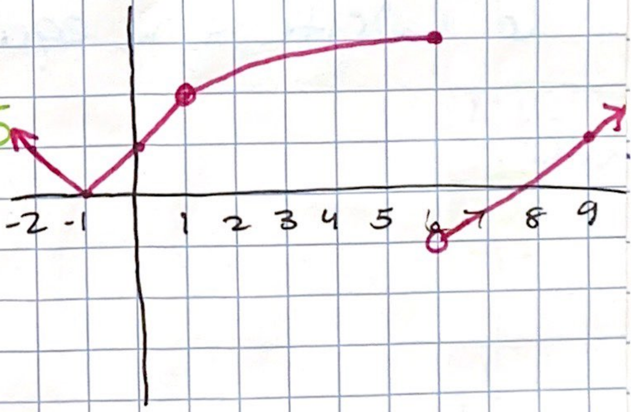
$y = \sqrt{x+3}$

x	y
● 1	2
2	$\sqrt{5}$
5	$\sqrt{8}$
● 6	3

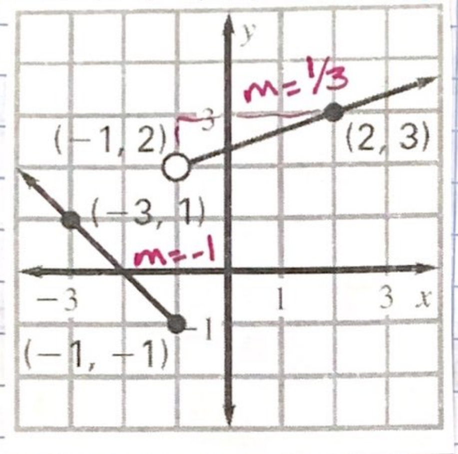
curved

$y = 2/3\,x - 5$

x	y
○ 6	-1
7	-1/3
9	1



4. Write the equation of the piecewise function.



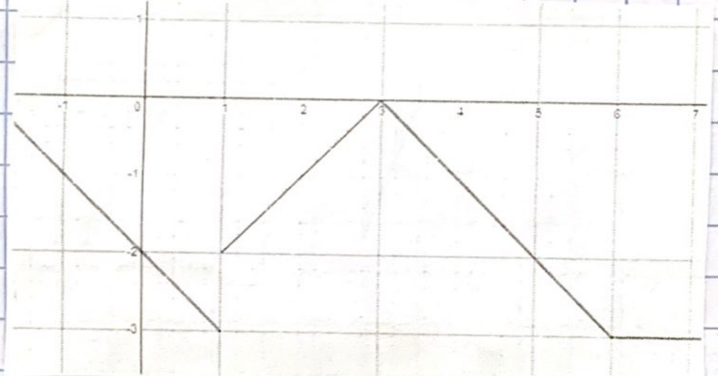
$$f(x)=\begin{cases} -x-2; & x\le -1 \\ \frac{1}{3}x+\frac{7}{3}; & x>-1 \end{cases}$$

$y-3=\frac{1}{3}(x-2)$

$y-3=\frac{1}{3}x-\frac{2}{3}$

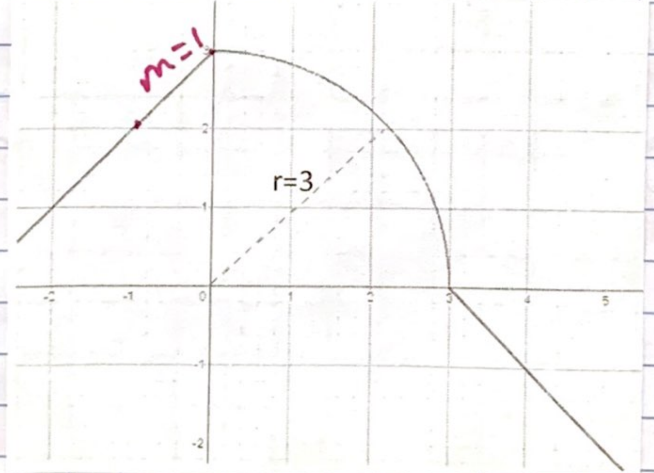
$y=\frac{1}{3}x+\frac{7}{3}$

5. Write the equation



$$f(x)=\begin{cases} -x-2; & x<1 \\ -|x-3|; & 1\le x\le 6 \\ -3; & x>6 \end{cases}$$

