

## Worksheet #2

09/12

1) Find the following limits

a)  $\lim_{x \rightarrow 3} \frac{x^2 - 5x + 6}{x^2 - 2x - 3}$

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

c)  $\lim_{x \rightarrow 2} \ln(3x - 1)$

d)  $\lim_{x \rightarrow +\infty} e^{\left(\frac{x^2 - x - 5}{2x^2 + 4}\right)}$

2) The floor function  $\lfloor x \rfloor$  is defined as the largest integer that is no greater than  $x$ . For example,  $\lfloor 5.13 \rfloor = 5$ ,  $\lfloor 28 \rfloor = 28$ ,  $\lfloor -3.2 \rfloor = -4$ 

Find:

a)  $\lim_{x \rightarrow 1^+} \lfloor x \rfloor$

b)  $\lim_{x \rightarrow 1^-} \lfloor x \rfloor$

c)  $\lim_{x \rightarrow \frac{1}{2}} \lfloor x \rfloor$

3) Use your favorite approximation of  $\pi$  to approximate  $\pi^2 + 1$ .

4) Find the following limits

a)  $\lim_{x \rightarrow +\infty} \frac{3x + 4}{\sqrt{x^2 - 2x + 3}}$

b)  $\lim_{x \rightarrow +\infty} \frac{1}{\sqrt{x+1} - \sqrt{x}}$  (Hint: rationalize)

c)  $\lim_{x \rightarrow +\infty} \sqrt{x^2 + 4x + 1} - x$  (Hint: solve (4.b) first)