Before Taking the Test...

September 19, 2007

1 "Reflection" about the origin

If this comes up on the test use the definition in the book. I don't know who is going to be grading these (hopefully not me) but they are probably misinformed about what a reflection is...

If asked to reflect about the origin use the map $(x, y) \mapsto (-x, -y)$.[1] That is, $y = f(x)$ goes to $-y = f(-x)$. The new equation can be rewritten as $y = -f(-x)$.

Example The equation

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

when "reflected about the origin" (which I still maintain is actually a rotation) gives the new equation

$$y = -((-x)^3 + (-x)^2) = x^3 - x^2.$$

2 Mysterious Floating Expressions

Always use equals signs '$=$'. They are going to be tougher about this one the test. Don't use free floating expressions.

Example If you are factoring the polynomial $x^3 - x$

BAD:

$$\begin{aligned} x^3 - x \\ x(x^2 - 1) \\ x(x - 1) \\ (x + 1) \end{aligned}$$

BAD:

$$\begin{aligned} x^3 - x &\implies x(x^2 - 1) \\ &\implies x(x - 1) \\ &\implies (x + 1). \end{aligned}$$

[1] The symbol '$\mapsto$' is read 'maps to'. So we read '$(x, y) \mapsto (-x, -y)$' as '(x, y) maps to $(-x, -y)$'.

Remember the symbol " $\Longrightarrow$ " means "implies".

GOOD:

$$\begin{aligned} x^3 - x &= x(x^2 - 1) \\ &= x(x - 1) \\ &= (x + 1) \end{aligned}$$

The reason they care about this is because free floating expressions mean nothing. You are not making a statement by just scribbling down expressions—without an equality it's just scratch work!

3 Show you are Taking a Limit

Always include limit signs in a series of equations when doing a computation involving limits.

Example When taking the limit of $f(x) = \frac{x^3}{x}$ as $x \to 2$:

BAD:

$$\lim_{x \to 2} \frac{x^3}{x} = x^2 = 4.$$

VERY BAD:

$$\frac{x^3}{x} = x^2 = 4.$$

GOOD:

$$\lim_{x \to 2} \frac{x^3}{x} = \lim_{x \to 2} x^2 = 4.$$