6. Write the equation of the following:



$$f(x)=\begin{cases} x+3 & ; x\le 0 \\ \sqrt{9-x^2} & ; 0<x<3 \\ -x+3 & ; x\ge 3 \end{cases}$$

circle:

$x^2+y^2=3^2$

$y=\sqrt{9-x^2}$

Exponentials & Logarithms

Properties of Exponents	Let a and b be real #'s and let m and n be integers.
Product of Powers	$a^m \cdot a^n = a^{m+n}$
Power of a Power	$(a^m)^n = a^{mn}$
Power of a Product	$(ab)^m = a^m b^m$
Negative Exponent	$a^{-m} = \frac{1}{a^m}, a \neq 0$
Zero Exponent	$a^0 = 1, a \neq 0$
Quotient of Powers	$\frac{a^m}{a^n} = a^{m-n}, a \neq 0$

$\log_e x = \ln x$

$y = e^x$ and $y = \ln x$ are inverses

$e^{-x} = \frac{1}{e^x}$

$\ln e = 1$

$\ln a^c = c \ln a$

$e^{\ln x} = x$

$\ln 1 = 0$

$\ln(ab) = \ln a + \ln b$

$a^{x+y} = a^x \cdot a^y$

$\ln e^b = b$

$\ln\left(\frac{a}{b}\right) = \ln a - \ln b$

$a^{x-y} = \frac{a^x}{a^y}$

Find the value without a calculator.

1. $5\ln e + 2\ln\left(\frac{1}{e}\right)$

$5(1) + 2\ln e^{-1}$

$5 - 2(1) = 3$

2. $e^{-\ln e} - e^{\ln\sqrt{e}}$

$\frac{1}{e^{\ln e}} - e^{\ln e^{1/2}} = \frac{1}{e} - e^{1/2}$

$\frac{1}{e} - \sqrt{e}$

Simplify.

3. $2\ln a - 3\ln b + \ln(ab)$

$\ln\left(\frac{a^2(ab)}{b^3}\right) = \ln\frac{a^3b}{b^3} = \ln\frac{a^3}{b^2}$

4. $3(\ln e^2 \ln(e \cancel{\ln e}))$

$3(\ln e^2)$

$3 \cdot 2 \cancel{\ln e} = 6$

Express as a single logarithm.

5. $2\ln x - 4\ln y - \ln 13$

$\ln\left(\frac{x^2}{13y^4}\right)$

6. $\log_3 7 + \frac{1}{2}\log_3 x - 5\log_3 y$

$\log_3 \frac{7x^{1/2}}{y^5} = \log_3 \frac{7\sqrt{x}}{y^5}$

Expand the following logarithms.

7. $\log \frac{x^2y^3}{wz^3}$

$\log x^2 + \log y^3 - \log w - \log z^3$

$2\log x + 3\log y - \log w - 3\log z$

8. $\log \frac{b^3}{\sqrt{ac}} = \log \frac{b^3}{(ac)^{1/2}}$

$\log b^3 - \log (ac)^{1/2}$

$3\log b - \frac{1}{2}(\log a + \log c)$

or

$3\log b - \frac{1}{2}\log a - \frac{1}{2}\log c$

Solving Equations with Common Bases

★ If $b^x = b^y$, then $x = y$

1. $\left(\frac{1}{3}\right)^{-x+7} = \left(\frac{1}{3}\right)^{3x-1}$

$-x+7 = 3x-1$

$-4x = -8$

$x = -2$

2. $8^{x+2} = 16^{2x+7}$

$((2)^3)^{x+2} = (2^4)^{(2x+7)}$

$3(x+2) = 4(2x+7)$

$3x+6 = 8x+28$

$x = -22/5$

Solving Equations when you can't get a common base → rewrite as a log equation.

