

# Prereq Review (AB Calculus)

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

$$\underline{2x^2 + 7x - 15}$$

2.  $(x^3-1)(x^3+1)$

$$\underline{x^6 - 1}$$

3.  $(2x+4)^2 = 4x^2 + 16x + 16$

4.  $(3xy^5)^4 = 81x^4y^{20}$

7.  $3x^{-2} = \frac{3}{x^2}$

10.  $\left(\frac{x^3}{y^4}\right)^{-5} = \frac{y^{20}}{x^{15}}$

5.  $(7xy^2)^0 = 1$

8.  $(3x^{-2})^3 = \frac{27}{x^6}$

$$\frac{y^{20}}{x^{15}}$$

6.  $x^{-3} = \frac{1}{x^3}$

9.  $(3x^2)^{-4} = \frac{1}{81x^8}$

11.  $\frac{8}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{8\sqrt{3}}{3}$

12.  $\frac{4x+2}{\sqrt{x-1}} \cdot \frac{\sqrt{x-1}}{\sqrt{x-1}} = \frac{(4x+2)\sqrt{x-1}}{x-1}$

13.  $\frac{2}{1-\sqrt{x}} \cdot \frac{1+\sqrt{x}}{1+\sqrt{x}} = \frac{2(1+\sqrt{x})}{1-x}$

14.  $x^{\frac{2}{3}}$

15.  $x^{\frac{8}{5}}$

16.  $\sqrt[5]{x^6}$

17.  $\sqrt[9]{x^4}$

$$B. 1. \frac{3x+6}{3} = \frac{3(x+2)}{3} = \underline{x+2} \quad 2. \frac{6x+3}{3x} = \frac{3(2x+1)}{3x} = \underline{\frac{2x+1}{x}}$$

$$3. \frac{(2 + \frac{1}{2})^{\frac{10}{1}}}{(1 + \frac{3}{5})^{\frac{10}{1}}} = \frac{20+5}{10+6} = \underline{\frac{25}{16}} \quad 4. \frac{(\frac{1}{x} + \frac{1}{3})^{\frac{6x}{1}}}{(1 + \frac{1}{6x})^{\frac{6x}{1}}} = \underline{\frac{6+2x}{6x+1}}$$

$$C. 1. \begin{array}{r} 2x^2 + 5 = 13 \\ -5 \quad -5 \\ \hline 2x^2 = 8 \\ x^2 = 4 \\ x = \pm 2 \end{array} \quad 2. \begin{array}{r} 5x + 2x + 8 = -6 \\ 7x = -14 \\ \frac{7x}{7} = \frac{-14}{7} \\ x = -2 \end{array} \quad 3. \begin{array}{r} 5x + 5 = 2x - 1 \\ 3x = -6 \\ \frac{3x}{3} = \frac{-6}{3} \\ x = -2 \end{array}$$

$$4. \begin{array}{r} 80 = 10(3t + 2) \\ 8 = 3t + 2 \\ \frac{6}{3} = \frac{3t}{3} \\ t = 2 \end{array} \quad 5. \begin{array}{r} 5[2 + 3x + 3] = 4 \\ 5[5 + 3x] = 4 \\ 25 + 15x = 4 \\ 15x = -21 \\ x = -\frac{7}{5} \end{array}$$

$$6. \begin{array}{r} SA = 4\pi r^2 \\ \frac{SA}{4\pi} = r^2 \\ r = \sqrt{\frac{SA}{4\pi}} \end{array} \quad 7. \begin{array}{r} V = h(\pi - r)^2 \\ \frac{V}{h} = (\pi - r)^2 \\ \sqrt{\frac{V}{h}} = \pi - r \\ r = \pi - \sqrt{\frac{V}{h}} \end{array} \quad 8.$$



D. 1.  $5x^3(x-4)$       2.  $-2x(x^2-3x+5)$       3.  $(x+5)(x+3)$

4.  $2(x^2+17x-110)$       5.  $(x+\frac{8}{12})(x+\frac{15}{12})$       6.  $(3x-2)(x+4)$   
 $2(x+22)(x-5)$        $(3x+2)(4x+5)$

7.  $(x+3)^2$       8.  $(x-5)(x+5)$       9.  $4(x-2)(x+2)$

E. 1.  $4x + \frac{3x+2}{3} = \frac{12x+3x+2}{3}$       2.  $\frac{4x+2}{3} \cdot \frac{2}{x+1} = \frac{8x^2+4x}{x+1}$   
 $= \frac{15x+2}{3}$

