

Calculus 1

Name \_\_\_\_\_

Unit Worksheet (Evaluating Algebraically and Infinity Limits)



$$\lim_{x \rightarrow \infty} \frac{4x^3 - 6x^2 + 3}{5x^3 + 7x^2 - 9}$$

$\frac{4}{5}$

$$2. \lim_{x \rightarrow \infty} \left(\frac{1}{3}\right)^x$$

0

$$\frac{1}{3^\infty} = 1$$

$$3. \lim_{x \rightarrow \infty} \frac{\sqrt{x} + 3}{x - 4}$$

0

$$\lim_{x \rightarrow \infty} \frac{9x^4 + 7x^2 + 3x}{4x^5 + 3x - 12}$$

0

$$5. \lim_{x \rightarrow 0} \frac{x}{|x|}$$

DNE

$$6. \lim_{x \rightarrow 3^+} \frac{1}{x - 3}$$

$\infty$

$$\lim_{x \rightarrow \infty} \frac{3x^3 + 7x^2 + 5x}{7x^2 + 2x + 5}$$

$\infty$

$$8. \lim_{x \rightarrow \infty} \frac{(-1)^x}{x} = 0$$

$$\frac{-1}{1} \quad \frac{1}{2} \quad \frac{-1}{3} \quad \frac{1}{100}$$

$$9. \lim_{x \rightarrow 3} \frac{1}{x - 3}$$

DNE

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

$\frac{-2}{7}$

$$11. \lim_{x \rightarrow 4} \frac{|x - 4|}{x - 4}$$

DNE

$$12. \lim_{x \rightarrow \infty} \frac{3x}{\sqrt{x^2 + 2}}$$

$\frac{3}{1}$

$$\frac{-25}{-5} = 10$$

$$\frac{-4}{-2} = 4$$

$$\frac{-2x+1}{x+7} = 4$$

$$\frac{-5x+6}{x-3} = 1$$

$$\frac{+1}{+1} = 3$$

$$14. \lim_{x \rightarrow 8} 7 = 7$$

$$17. \lim_{x \rightarrow 2} \frac{x^2}{x-2} - \frac{4}{x-2} = 4$$
$$\frac{x^2-4}{x-2}$$

$$20. \lim_{x \rightarrow 3} \frac{x^2-2x}{x+1} = \frac{3}{4}$$

$$23. \lim_{x \rightarrow \infty} \frac{2^{-x}}{2^x} = 0$$
$$\frac{1}{2^x \cdot 2^x}$$

$$26. \lim_{x \rightarrow 5} x = 5$$

$$15. \lim_{x \rightarrow \infty} \frac{3x-2}{\sqrt{4x^2-1}}$$

$$18. \lim_{x \rightarrow -1} \frac{(x+6)(x+1)}{x^2+7x+6} = \frac{1}{-2}$$
$$\frac{(x+6)(x+1)}{(x+5)(x+1)}$$

$$21. \lim_{x \rightarrow \infty} \frac{x^2 + 2x^3 - 5}{x^2 + 2} = \frac{1}{2}$$

$$24. \lim_{x \rightarrow 0} \frac{\sqrt{x+1}-1}{x} = \frac{1}{2}$$

$$27. \lim_{x \rightarrow \infty} x = \infty$$

homework: Find the values of the requested limits.

$$\lim_{x \rightarrow 8} 7 = 7$$

$$2) \lim_{y \rightarrow 3} (12y) = 36$$

$$3) \lim_{y \rightarrow -1} (y^6 - 12y + 1) = 14$$

$$\lim_{x \rightarrow 4} \left( \frac{x^2 - 16}{x - 4} \right) = 8$$

$$5) \lim_{x \rightarrow -1} \left( \frac{x^2 + 6x + 5}{x^2 - 3x - 4} \right) = \frac{-4}{5}$$

$(x+5)(x+1)$   
 $(x-4)(x+1)$

$$6) \lim_{x \rightarrow \infty} \left( \frac{3x + 1}{2x - 5} \right) = \frac{3}{2}$$

$$\lim_{y \rightarrow -\infty} \left( \frac{3}{y + 4} \right) = 0$$

$$8) \lim_{x \rightarrow -\infty} \left( \frac{x - 2}{x^2 + 2x + 1} \right) = 0$$

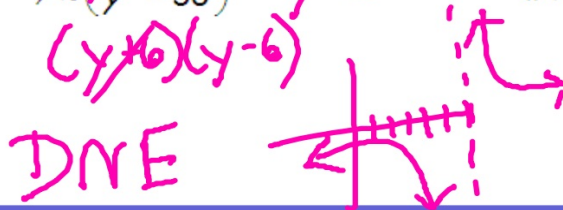
$$9) \lim_{x \rightarrow -\infty} \left( \frac{\sqrt{5x^2 - 2}}{x + 3} \right) = -\sqrt{5}$$

$$10) \lim_{x \rightarrow 3^-} \left( \frac{x}{x - 3} \right) = \infty$$

$$11) \lim_{y \rightarrow 6} \left( \frac{y + 6}{y^2 - 36} \right) = \frac{1}{y - 6}$$

$(y+6)(y-6)$

$$12) \lim_{x \rightarrow \infty} \left( \frac{7 - 6x^5}{x + 3} \right) = -\infty$$



$$\lim_{t \rightarrow \infty} \left( \frac{6 - t^3}{7t^3 + 3} \right) =$$

$$14) \lim_{x \rightarrow -\infty} (3 - x) =$$

$$15) \lim_{x \rightarrow \infty} (1 + 2x - 3x^5) =$$

$$\lim_{x \rightarrow -\infty} (2x + 5) =$$

$$17) \lim_{x \rightarrow \infty} \left( \frac{1}{x^2 - 4} \right) =$$

$$18) \lim_{x \rightarrow \infty} \left( \frac{x^2}{x + 2} \right) =$$

$$\lim_{x \rightarrow \infty} \left( \frac{3x^3 + 3}{x^2 - x + 2} \right) =$$

$$20) \lim_{x \rightarrow \infty} \left( \frac{4x - 7}{2x^3 - x^2 + 2} \right) =$$

$$21) \lim_{x \rightarrow \infty} \left( \frac{x^4}{4x^6 + 2x^2 - 4} \right) =$$

$$22) \lim_{x \rightarrow \infty} \left( \frac{3x^2 + 2}{5x^2 - x} \right) =$$

$$23) \lim_{x \rightarrow \infty} \left( \frac{2x^3 + 5x - 6}{6x^3 + x^2 + 5} \right) =$$

$$24) g(x) = \begin{cases} x^2 - 2 & x < 3 \\ 2x + 2 & 3 < x < 1 \\ \frac{1}{x - 5} & x \geq 1 \end{cases}$$

$$\lim_{x \rightarrow 3} g(x) =$$

$$\lim_{x \rightarrow 5} g(x) =$$

$$\lim_{x \rightarrow 1} g(x) =$$

$$\lim_{x \rightarrow 0} g(x) =$$