1. $3e^{4x} = 45$

$e^{4x} = 15$

$\frac{\ln 15}{4} = \frac{4x}{4}$

$x \approx .677$ calc→

2. $2(5^{2x}) - 1 = 47$

$5^{2x} = 24$

$\log_5 24 = 2x$

$\frac{\log 24 \div \log 5}{2} = \frac{2x}{2}$

$x \approx .987$

3. $4 - 2e^x = -23$

$-2e^x = -27$

$e^x = 13.5$

$\ln 13.5 = x$

$x \approx 2.603$

Solving Log Equations

1. $\log_3(5x-1) = \log_3(x+7)$

$5x-1 = x+7$

$4x = 8$

$x = 2$

2. $\log(x+6) = \log(8x) - \log(3x+2)$

condense!

$\log(x+6) = \log \frac{8x}{3x+2}$

$x+6 = \frac{8x}{3x+2}$

$(3x+2)(x+6) = 8x$

$3x^2+20x+12 = 8x$

$3x^2+12x+12 = 0$

$3(x^2+4x+4) = 0$

$3(x+2)(x+2) = 0$

$x = -2$

No Solution

can't take logs of # or 0

3. $\log_5(3x+1) = 2$

$5^2 = 3x+1$

$25 = 3x+1$

$x = 8$

4. $4\ln(x+2) = 6$

$\log_e \rightarrow \ln(x+2) = 3/2$

$e^{3/2} = x+2$

$x \approx 2.482$

5. $\log_2 4x + \log_2(x+3) = 4$

condense 1st!

