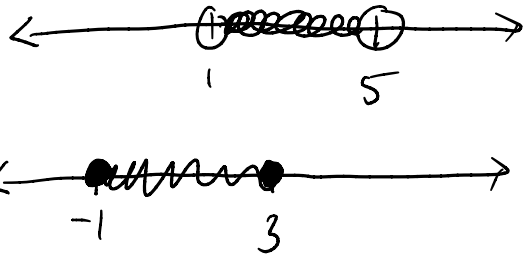
MATH 161: Pretest

Name: key

Directions: No calculators. Do everything by hand. Good luck!

Chapter 1

1. What is $(1,5) \cap [-1,3]$?



overlap is $(1,3]$

2. Simplify by applying laws of exponents: $\left(\frac{a^2}{b}\right)^3 \cdot \left(\frac{x^2}{y^3}\right)^{-2}$.

$= \frac{a^6}{b^3} \cdot \frac{x^{-4}}{y^{-6}} = \frac{a^6 y^6}{b^3 x^4}$

3. Expand $(a+b+c)(a+b)$.

$= (a+b+c)\cdot a + (a+b+c)\cdot b$

$= a^2 + ab + ac + ab + b^2 + bc = a^2 + b^2 + 2ab + ac + bc$

4. Factor $x^2 + 4x - 5$.

$1 \quad 5$
$1 \quad -1$

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

$3 \quad 2$
$2 \quad 5$

5. Factor $6x^2y + 19xy + 10y$.

$= y(6x^2 + 19x + 10) = y(3x+2)(2x+5)$

6. Simplify $\frac{1}{x+2} + \frac{2}{(x+1)^2}$.

find LCD

$\frac{(x+1)^2}{(x+1)^2} \cdot \frac{1}{x+2} + \frac{x+2}{x+2} \cdot \frac{2}{(x+1)^2} = \frac{x^2+2x+1}{(x+1)^2(x+2)} + \frac{2x+4}{(x+1)^2(x+2)} = \frac{x^2+4x+5}{(x+1)^2(x+2)}$

7. Can I cross out the x^2 in

$$\frac{x^2+1}{x^2+2}$$

to get $\frac{1}{2}$?

No! Can only cancel factors not terms

8. Solve $a(b+cx)+d=e$ for x.

$a(b+cx) = e-d$

$b+cx = \frac{e-d}{a}$

$cx = \frac{e-d}{a} - b$

$x = \frac{\frac{e-d}{a} - b}{c}$

or distribute first:

$ab+acx+d = e$

$acx = e-d-ab$

$x = \frac{e-d-ab}{ac}$

9. Solve $x^2+4x-5=0$ for x.

We have

$(x+5)(x-1)=0$ so

$x+5=0$ or $x-1=0 \Rightarrow x=-5$ or $x=1$

10. Multiply the complex numbers $(1+i)(2+i)$. Write your answer in the form $a+bi$ where a, b are both real numbers.

$(1+i)\cdot 2 + (1+i)\cdot i = 2+2i+i+i^2$

$= 2-1+3i$

$= 1+3i$

11. Suppose a, b are real numbers. Which of the following are true? Cite the reason why they are true or not.

* $(a+b)^2 = a^2 + b^2$ false, missing $+2ab$
* $(a \cdot b)^2 = a^2 \cdot b^2$ true, exponent law
* $(a-b)^2 = a^2 - b^2$ false, missing $-2ab$ and b^2 should be positive.

12. True or False: Suppose I have a function f. Is it possible for this function to satisfy $f(1) = 3$ and $f(1) = 2$ at the same time?

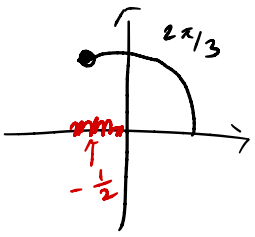
No; functions must send one input to only one output.

13. Find the domain of $\dfrac{1}{(x-1)(x-2)(x-3)(x-4)}$. (2.1)

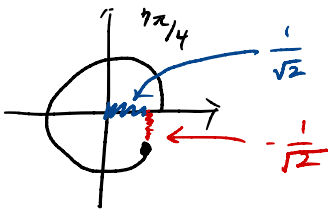
$(-\infty, 1) \cup (1, 2) \cup (2, 3) \cup (3, 4) \cup (4, \infty)$

14. Find the following:

(a) $\cos\left(\dfrac{2\pi}{3}\right) = -\dfrac{1}{2}$



(b) $\tan\left(\dfrac{7\pi}{4}\right) = -1$



(c) $\sin\left(\dfrac{2\pi}{3}\right) = \dfrac{\sqrt{3}}{2}$