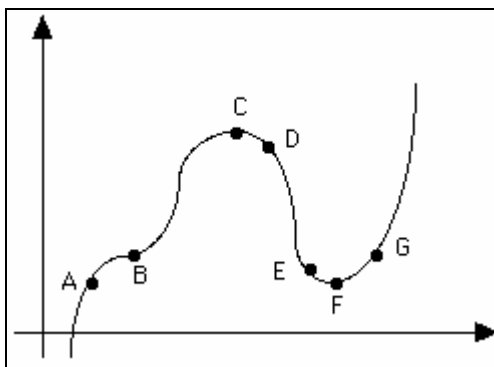


## AP Calculus Worksheet

1. At which point on the following graph is  $f'(x) > 0$  and  $f''(x) > 0$ ?



2. Find all values of  $x$  for which the graph of  $f(x) = x^4 - 8x^3 + 14$  is increasing.

For problems 3–10, find relative max., relative min. and terrace points.

3.  $f(x) = x^2$       4.  $f(x) = -x^2$       5.  $f(x) = x^3 - x$       6.  $f(x) = x^4 - x^2$   
 7.  $f(x) = x^2 - x - 6$       8.  $f(x) = (x-1)^3 + 1$       9.  $f(x) = (x-2)^4 + 5$       10★.  $f(x) = x^4 - 6x^2 + 8x$

In Ex. 11 – 16, find the rel. and abs. max. and min. points and the terrace points in the given interval.

11.  $f(x) = x^2, -1 \leq x \leq 2$       12.  $f(x) = x^2, 0 \leq x \leq 1$       13.  $f(x) = x^3, -1 \leq x \leq 1$   
 14.  $f(x) = 2x^3 - 3x^2 - 12x + 1, -2 \leq x \leq 4$       15.  $f(x) = |x|, -1 \leq x \leq 2$       16.  $f(x) = 5x + 3, -5 \leq x \leq 4$

17. The total number of relative maximum and minimum points of the function whose derivative is  $f'(x) = x^2(x+1)^3(x-4)^3$  is (A) 0 (B) 1 (C) 2 (D) 3 (E) 4

18. Find all absolute and relative maximums and minimums for  $y = x^3 - 3x + 1$  on  $[-2, 3]$ .  
 19. If  $f(x) = x^2 - 5x + 6$  then find the absolute minimum of  $f(x)$  on  $[-3, 4]$ .  
 20. If  $f(x) = x^3 + 2x^2 + x + 2$  find then the absolute maximum of  $f(x)$   $[-2, 1]$ .  
 21. Find the maximum value of  $y = -x^2 + 4x + 25$  on  $[-2, 3]$  (Find the  $y$  at the abs. max. point)  
 22. Find the absolute minimum value (the  $y$  number) of  $f(x) = x^3 - 6x^2$  on  $[1, 2]$ .  
 23. Find the equation of the line tangent to  $y = (\sin x)(\cos x)$  at the point where  $x = \frac{\pi}{4}$   
 24. Find the slope of the line tangent to the curve  $y = e^{\sin x}$  at the point where  $x = \pi$

**Answers on next page**

## AP Calculus Worksheet

### Answers:

1.G	2. $x > 6$	3) (0, 0) min	4) (0, 0) max
5) $\left(-\frac{\sqrt{3}}{3}; \frac{2\sqrt{3}}{9}\right)$ max $\left(\frac{\sqrt{3}}{3}; -\frac{2\sqrt{3}}{9}\right)$ min	6) $\left(\frac{-\sqrt{2}}{2}, \frac{-1}{4}\right)$ min; $\left(\frac{\sqrt{2}}{2}, \frac{-1}{4}\right)$ min; (0, 0) max	7) $\left(\frac{1}{2}, \frac{-25}{4}\right)$ min	8) (1,1) terrace
9) (2,5) min	10) (-2, -24) min; (1,3) terrace	11) (0,0) rel. min; (0,0) abs. min; (2,4) abs. max	12) (0,0) rel. min; (1,1) abs. max
13) (0,0) terrace; (1,1) abs. max; (-1, -1) abs. min	14) (-1,8) rel. max; (2, -19) rel. min; (4, 33) abs. max; (2, -19) abs. min	15) (0,0) abs. min; (2,2) abs. max	16) (4, 23) abs. max; (-5, -22) abs. min
17. C	18. . abs min (-2, -1), rel and abs min (1, -1) abs max (3, 19), rel max (-1, 3)	19. -1/4	20. 6
21 29	22. -16	23. $y=1/2$	24. -1