$\log_2 4x^2 + 12x = 4$

$4x^2 + 12x = 2^4$

$4x^2 + 12x - 16 = 0$

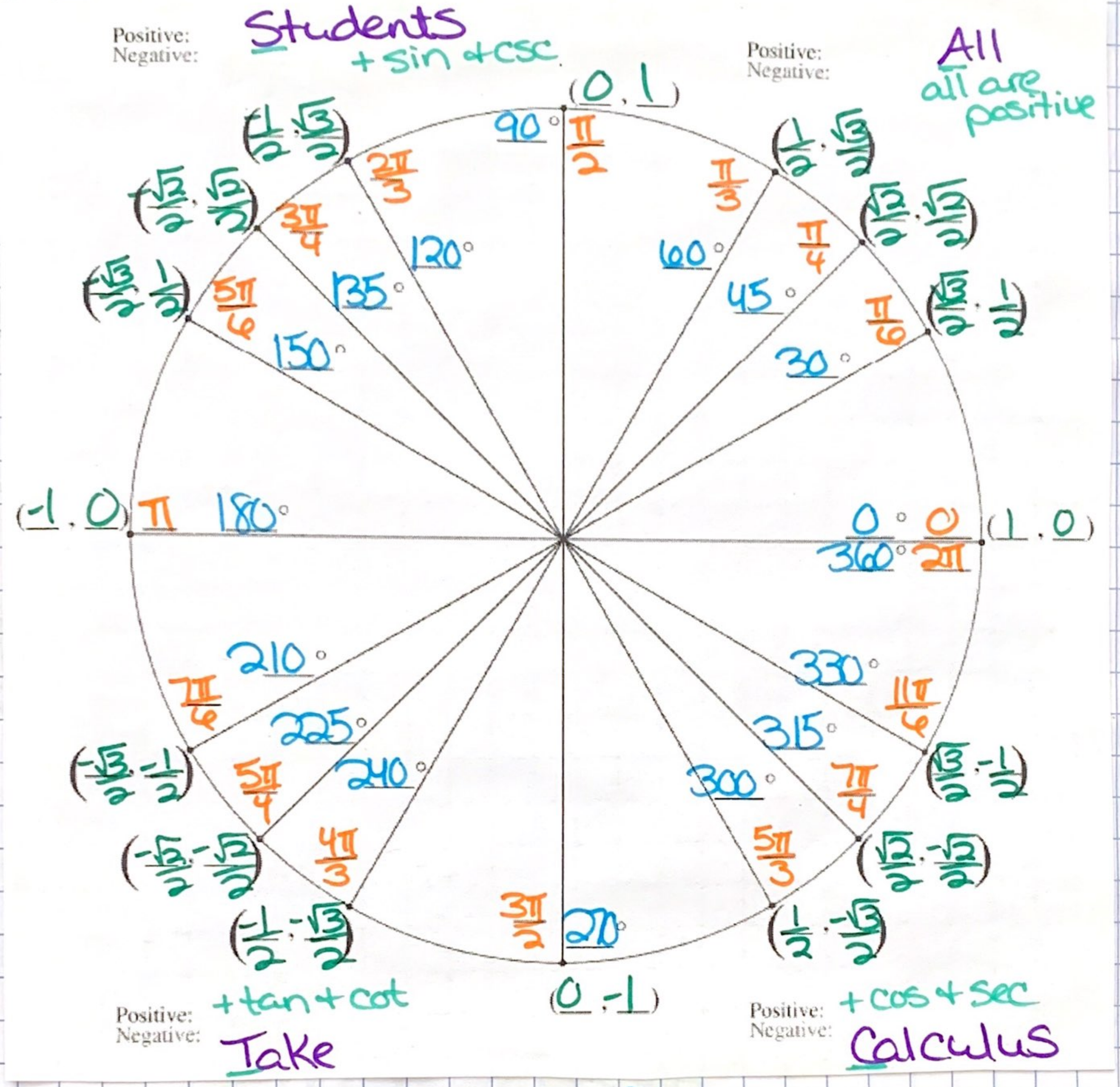
$4(x^2+3x-4) = 0$

$4(x+4)(x-1) = 0$

$x \neq -4$

$x = 1$

The Unit Circle



(cos, sin)

cos = x-coordinate

sin = y-coordinate

$\tan = \frac{\sin}{\cos}$ or $\frac{y}{x}$

$\cot = \frac{\cos}{\sin}$ or $\frac{x}{y}$

$\sec = \frac{1}{\cos}$ or $\frac{1}{x}$

$\csc = \frac{1}{\sin}$ or $\frac{1}{y}$

Find the exact values of the trig function:

1. $\cos\left(\frac{4\pi}{3}\right)$ cos sin $\left(-\frac{1}{2}, -\frac{\sqrt{3}}{2}\right) = -\frac{1}{2}$

2. $\tan(210°)$ $-\frac{\sqrt{3}}{3}$

$-\frac{1}{2} \div -\frac{\sqrt{3}}{2} = -\frac{1}{2} \cdot \frac{-2}{-\sqrt{3}}$

3. $\csc\left(\frac{11\pi}{6}\right)$ $\sin \frac{11\pi}{6} = -\frac{1}{2} = -2$

4. $\sec(270°)$ DNE

$\frac{1}{0}$

5. $\sin(-120°) = -\frac{\sqrt{3}}{2}$

$+360°$

$\sin 240°$

6. $\cot\left(\frac{17\pi}{6}\right) - \frac{12\pi}{6} = \frac{5\pi}{6}$

$-\frac{\sqrt{3}}{2} \div -\frac{1}{2} = -\frac{\sqrt{3}}{2} \cdot -\frac{2}{1} = \sqrt{3}$

Trigonometric Identities

Reciprocal Identities	Quotient Identities
$\cot\theta = \frac{1}{\tan\theta}$ $\csc\theta = \frac{1}{\sin\theta}$ $\sec\theta = \frac{1}{\cos\theta}$	$\tan\theta = \frac{\sin\theta}{\cos\theta}$ $\cot\theta = \frac{\cos\theta}{\sin\theta}$

