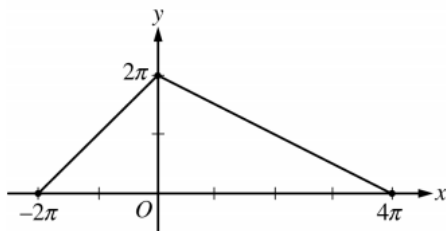


Please answer every question (you may need to do some work on a separate paper). We will correct/grade this assignment the first day of class. Some of these questions are easy, some are challenging. Email me at svogel@ktufsd.org if you run into a major stumbling block. Remember that we start at a disadvantage – much of the country starts school before we do, so we have less time to master material before the AP exam. I would like to get as many issues as possible cleared up before school starts.

Section I - No Calculator

- Solve the following equation for z : $\cos(xy)(xz + y) = 1$
 - $\frac{1}{\cos(xy)}$
 - $\frac{1}{x \cos(xy)}$
 - $\frac{1 - \cos(xy)}{\cos(xy)}$
 - $\frac{1 - y \cos(xy)}{x \cos(xy)}$
 - $\frac{y(1 - \cos(xy))}{x}$
- At which x -value(s) does the function $y = x^2(x - 3)(x - 6)$ **cross** the x -axis?
 - 0 only
 - 3 only
 - 0 and 6 only
 - 3 and 6 only
 - 0, 3, and 6
- Consider $L(x)$, which is a linear function with a slope of 4, and $L(2) = 1$. What is $L(1.9)$?
- Find all intervals on which the function $f(x) = \frac{2x - 12}{x^4}$ is negative.

5. The graph of $g(x)$ is shown below, and $h(x) = 3 \cdot g(3x)$. Evaluate $h\left(-\frac{\pi}{3}\right)$.



Graph of g

6. The function $c(x) = 4e^x + 2xe^x$ is positive when
(A) $x < -2$ (B) $x > -2$ (C) $x < -1$ (D) $x > -1$ (E) $x < 0$

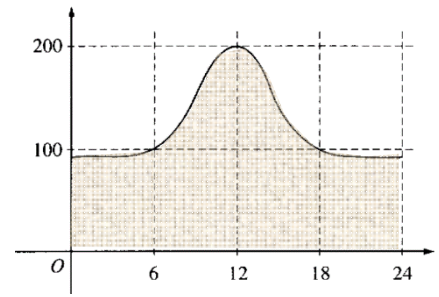
7. The expression $2x \sin(2x) + x^2 \cos(2x) \cdot 2$ simplifies to
(A) $2x \cos 2x$
(B) $4x \cos 2x$
(C) $2x(\sin 2x + \cos 2x)$
(D) $2x(\sin 2x - x \cos 2x)$
(E) $2x(\sin 2x + x \cos 2x)$

8. Solve for all values of t : $6t^2 - 42t + 72 = 0$

9. Solve for z when $x = 3$ and $y = 2$: $6yz - 4x = -2y + -2xz$

10. Which of the following values best estimates the area of the shaded region shown in the graph to the right?

- (A) 500 (B) 600 (C) 2,400 (D) 3,000 (E) 4,800

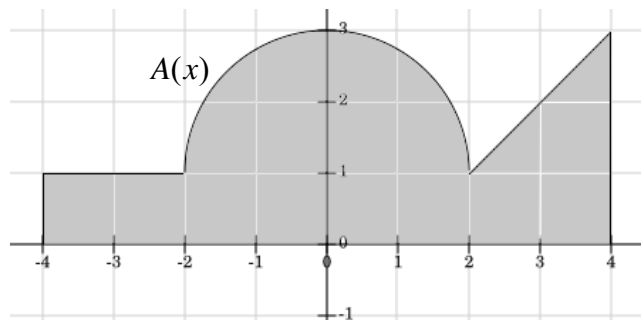


11. The expression $x \cdot \frac{1}{2}(2x-3)^{-\frac{1}{2}} \cdot 2 + \sqrt{2x-3}$ simplifies to

- (A) $\frac{3x-3}{\sqrt{2x-3}}$
 (B) $\frac{x}{\sqrt{2x-3}}$
 (C) $\frac{1}{\sqrt{2x-3}}$
 (D) $\frac{-x+3}{\sqrt{2x-3}}$
 (E) $\frac{5x-6}{2\sqrt{2x-3}}$

12. Solve for y : $\ln(y-1) = \frac{x^{-1}}{-1} + \frac{1}{2}$

13. $A(x)$ consists of line segments and a semi-circle, as shown in the graph to the right. Find, in terms of π , the shaded area enclosed by $A(x)$ and the x -axis.



14. Solve the following system of equations for all point(s) (x, y) :

$$\frac{y}{2y - x} = \frac{1}{2}$$
$$y^2 = 2 + xy.$$

Section II – Calculator Available. *Unless otherwise stated, decimal answers should be accurate to at least three places.*

15. A water tank at Camp Newton holds 1200 gallons of water at time $t = 0$. During the time interval $0 \leq t \leq 18$ hours, water is pumped into the tank at the rate

$$W(t) = 95\sqrt{t} \sin^2\left(\frac{t}{6}\right) \text{ gallons per hour.}$$

During the same time interval, water is removed from the tank at the rate

$$R(t) = 275 \sin^2\left(\frac{t}{3}\right) \text{ gallons per hour.}$$

Is the amount of water in the tank increasing at time $t = 15$? Why or why not?

16. How many relative extremes* does the function $y = x^2 \cos(x^2)$ have on the open interval $(-2, 2)$? Be sure to use **radian mode!**

* relative extremes = local extremes = local minimum or local maximum (mountain tops, valley bottoms)

17. Find the x -coordinates for all points of intersection of the graphs of $y = x^3 - 8x^2 + 18x - 5$ and $y = x + 5$

18. During which interval(s) is the function $v(t) = \ln(t^2 - 3t + 3)$ negative?

19. The function $f(x)$ is *increasing* at a *decreasing rate*. Which of the following could be a table of values for f ?

(A)

x	$f(x)$
2	7
3	9
4	12
5	16

(B)

x	$f(x)$
2	7
3	11
4	14
5	16

(C)

x	$f(x)$
2	16
3	12
4	9
5	7

(D)

x	$f(x)$
2	16
3	14
4	11
5	7

(E)

x	$f(x)$
2	16
3	13
4	10
5	7