3.  $\frac{x+1}{x} \cdot \frac{x}{2(x+1)} = \frac{1}{2}$       4.  $\frac{x+3}{3x} \cdot \frac{2x}{x-1} = \frac{2x+6}{3x-3}$

5.  $\frac{3}{x-1} \frac{(x-2)}{(x-2)} + \frac{4}{x-2} \frac{(x-1)}{(x-1)}$       6.  $\frac{2x-1}{x} \frac{(x-2)}{(x-2)} - \frac{3x}{x-2} \cdot \frac{x}{x}$   
 $\frac{3x-6+4x-4}{(x-1)(x-2)}$        $\frac{2x^2-5x+2-3x^2}{x(x-2)}$   
 $\frac{10x-10}{(x-1)(x-2)}$        $\frac{-x^2-5x+2}{x(x-2)}$   
 $\frac{10(x-1)}{(x-1)(x-2)} = \frac{10}{x-2}$

$$1. \quad \underline{y - 4 = -\frac{2}{3}x}$$

$$2. \quad \underline{y - 3 = 2(x - 1)}$$

$$3. \quad \underline{m = \frac{6 - 5}{1 + 3} = \frac{1}{4}}$$

$$4. \quad \underline{m = -3}$$

$$\underline{y - 6 = \frac{1}{4}(x - 1)}$$

$$\underline{y + 5 = -3(x + 1)}$$

$$5. \quad \underline{m = -\frac{1}{2}}$$

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

$$6. \quad \underline{m = \frac{5}{2} \quad b = 1}$$

$$7. \quad y = \frac{-5}{4}x + 1$$

$$\underline{m = \frac{-5}{4} \quad b = 1}$$

$$8. \quad x + y = 3$$

$$9. \quad x + y = 5$$

$$\underline{5x - y = -27}$$

$$\underline{-(x + 3y = 11)}$$

$$6x = -24$$

$$-2y = -6$$

$$\underline{x = -4}$$

$$\underline{y = 3}$$

$$\underline{y = 7}$$

$$\underline{x = 2}$$



G 1.  $\frac{1}{5} \frac{P}{N}$   
 3.  $\frac{1}{5} \frac{N}{P}$   
 5.  $\frac{1}{5} \frac{P}{N}$

2.  $\frac{11}{P}$   
 4.  $\frac{P}{N}$   
 6.  $\frac{P}{M}$

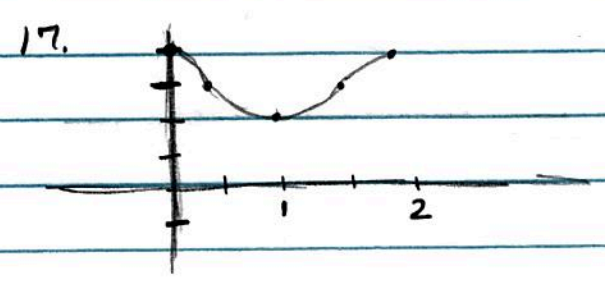
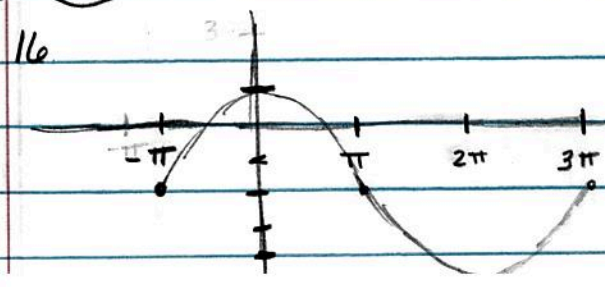
see below for # 7, 8

9.  $\frac{1}{2}$       10.  $-\frac{1}{2}$       11.  $-\frac{\sqrt{3}}{2}$       12.  $\frac{\sqrt{3}}{2}$

13.  $\frac{1}{2}$       14. 1      15.  $-\sqrt{3}$

7.  $\frac{\sin \theta \cdot 2 \sin \theta \cos \theta}{\cos \theta} = 2 \sin^2 \theta$   
 $2 \sin^2 \theta = 2 \sin^2 \theta \checkmark$

8.  $\frac{\sin \theta \cdot \sin \theta}{\cos \theta} + \cos \theta = \sec \theta$   
 $\frac{\sin^2 \theta}{\cos \theta} + \frac{\cos^2 \theta}{\cos \theta} =$   
 $\frac{1}{\cos \theta} = \sec \theta$   
 $\sec \theta = \sec \theta \checkmark$