Pythagorean Identities

$\sin^2\theta + \cos^2\theta = 1$

$\tan^2\theta + 1 = \sec^2\theta$

$1 + \cot^2\theta = \csc^2\theta$

Solve the trig equations.
Give answers in radians $(0 \le \theta < 2\pi)$

1. $2\cos\theta - 1 = 0$

$2\cos\theta = 1$ Inverse trig

$\cos\theta = 1/2$ Find an angle with $\cos = 1/2$

$\theta = \cos^{-1}(1/2)$

$\theta = \pi/3 + 5\pi/3$

2. $4\sin^2\theta = 3$

$\sqrt{\sin^2\theta} = \pm\sqrt{3/4}$

$\sin\theta = \pm\frac{\sqrt{3}}{2}$

$\theta = \frac{\pi}{3}, \frac{4\pi}{3}, \frac{5\pi}{3}, \frac{7\pi}{3}$

3. $2\sin^2\theta - \sin\theta = 3$

$2\sin^2\theta - \sin\theta - 3 = 0$

$(2\sin\theta - 3)(\sin\theta + 1) = 0$

$\sin\theta = 3/2$ $\sin\theta = -1$

$\theta = 3\pi/2$

4. $2\sin^2\theta = \cos\theta - 1$

use trig identities to have only 1 trig function

$\sin^2\theta + \cos^2\theta = 1$

$\sin^2\theta = 1 - \cos^2\theta$

$2(1 - \cos^2\theta) = \cos\theta - 1$

$2 - 2\cos^2\theta = \cos\theta - 1$

$0 = 2\cos^2\theta + \cos\theta - 3$

$0 = (2\cos\theta + 3)(\cos\theta - 1)$

$\cancel{\cos\theta = -3/2}$ $\cos\theta = 1$

$\theta = 0$

Inequalities

1. $x^2 + 4x + 7 < 28$

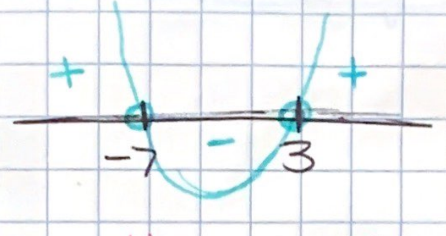
$x^2 + 4x - 21 < 0$

$(x+7)(x-3) < 0$

$x+7=0 \quad x-3=0$

$x=-7 \quad x=3$

$(-7, 3)$



+ quadratic sketch

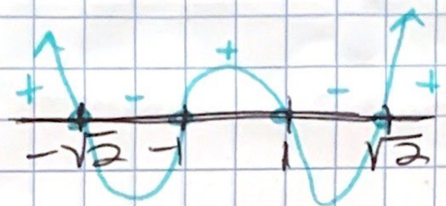
These are the zeros (x-int) of graph so plot on # line + test pts or sketch the graph

2. $x^4 - 3x^2 + 2 \geq 0$

$(x^2-2)(x^2-1) \geq 0$

$(x^2-2)(x+1)(x-1) \geq 0$

$x = \pm\sqrt{2}, -1, 1$ x-int.



use end behavior to sketch + even

$(-\infty, -\sqrt{2}] \cup [-1, 1] \cup [\sqrt{2}, \infty)$

3. $\sqrt{2x+5} \leq 3$

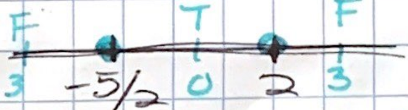
$2x+5 \geq 0$ consider domain restrictions

$x \geq -5/2$

$\sqrt{2x+5} \leq 3$ Solve for x-int.

$2x+5 \leq 9$

$x \leq 2$



Test pts or shade # line

$[-5/2, 2]$

4. $8^{2x+1} > 4^{8x}$

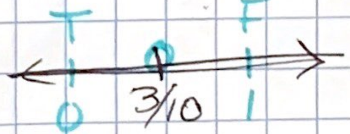
$(2^3)^{(2x+1)} > (2^2)^{8x}$ Solve for x. No domain restrictions

$3(2x+1) > 2(8x)$

$6x+3 > 16x$

$3 > 10x$

$3/10 > x$ or $x < 3/10$



$(-\infty, 3/10)$

5. $\frac{x^2-5x+6}{x+4} \leq 0$

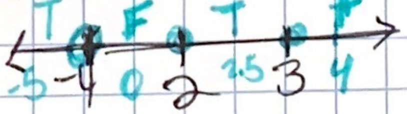
$x+4 \neq 0$ Find domain restriction

$x \neq -4$

$\frac{x^2-5x+6}{x+4} \times \frac{0}{1}$ Find x-intercepts

$0 = x^2-5x+6 \quad x=3$

$0 = (x-3)(x-2) \quad x=2$



$(-\infty, -4) \cup [2, 3]$