Summer Packet
ACP Calculus

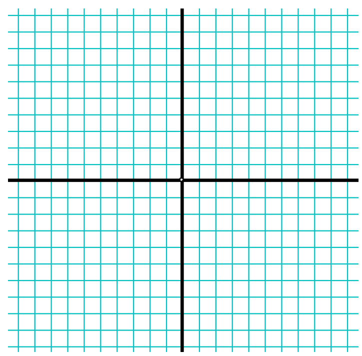
Calculus is a demanding course that relies heavily upon a student's algebra, geometry, trigonometry, and pre-calculus skills. You are expected to know these topics before entering Intro to Calculus. You should be able to do 95% of this packet without a calculator!

<u>DUE:</u> 1st day of school

We will briefly review this in class and you will be assessed on the contents of the packet before starting the new material. The packet will be collected and graded.

1. Find slope of the line containing the points $(5,4)$ and $(1,7)$.

2. Graph the line 4x – y = 8



3. Determine if the following pair of lines are parallel, perpendicular, or neither.
$$7x-4y=3$$
$$8y-14x=2$$

4. Find an equation in Standard Form of the line with x – intercept 5 and y-intercept 3.

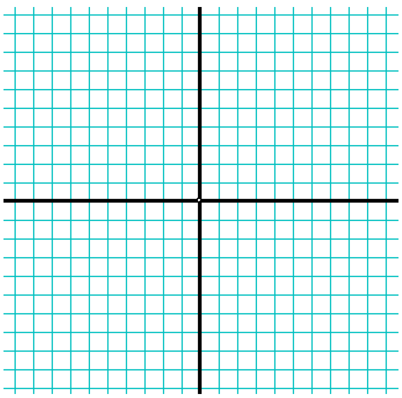
5. Find an equation in Slope-Intercept Form of the line that goes through (8, 3) and (2, -1).

6. Find an equation in Slope-Intercept Form of the line through (1, -4) that is perpendicular to the line 2x – y = 4.

7. Use substitution to find all points of intersection of the graphs of $x - y = 2$ and $6x - 5y = 16$.

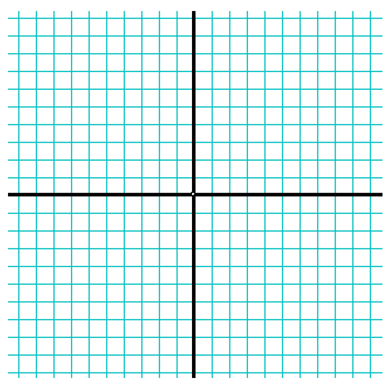
8. Use elimination to find all points of intersection of the graphs of $3x + 2y = 10$ and $2x + 5y = 3$.

9. Find all points of intersection of the system of $2x - y = -2$ and $4x - y = -6$ by graphing.



10. Find the intercepts, zeros, axis of symmetry and vertex of the graph of $y = x^2 + 3x - 10$. Graph the parabola.

(Hint: Axis of symmetry $x = \dfrac{-b}{2a}$)



11. Solve the quadratic. Solutions may be real or complex.

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

b) $\frac{2}{3}x^2 - 6x + 9 = 0$

c) $4x(x-2) = -3$

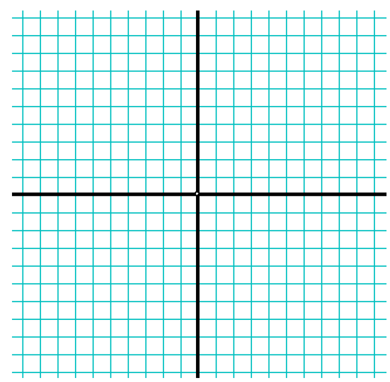
d) $30x^2 - 80x + 50 = 7x - 4$

e) $-16t^2 - 30t + 200 = 0$

f) $x^2 + 2x + 5 = 0$

12. Sketch a graph by constructing a table of values given a domain (-2, 2)

$f(x) = -3x^2 - 5x + 2$



13. Graph, name and state the domain and range of each of these functions.
Each graph should have a minimum of four points.