H 1.  $x = \frac{\pi}{2}, \frac{3\pi}{2}$     2.  $x = \frac{\pi}{3}, \frac{2\pi}{3}$     3.  $x = \frac{3\pi}{2}$     4.  $x = \pi$

5.  $x = \frac{3\pi}{4}, \frac{7\pi}{4}$     6.  $\sin x (\sin x - 1) = 0$   
 $\sin x = 0, \sin x = 1$   
 $x = 0, \pi, \frac{\pi}{2}$

7.  $\cos^2 x = \frac{1}{2}$   
 $\cos x = \pm \frac{\sqrt{2}}{2}$   
 $x = \frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4}$

\* 8.  $x = .485$

\* 9.  $1.334$

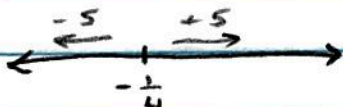
I. 1.  $y = (x-5)(x+2)$   
Roots: 5, -2

2.  $y = (x-1)^2$   
Root: 1

3.  $y = x^2 + 5x - 1$   
 $x = \frac{-5 \pm \sqrt{25 - 4(1)(-1)}}{2(1)}$   
Roots:  $\frac{-5 \pm \sqrt{29}}{2}$

4.  $y = -3x^2 + 2x + 10$   
 $x = \frac{-2 \pm \sqrt{4 - 4(-3)(10)}}{2(-3)}$   
 $x = \frac{-2 \pm \sqrt{124}}{-6}$   
 $x = \frac{-1 \pm \sqrt{31}}{-3}$

J. 1.  $\left| \frac{4x+1}{4} \right| = \frac{20}{4}$

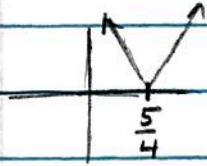
$\left| x + \frac{1}{4} \right| = 5$   
  
 $x = -5\frac{1}{4}, 4\frac{3}{4}$

2.  $|x^2 - 3| = 8$   
 $x^2 - 3 = 8$  or  $-8$   
 $x^2 = 11, \cancel{x}$   
 $x = \pm \sqrt{11}$

3.  $|-x-4| = 10$   
 $-x-4 = \pm 10$   
 $-x = 14, -6$   
 $x = -14, 6$

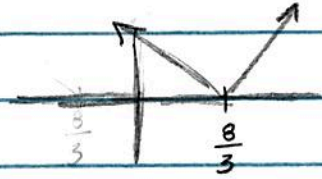


$$4. y = |4x - 5| = |4(x - \frac{5}{4})|$$



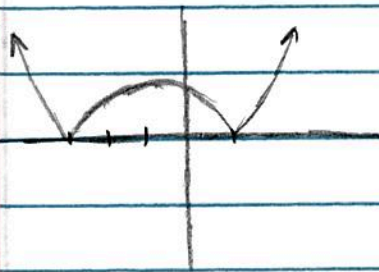
$$y = \begin{cases} -4(x - \frac{5}{4}), & x < \frac{5}{4} \\ 4(x - \frac{5}{4}), & x \geq \frac{5}{4} \end{cases}$$

$$5. y = |-3(x - \frac{8}{3})|$$

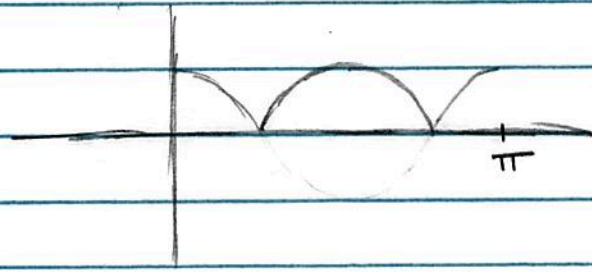


$$y = \begin{cases} -3(x - \frac{8}{3}), & x < \frac{8}{3} \\ 3(x - \frac{8}{3}), & x \geq \frac{8}{3} \end{cases}$$

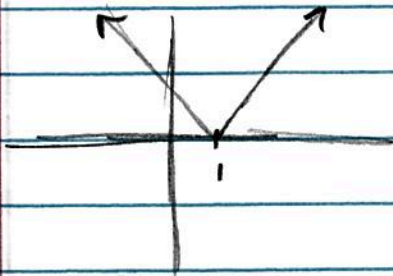
$$6. y = |(x+3)(x-1)|$$



$$7. y = |\cos(2x)| \quad [0, 2\pi]$$



$$8. y = |x - 1|$$



$$K.1 \quad \frac{3x-6}{x+4} = 0$$

$$x = 2$$

$$2. \quad \frac{(x+8)(x+1)}{x+1} = 0$$

$$x = -8$$

$$3. \quad \frac{x^2(2x+3)}{x(x-2)(x+2)} = 0$$

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

L. 1.  $\log_3 81 = x$

$$3^x = 81$$

$$x = 4$$

2.  $\log_x 25 = 2$

$$x^2 = 25$$

$$x = 5$$

(base can't be -)

