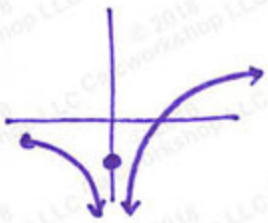
Key

Are you Ready for Calculus 2?

1. $\lim_{x\to\infty}\dfrac{3x^2-5x+7}{\sqrt{3+2x^3+13x^4}}$ $= \dfrac{3}{\sqrt{13}}$

2. $\lim_{x\to 0}\dfrac{\cos x+\sin 9x-1}{x}$ $= 9$

3. Given $f(x)=\begin{cases}\ln x & , \quad x>0\\ -4 & , \quad x=0\\ \dfrac{1}{x} & , \quad x<0\end{cases}$, find (a) $\lim_{x\to 0^-} f(x)$, (b) $\lim_{x\to 0^+} f(x)$, and (c) $\lim_{x\to 0} f(x)$



a) $\lim_{x\to 0^-}\left(\frac{1}{x}\right) = -\infty$

b) $\lim_{x\to 0^+}(\ln x) = -\infty$

c) $\lim_{x\to 0} f(x) = -\infty$

4. Write the equation of the tangent line for $y = \dfrac{x^2-7}{2x-3}$ at $x=-2$.

$y - \frac{3}{7} = \frac{34}{49}(x+2)$

5. Given $y = e^{x\cos x} + 3\ln\sqrt{x}$ find $\frac{dy}{dx}$

$\frac{dy}{dx} = e^{x\cos x}(\cos x - x\sin x) + \frac{3}{2x}$

6. Given $x^2 - 4xy = 2y + 2$, find $\frac{d^2y}{dx^2}$

$\frac{d^2y}{dx^2} = \frac{1-2x+8y}{(2x+1)^2}$

For #7-11, Solve

7. $\sec^2 x = \sec x + 2, 0 \le x < 2\pi$

$X = \frac{\pi}{3}, \frac{5\pi}{3}, \pi$

8. $\sin^2 x + \cos 2x = \cos x, 0 \le x < 2\pi$

$X = \frac{\pi}{2}, \frac{3\pi}{2}, 0$

9. $\log x + \log(x+3) = 1$

$X = 2$

10. $\sqrt{4r+13} = 2r - 1$

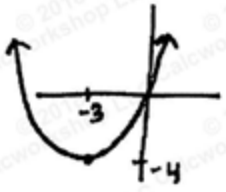
$Y = 3$

11. $\frac{2}{x+3} - \frac{5}{x-1} = \frac{1}{3-2x-x^2}$

$X = \frac{-16}{3}$

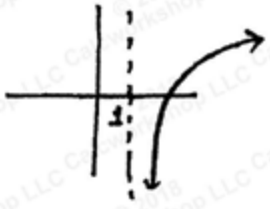
For #12- 16, sketch the graph and identify the domain and range

12. $f(x) = (x+3)^2 - 4$



D: $x \in (-\infty, \infty)$
R: $y \in [-4, \infty)$

13. $y = \ln(x-1)$

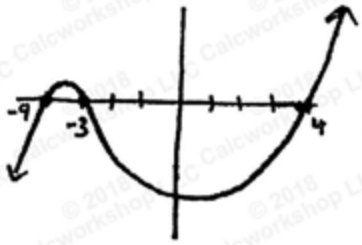


D: $x \in (1, \infty)$
R: $y \in (-\infty, \infty)$

14. $f(x) = \frac{x}{x-2}$

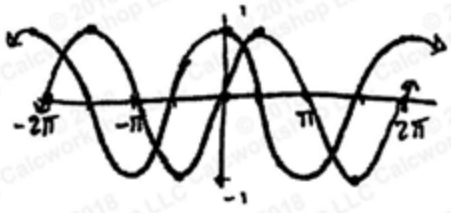
D: $x \in (-\infty, 2) \cup (2, \infty)$
R: $y \in (-\infty, 1) \cup (1, \infty)$

15. $f(x) = x^3 + 3x^2 - 16x - 48$



D: $x \in (-\infty, \infty)$
R: $y \in (-\infty, \infty)$

16. Graph both $f(x) = \sin x$ and $g(x) = \cos x$ on the same coordinate plane



D: $x \in (-\infty, \infty)$
R: $y \in [-1, 1]$

17. Determine the points of intersection(s) for $f(x) = 2x - x^2$ and $g(x) = 3x^3 - x^2 - 10x$

(0,0) (2,0) (-2,-8)

18. Write the first five terms of the sequence: $a_n = \frac{3^n}{n!}$

$\left\{3, \frac{9}{2}, \frac{9}{2}, \frac{27}{8}, \frac{81}{40}\right\}$

For #19-21, find the sum of the series:

19. $\sum_{k=0}^{3} \left(\frac{2}{3}\right)^k$ $= \frac{65}{27}$

20. $\sum_{n=1}^{4} \left(\frac{1}{n} - \frac{1}{n+1}\right)$ $= \frac{4}{5}$

20. $\sum_{n=0}^{\infty} 3\left(\frac{1}{4}\right)^n$ *given* $\sum_{n=0}^{\infty} a_1 r^n, |r| < 1$ *then* $S = \frac{a_1}{1-r}$

$S = 4$