

Dear Future AP Calculus Student,

I look forward to having you in my class next year. We are going to learn a lot of really cool math concepts. It is a great adventure that will be difficult, but worth it. If you pass the AP Exam, you will receive a college credit for this course.

So that you are prepared for AP Calculus, you need to complete the attached summer packet. Please complete each problem on the summer packet, in order, on your own paper and staple this packet to the front. **I will be collecting this packet on the fourth day of school and grading it.**

Things to know about the summer packet:

- You will need to invest a few hours on this assignment. Prepare accordingly.
- You are welcome to use any printed resource at your disposal (old notes, textbooks, internet sites, etc.).
- I encourage you to work with other future AP Calculus students on these problems.

See you soon!

Ms. Turner

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Name _____

AP CALCULUS SUMMER SKILL REVIEW

1. Write the equations of each line in point-slope form:

(a) the line through $(-1, 3)$ and $(2, -4)$

(b) the line through $(-1, 2)$ and parallel to the line $2x - 3y + 5 = 0$

2. Simplify: (a) $\frac{x^2 - 2x - 8}{x^3 + x^2 - 2x}$ (b) $\frac{9 - x^{-2}}{3 + x^{-1}}$

3. Simplify each expression with positive exponents:

(a) $\frac{a - ab}{b^2 - b}$ (b) $\frac{a\left(\frac{2}{b}\right)}{\frac{3}{a}}$ (c) $\frac{\frac{1}{x+h} - \frac{1}{x}}{h}$ (d) $\frac{1}{x} + 1$, (as a single fraction)

4. Solve algebraically for x (do not use a calculator):

(a) $5^{x+1} = 25$

(b) $\frac{1}{3} = 3^{2x+2}$

(c) $\log_2 x = 3$

(d) $\log_3 x^2 = 2\log_3 4 - 4\log_3 5$; $x > 0$

(e) $\ln(x+1) = 7$

(f) $10e^{2x} = 90$

5. Write the expression as a single log: $2\ln\sqrt{x} + 3\ln x^{\frac{1}{3}} - \ln(x+4)$

6. Evaluate: (a) $2\ln\frac{1}{e^3}$

(b) $\log_8 4$

(c) $\log_b 1$

(d) $\log_{10}(10^{3x})$

(e) $3^{2\log_3 5}$

7. Write the following in the form x^n :

(a) $\sqrt[3]{x}$

(b) $\frac{1}{x}$

(c) $\frac{1}{\sqrt{x}}$

(d) $\frac{\sqrt[3]{x}}{x}$

8. Rewrite $\sqrt{4x^2 - 36}$ in the form $k\sqrt{x^2 - a^2}$.

9. Rewrite $\frac{x^2 - 3x + 2}{\sqrt{x}}$ as a sum using fractional exponents.

10. Without a calculator, evaluate the exponential expression $(x^3 + 17)^{\frac{-3}{4}}$ when $x = 4$.

11. Solve the following equations for the indicated variables:

(a) $A = P + nrP$, for P

(b) $xy' + y = 1 + y'$, for y'

12. Find all real solutions: $x^6 - 16x^4 = 0$

13. Solve for x , giving radian form for $0 \leq x \leq 2\pi$:

(a) $\sin(x) = \frac{\sqrt{3}}{2}$

(b) $\cos x = -\frac{1}{2}$

(c) $4\cos^2 x = 3$

14. Without using a calculator, evaluate the following:

(a) $\cos \frac{\pi}{6}$

(b) $\sin \frac{5\pi}{4}$

(c) $\tan^{-1}(-1)$

(d) $\sin^{-1}(-1)$

(e) $\cos \frac{5\pi}{3}$

(f) $\sin^{-1} \frac{\sqrt{3}}{2}$

(g) $\tan \frac{7\pi}{6}$

15. Solve the equations: (a) $4x^2 + 12x + 3 = 0$

(b) $2x + 1 = \frac{5}{x + 2}$

16. Solve: $|5x - 2| = 8$

17. Determine the domain and range of each function, sketching first:

(a) $r(x) = \sqrt{4-x^2}$

(b) $y = 5e^x$

(c) $g(x) = \ln(x-3)$

18. Let $f(x) = |x-5|$. (a) Write a piecewise defined rule for $f(x)$.

(b) Find the domain and range of $f(x)$.

19. Simplify $\frac{f(x+h)-f(x)}{h}$, where: (a) $f(x) = 2x+3$ (b) $f(x) = \frac{2}{x}$ (c)
 $f(x) = x^2$

Use a separate sheet of **graph** paper for #20. For each part:

(i) name the transformation(s), For example, horizontal translation of 7 units left, or vertical scale change of factor 3.

(ii) on separate axes for each part, sketch the parent function and the image. Use a window of $-6 \leq x \leq 6$ by $-4 \leq y \leq 4$

(iii) list the domain and range.

(You may find it helpful to sketch the parent function with colored pencils on the axes where you draw each transformation. You can check your sketches on the graphing calculator.)

20. Parent Function: $f(x) = \sqrt{x}$

a) $f(x)-2$

b) $f(-x)$

c) $f(x+2)$

d) $-f(x)$

e) $|f(x)-3|$