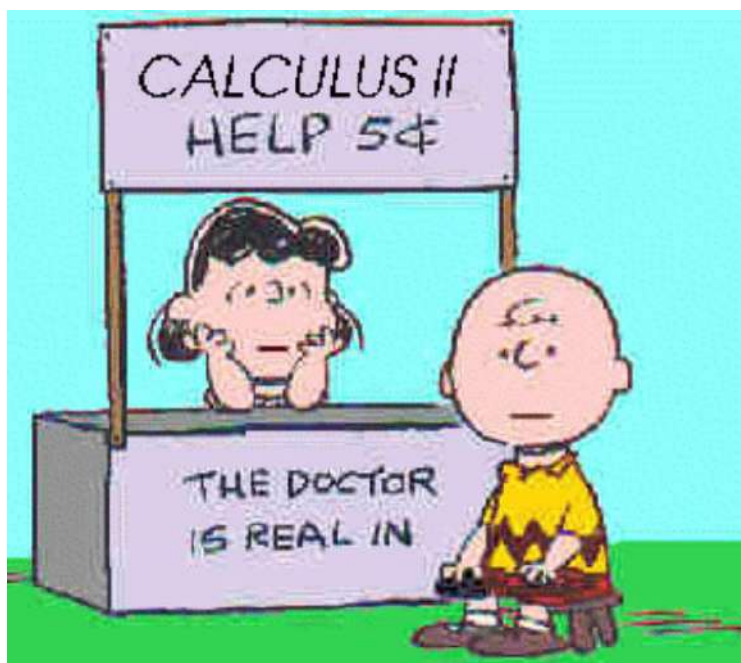


AP Calculus AB

Summer Assignment 2020

This is your summer assignment for AP Calculus AB that needs to be completed for the first day of school. We need to make sure that you are comfortable with the material in this packet so that you will be prepared to start Calculus. Please do out all problems on a separate piece of paper and show all work. Please do your work in pencil. This assignment will be collected the first day of school, so please have it fully completed. We will have about two days of review on this material and then you will be having your first test on the material reviewed in this packet. If you need ANY help with problems in this packet, please either email me: Johnson_wendy@mybps.us or you can message me through the Remind 101 app. Do not wait if you are having trouble. I can help you over the summer and we can get you squared away with the material. I look forward to having you as a student this coming school year. I hope you have a great rest of the summer!

Join our Remind Class: AP Calculus 20-21 code: @b8daec



Name: _____

Date: _____

AP Calculus Summer Work

Do out the following problems on a separate piece of paper and show all work.

Simplify the following rational expressions.

1.
$$\frac{3}{6x^2 - 4x} - \frac{x-2}{9x-6}$$

2.
$$\frac{8a}{2a^2 + 4a + 2} - \frac{3a-3}{a^2 - 1}$$

3.
$$\frac{w^2 - 3}{3w^3 + 81} - \frac{2}{6w + 18} - \frac{w-4}{w^2 - 3w + 9}$$

4.
$$\frac{\frac{x+4}{x+1} + \frac{4}{x}}{\frac{x+1}{x} - \frac{1}{x+1}}$$

Factor.

5.
$$9x^4 - 3x^{\frac{1}{2}} - 6x^{-\frac{3}{4}}$$

6.
$$(x^2 - 1)^{\frac{1}{4}} + (x^2 - 1)^{-\frac{1}{2}} - (x^2 - 1)^{-\frac{1}{3}}$$

7.
$$\frac{\sqrt{x-1} - \sqrt[3]{x-1} - 3\sqrt[4]{x-1}}{(x-1)^{\frac{2}{3}}}$$

8.
$$(2x-3)^3(x+1) + (x-3)(2x-3)^2$$

9.
$$x^3 + 27$$

10.
$$(3x-2)^{-4}(x+3) + (x+3)^2(3x-2)^{-3}$$

Rationalize the numerator.

Example:

$$\frac{\sqrt{x+4}-2}{x} = \frac{\sqrt{x+4}-2}{x} \cdot \frac{\sqrt{x+4}+2}{\sqrt{x+4}+2} = \frac{x+4-4}{x(\sqrt{x+4}+2)} = \frac{x}{x(\sqrt{x+4}+2)} = \frac{1}{\sqrt{x+4}+2}$$

11. $\frac{\sqrt{x-3}+1}{x}$

12. $\frac{4-\sqrt{2x+1}}{x}$

Rationalize the denominator.

