

ARE YOU READY FOR AP CALCULUS BC?

SCHS EDITION - MR. RIZZI (CRIZZI@ROCHESTER.K12.MI.US)

Skill #1 – Writing Equations of Lines

1. Write equations for the following lines in point slope form:

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

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

(c) the line through $(2, 3)$ and parallel to $y = \frac{1}{2}x - 5$

Skill #2 – Graphing Solutions on a Number Line

2. Graph the solutions to the following inequalities on a number line.

(a) $2x + 3 > 8x - 21$

(b) $x^2 + 7x - 30 \geq 0$

(c) $x^2 - 8x \leq -12$

Skill #3 – Factoring and Solving Quadratic and Polynomial Equations

3. Factor completely to find all real solutions:

(a) $x^2 + 2x - 3 = 0$

(b) $x^2 + 11x + 24 = 0$

(c) $4x^2 + 12x + 3 = 0$

(d) $x^6 - 16x^4 = 0$

(e) $4x^3 - 8x^2 - 25x + 50 = 0$

(f) $8x^3 + 27 = 0$

Skill #4 – Evaluating Trigonometric Functions

4. Without using a calculator, evaluate the following in RADIANS.

(a) $\cos\left(\frac{7\pi}{6}\right)$

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

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

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

(e) $\cos\left(\frac{9\pi}{4}\right)$

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

(g) $\tan\left(\frac{5\pi}{6}\right)$

(h) $\cos^{-1}\left(-\frac{\sqrt{2}}{2}\right)$

Skill #5 – Using a Graphing Calculator to Solve Equations

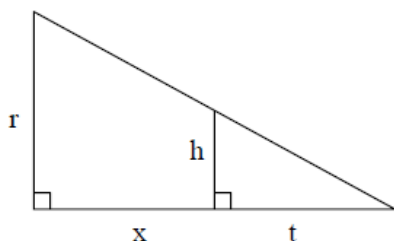
5. Some equations cannot be solved by hand. Please use the graphing features of your graphing calculator (**in radians**) to solve the following equations. **Give all answers correct to three decimal places.** (*Hint: you will need to use 2nd → CALC → Intersect or Zero to do these.*)

(a) $5x^3 - 3x^2 - 2x + 1 = 0$ (b) $e^{2-x^2} = 0.5x^2$ (c) $\sin(2x + 1) = 4x^2$ on $[-2, 2]$

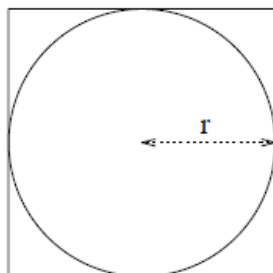
6. Find the point of intersection of the lines $3x - y - 7 = 0$ and $x + 5y + 3 = 0$

Skill #6 – Setting Up and Solving Story Problems

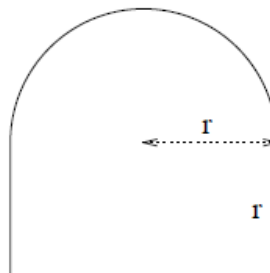
7. Express x in terms of the other variables in the picture:



8. Find the ratio of the area inside the square but outside the circle to the area of the square in the picture (a) below.



(a)



(b)

9. Find a formula for the perimeter of a window of the shape in the picture (b) above.

10. A water tank has the shape of a cone (like an ice cream cone without ice cream). The tank is 10m high and has a radius of 3m at the top. If the water is 5m deep (in the middle), what is the surface area of the top of the water?
11. Two cars start moving from the same point. One travels south at 100km/hour, the other west at 50 km/hour. How far apart are they two hours later?
12. A kite is 100m above the ground. If there are 200m of string out, what is the angle between the string and the ground?

For #13-15, use a graphing calculator to solve. Give all answers correct to three decimal places.

13. The number of students in a school infected with the flu t days after exposure is modeled by the function $P(t) = \frac{300}{1+e^{4-t}}$.

(a) How many students were infected after three days?

(b) When will 100 students be infected?

14. Exponential growth is modeled by the function $A = Pe^{kt}$. A culture contains 500 bacteria when $t = 0$. After an hour, the number of bacteria is 1200.

(a) How many bacteria are there after four hours?

(b) After how many hours will there be 8000 bacteria?

15. A rancher has 200 feet of fencing with which to enclose two adjacent rectangular corrals, as shown. What dimensions should be used so that the enclosed area will be a maximum?



Skill #7 – Using the Difference Quotient

16. For the following, simplify $\lim_{h \rightarrow 0} \frac{f(x+h)-f(x)}{h}$. Show all work.

(a) $f(x) = 2x + 3$

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

(c) $f(x) = x^2 + x$

Skill #8 – Applying the Power, Product, and Quotient Rules

17. Find the derivative of the following functions using either the power, product, or quotient rule:

(a) $y = 4x^3 + \frac{1}{4}x^2 - 5x + 1$

(b) $f(x) = (2x^2 + 1)(3x + 4)$

(c) $f(x) = x^{3/2} + 4x^{-1/4}$

(d) $f(x) = \frac{3x+4}{2x^2+5x+1}$

18. What is the slope of the line tangent to $y = 3x^2 - 2x + 1$ when $x = 2$?

19. Find the x value(s) where the curve has a horizontal tangent line: $f(x) = \frac{1}{3}x^3 - x^2 - 15x + 4$

Skill #9 – Limits Review

Please view the series of videos in the section entitled "Limits" in [Differential Calculus](#) on Khan Academy. To gain access to this list of videos, sign up as part of my class on the Khan Academy website. You will receive a grade on the first day of class for watching **ALL of the Limit videos and completing the practice questions and quizzes up through Quiz #3**.

In order to sign up for my class on Khan Academy, please read the following directions:

1. Create a free account at khanacademy.org (or log in with your existing accounts)
2. Visit khanacademy.org/coaches
3. In the "Add a coach" field, enter the class code **DCWB8EAB**
4. Complete the videos and practice problems at <https://www.khanacademy.org/math/ap-calculus-bc/bc-limits-continuity>