3.  $\log x = 3$

$$x = 10^3$$

$$x = 1000$$

4.  $y = \log_3 x$

4.  $3^y = x$

$$y^{-1} = 3^x$$

5.  $\log 12 = \log(4 \cdot 3)$

$$= 2 \log 2 + \log 3$$

6.  $\log 18 = \log(2 \cdot 9)$

$$= \log 2 + 2 \log 3$$

7.  $\log(6.\bar{6}) = \log \frac{2}{3}$

$$= \log 2 - \log 3$$

8.  $e^{3x} = 19$

$$\ln 19 = 3x$$

$$x = \frac{\ln 19}{3}$$

9.  $\log(3x^2 - 2) = 1$

$$10^1 = 3x^2 - 2$$

$$3x^2 = 12$$

$$x^2 = 4$$

$$x = \pm 2$$

10.  $5^{(x-2)} = 5^3 \cdot 2$

$$\frac{5^{x-2}}{5^3} = 2$$

$$5^{x-5} = 2$$

$$\log_5 2 = x - 5$$

$$x = 5 + \log_5 2$$



M 1.  $[-2, \infty)$

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

3.  $(-\infty, -6) \cup (-6, 0) \cup (0, \infty)$



$x \neq 0, -6$

4.  $[0] \cup (1, \infty)$



5.  $3x - 6 > 0$

$x > +2$

$(2, \infty)$

6.  $(-\infty, \infty)$

polynomial

N. 1. HA:  $y = 0$   
VA:  $x = 0, x = 3$

2. 
$$\begin{array}{c|cc|c} -1 & 1 & 2 & 3 \\ \hline & \downarrow & -1 & -1 \\ \hline & 1 & 1 & 2 \end{array}$$

VA:  $x = -1$

SA:  $y = x + 1$

3.  $y = \frac{2x^2 + 4x + 9}{5x(x+2)}$

HA:  $y = \frac{2}{5}$

VA:  $x = 0, \frac{2}{5}$

4.  $y = \frac{(x+3)(x-1)}{x-1}$

No Asymptotes  
"hole" @ (1, 4)

5.  $y = \frac{(x+2)^2}{(x+2)(x-2)} = \frac{x+2}{x-2}$

HA =  $y = 1$

VA =  $x = 2$

"hole" @ (-2, 0)

Q. 1.  $x = 3y + 2$

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

2.  $x = \frac{1}{2}y - 6$

$$y^{-1} = 2(x+6)$$

3.  $x = y^2 + 5$

$$y^{-1} = \pm \sqrt{x-5}$$

4.  $y^{-1} = \sin^{-1} x$

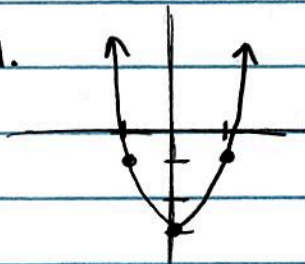
P. 1.  $\sin^{-1} \frac{1}{2} = \frac{\pi}{6}$

2.  $\tan^{-1}(-\sqrt{3}) = -\frac{\pi}{3}$

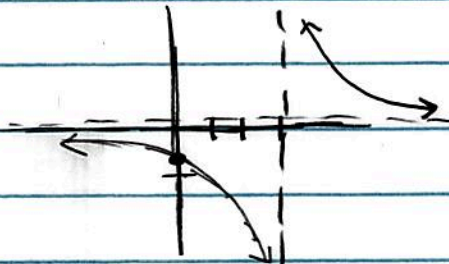
3.  $\sin^{-1} \frac{1}{2} = \frac{\pi}{6}$

4.  $\cos^{-1} \left(-\frac{\sqrt{3}}{2}\right) = \frac{5\pi}{6}$

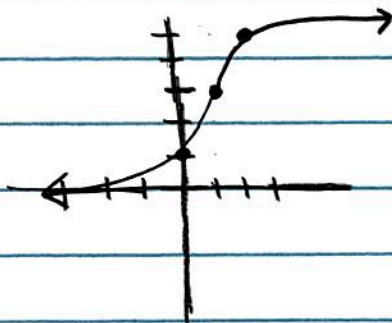
Q. 1.



2.



3.



4.