13. $\frac{4x}{1-\sqrt{x+1}}$

14. $\frac{\sqrt{x-2}}{\sqrt{x-2}+3}$

Use long division to divide.

15. $\frac{x^3+x^2+2x}{x^3-1}$

16. $\frac{x^2-3x+2}{x+1}$

Simplifying Functions Examples

Find $f(x+h)$ if $f(x) = x^2 + 4x$

Substitute in $(x+h)$ for the x 's

$$=(x+h)^2 + 4(x+h)$$

Now simplify:

$$\begin{aligned} &= (x+h)(x+h) + 4(x+h) \\ &= x^2 + xh + xh + h^2 + 4x + 4h \\ &= x^2 + 2xh + h^2 + 4x + 4h \end{aligned}$$

:Find $\frac{f(x+h)-f(x)}{h}$ if $f(x) = x^2 + 4x$

Substitute in $(x+h)$ for the x 's

$$=\frac{(x+h)^2 + 4(x+h) - (x^2 + 4x)}{h}$$

Now simplify:

$$\begin{aligned} &= \frac{(x+h)(x+h) + 4(x+h) - x^2 - 4x}{h} \\ &= \frac{x^2 + xh + xh + h^2 + 4x + 4h - x^2 - 4x}{h} \\ &= \frac{2xh + h^2 + 4h}{h} \end{aligned}$$

Factor out the h and simplify:

$$= \frac{h(2x + h + 4)}{h} = 2x + h + 4$$

17. Find $f(x+h)$ if $f(x) = x^2 - 2x - 3$

18. Find $\frac{f(x+h) - f(x)}{h}$ if $f(x) = 8x^2 + 1$

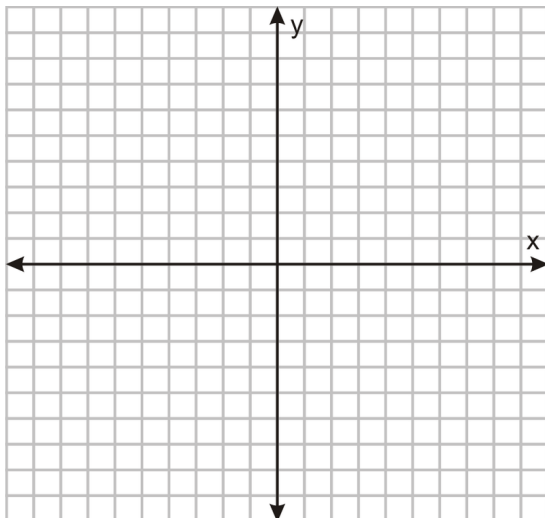
19. Find $\frac{f(x+h) - f(x)}{h}$ if $f(x) = \frac{1}{x}$

Simplify:

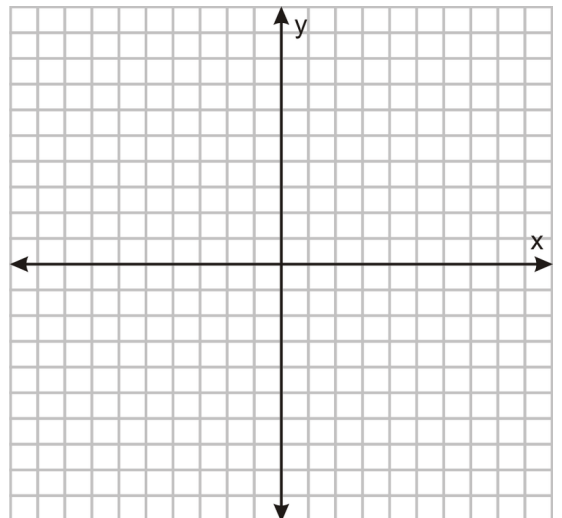
20.
$$\frac{\sqrt{x^2 + 1} - \frac{1}{\sqrt{x^2 + 1}}}{x^2 + 1}$$

Graph the following equations.