$f(x) = x$

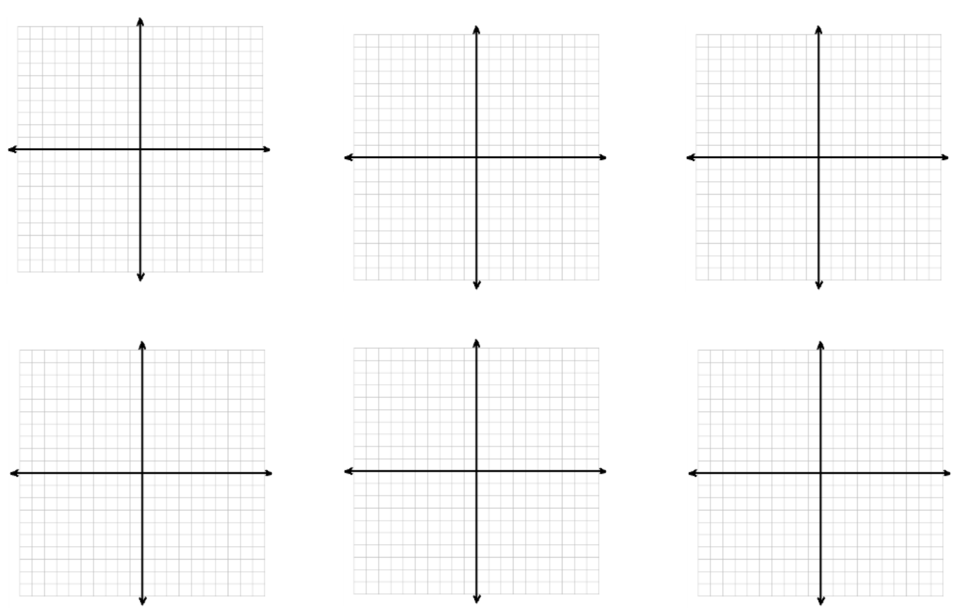
$f(x) = x^2$

$f(x) = x^3$

$f(x) = \sqrt{x}$

$f(x) = |x|$

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



14. Find the domain and range of each. (Use a graph to help you)

a) $y = 3x - 9$

b) $y = -|x| + 2$

c) $y = 2x^2 + 6x - 7$

15. Simplify.

a) $\frac{1}{i^{23}}$

b) $(6-7i)^2$

c) $\frac{5+4i}{1-2i}$

d) $-\frac{16}{4-2i}$

16. Factor each

a. $x^2 - xy + 2x - 2y$

b. $b^4 - 81$

c. $x^3 - 3x^2 - 54x$

d. $8m^3 - 25$

e. $6n^2 - 11n - 2$

f. $x^2 - 8x - 8$

g. $8a^2 + 2a - 6$

17. Find the x and y intercepts of the graph of each equation.

a) $y=\sqrt{x+4}$

b) $y=-|x+10|$

c) $y=x^4-25$

d) $y^2=x+1$

18. Solve each inequality

a. $2x-5<7$

b. $-2\le x-3\le 2$

19. Factor, reduce, perform the operation and simplify.

a. $\dfrac{x^2+2x-8}{x^2+4x+3}\bullet\dfrac{3x+3}{x-2}$

b. $\dfrac{a+2}{a+3}\div\dfrac{a^2+a-12}{a^2-9}$

c. $\dfrac{w+12}{4w-16}-\dfrac{w+4}{w+2}$

20. Let $f(x) = x^2 + 2x + 1$, $g(x) = x + 2$ and $h(x) = 4 - x^2$.

Find:

a) $(g \circ h)(x)$

b) $h(g(x))$

c) $f(x-2)$

d) $f(x+b)$

e) $(f-g)(x)$

f) $\left(\frac{h}{g}\right)(x)$

g) $(f \cdot g)(x)$

21. Use synthetic division to simplify $\dfrac{5x^3+6x+8}{x+2}$.

22. Use long division to simplify $\frac{12x^3-19x^2-25x-10}{4x+3}$.

23. Simplify $\left(\frac{3^4 a^{-7} b^8 d^{-4}}{43^0 a^{-4} b^{-5} c^6}\right)^{-4}$

24. Simplify $\dfrac{x^{-2} - y^{-2}}{x^{-1} - y^{-1}}$

25. In right triangle ABC, with angle B being the right angle, (Hint: Use SOH-CAH-TOA)

a. If AB = 16 and m $\angle$ A = 53°, find BC

b. If AB = 36 and AC = 47, find m $\angle$ A

26. A 25 foot ladder is placed against a wall of an angle of 42° with the ground. How far from the base of the wall is the bottom of the ladder?

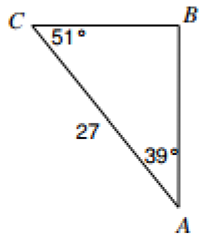
27. Express each angle in radians:

a. 150°   b. -300°   c. 240°

28. Express each angle in degrees:

a. $\dfrac{\pi}{2}$ b. $\dfrac{7\pi}{9}$ c. $\dfrac{\pi}{36}$

29. Find BC.



30. Given $f(x) = 2 \cdot 3^x$, find $f(5)$.

31. Given $f(x) = \frac{1}{2} \cdot 2^x$, find $f(-3)$.

32. Solve each equation

a) $2(3)^{2x} = 5$

b) $5\log(x-2) = 11$

c) $12 = 10^{x+5} - 7$

d) $\log_2 x = 5$

e) $3(5^{-x/4}) = 15$

f) $\log_6 x - \log_6(x+1) = 2$

g) $\log_5 x + \log_5(x+1) = \log_5 20$

h) $\frac{1}{16}^{\,x} = 64$

33. Rewrite as a single log $\log 2x + \frac{1}{2}\log 4 - \log 4x$