1. Every strictly increasing function has an inverse. T / F

passes Horizontal Line Test.

2. We know that $\cos x = x$ has a solution between $x = 0$ and $x = 1$. T / F

Intermediate Value Theorem! $\cos 0 = 1 > 0$

$\cos 1 < 1$.

3. If $g(7) = 0$ then the function $\frac{f(x)}{g(x)}$ has a vertical asymptote at $x = 7$. T / F

e.g. $\frac{(x+2)(x-7)}{x-7}$ has a hole at $x = 7$.

4. If $\lim_{x\to 4} f(x) = +\infty$ and $\lim_{x\to 4} g(x) = -\infty$, then $\lim_{x\to 4} f(x) + g(x) = 0$. T / F

e.g. $f(x) = \frac{1}{(x-4)^2}$, $g(x) = 3 - \frac{1}{(x-4)^2}$

5. $\lim_{x\to 0} \frac{\sin x}{x}$ does not exist. T / F

Limit $= 1$.

6. We can use the Sandwich Theorem to evaluate the limit $\lim_{x\to\infty} \frac{\sin x}{x}$. T / F

$-\frac{1}{x} \le \frac{1}{x}\sin x \le \frac{1}{x}$

$x \to \infty$ $\quad 0$

7. $\lim_{x\to 0} \sin(1/x) = 0$. T / F

DNE!

8. $\lim_{z\to 0} z^2 \sin(1/z) = 0$. T / F

Standard Sandwich Theorem.

9. The function $\dfrac{\sqrt{x^3+8}}{x^4-x^3+1}$ has no horizontal asymptotes. T / F

horiz. asymptote at $y=0$.

10. A polynomial can have a horizontal asymptote. T / F*

*Maybe we'd say that $f(x)=5$ has a HA at $y=5$, but that sort of misses the point.

11. A polynomial can have a vertical asymptote. T / F

A polynomial is defined & continuous at every x.

12. A rational function can have a horizontal asymptote. T / F

13. A rational function can have a vertical asymptote. T / F

14. We can find $\lim_{x\to 0}\dfrac{(-8+x)^2-64}{x}$ without doing any algebra. T / F

(derivative of $y=x^2$ evaluated at $x=-8$) $= 2(-8)$
$= -16$

15. If f is defined by $f(x)=\begin{cases}-x-3 & \text{if } x\le 0\\ x+4 & \text{if } x>0\end{cases}$, then $f(x)=0$ must have a solution because $f(-1)$ is negative and $f(1)$ is positive. T / F

Can't apply IVT bc. f discontinuous.

16. My home is ≈ 1.25 miles from Malott Hall (as the crow flies). At some point on my walk this morning, I was exactly 0.5 miles from home. T / F

IVT.