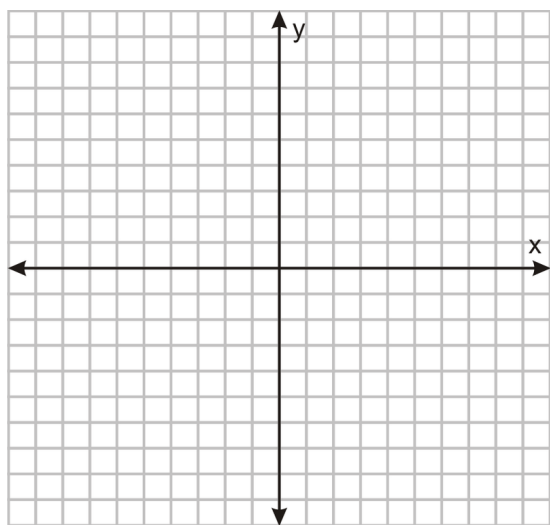
21. $y = (x - 4)^2 - 2$



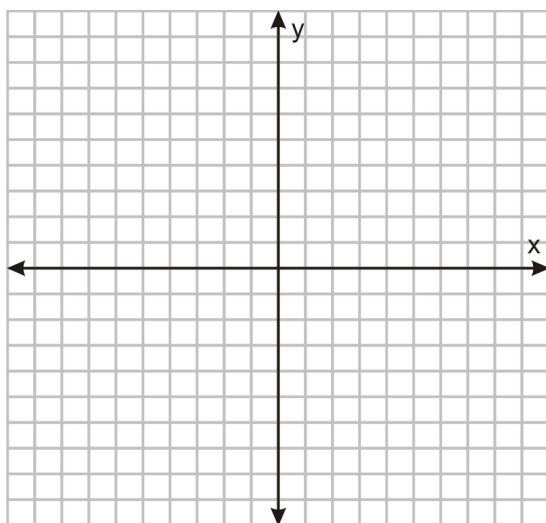
22. $y = -(x+2)^3 + 3$



23. $f(x) = 2\sqrt{x-3} + 4$



24. $y = \frac{x-3}{2x^2+5x+2}$



Solve the following equations.

25. $x^{\frac{4}{3}} = 81$

26. $x^2 + x - 1 = 0$

27. $\sqrt{x} = \sqrt[3]{x}$

28. $(x-3)^2 + 9 = 25$

28. $3x^2 - 6x - 24 = 0$

29. $\frac{2x-1}{(x+2)(x^2+3)} = 0$

30. $x^3 - 2x^2 - 5x + 6 = 0$

31. $\frac{x}{x+2} - \frac{2}{2x-1} = \frac{1}{5}$

32. $(2x-1)^2(x-5)^2 + (2x-1)^3(x-5) = 0$

Trigonometry

a. $\tan\left(\frac{\pi}{6}\right) = \underline{\hspace{2cm}}$ b. $\arcsin\left(\frac{\sqrt{3}}{2}\right) = \underline{\hspace{2cm}}$ c. $\csc\left(\frac{\pi}{4}\right) = \underline{\hspace{2cm}}$

Complete each of the following using trigonometric identities and formulas.

35. $\sin^2 x + \cos^2 x = \underline{\hspace{2cm}}$ 36. $1 + \cot^2 x = \underline{\hspace{2cm}}$ 37. $1 + \tan^2 x = \underline{\hspace{2cm}}$

Solve each trigonometric equation for $0 \leq x \leq 2\pi$.

38. $\sin x = \frac{\sqrt{3}}{2}$ $\underline{\hspace{2cm}}$ 39. $\tan^2 x = 1$ $\underline{\hspace{2cm}}$

40. $\cos \frac{x}{2} = \frac{\sqrt{2}}{2}$ $\underline{\hspace{2cm}}$ 41. $2\sin^2 x + \sin x - 1 = 0$ $\underline{\hspace{2cm}}$

Solve each exponential or logarithmic equation.

42. $5^x = 125$ $\underline{\hspace{2cm}}$ 43. $8^{x+1} = 16^x$ $\underline{\hspace{2cm}}$ 44. $81^{\frac{3}{4}} = x$ $\underline{\hspace{2cm}}$

45. $8^{\frac{-2}{3}} = x$ $\underline{\hspace{2cm}}$ 46. $\log_2 32 = x$ $\underline{\hspace{2cm}}$ 47. $\log_x \frac{1}{9} = -2$ $\underline{\hspace{2cm}}$

48. $\log_4 x = 3$ $\underline{\hspace{2cm}}$ 49. $\log_3(x + 7) = \log_3(2x - 1)$ $\underline{\hspace{2cm}}$

Expand each of the following using the laws of logs.

50. $\log_3 5x^2$ _____

51. $\ln \frac{5x}{y^2}$ _____