ANSWERS:

1. 1	6. $\frac{1}{32}$	11. 6	16. $\frac{1}{k}$	21. $\frac{11}{6}$
2. $\frac{1}{2}$	7. $-\frac{\sqrt{2}}{4}$	12. 1	17. $-\frac{1}{3}$ *	22. $-\frac{3}{8}$
3. -1	8. 48	13. 4	18. 26	23. 16
4. -5	9. -1	14. 5	19. 5	24. 4
5. -1	10. 4	15. $\frac{1}{4}$	20. $\frac{7}{3}$	25. $-\frac{1}{2}$

* one value only.

SOLUTIONS:

1. f"= $12x-3>0$ for x>0.25, and the least integer is 1.

2. $\int_0^{\pi/4}\sec^2 x\tan x dx=\int u du$ for u=tanx. $\frac{1}{2}\tan^2 x\Big|_0^{\pi/4}=\frac{1}{2}(1-0)=1/2$.

3. f= $\sqrt{(x-1)^2}=|x-1|$, and the slope to the left of the cusp is -1.

4. The derivative of $y=2x^2+3x$ is 4x+3. At x= -2, the derivative is -5.

5. $2xe^{2x}+x^2(2e^{2x})<0$, $2xe^{2x}(1+x)<0$. Between x=0 and x=-1 this is true, and so a= -1.

6. $\frac{dy}{dt}=8x\frac{dx}{dt}$, $\frac{dy}{dt}=8x\left(4\frac{dy}{dt}\right)$. This is true for x= 1/32.

7. f' = $\frac{1}{2}(9-x^2)^{-1/2}(-2x)$ and at x= $2\sqrt{2}$, f' = $-2\sqrt{2}$. so g'(1) = 1/ f'($2\sqrt{2}$) = $-\frac{\sqrt{2}}{4}$.

8. f' = 4(g(x))g'(x) by the chain rule, and 4(4)(3) = 48.

9. f" = 6x+3 < 0 and f' < 0 for the interval (-2, -1/2) and the integer in this interval is -1.

10. $\frac{1}{6}\left(-\frac{3}{4}x^2+kx\right)\Big|_0^6=-\frac{1}{2}$ when (-27+6k)= -3 and k= 4.

11. The values must be equal at x=1 so a+3+b = 2a-b and –a+2b = -3. The derivatives must be equal 2a+3 = 2a-b so b= -3, and thus a = -3. So the abs value of a+b is 6.

12. $e^x=e$ when x=1, so the area is $\int_0^1\left(e-e^x\right)dx=ex-e^x\Big|_0^1=(e-e)-(0-1)=1$.

13. y dy = dx, $\frac{y^2}{2}=x+c$, 2= -1+c, c=3. For the initial condition, we have the function is the "positive" part of the graph $y=\sqrt{2x+6}$. When x=5 y= 4.

14. The values of f' are 0 or undefined at x= 0, pi, pi/2, 3pi/2, 2pi. Five values.

15. 8x+3 = 9-16x at x= 1/4.

16. f' is zero and f" must be positive. f'=0 at x=1/k or x= -2k. f" = $kx^2+2k^2x-x-2k$. When x= 1/k, f" = $2+2k^2-1$ which is positive. At x= -2k, $f''=-2k^2-1$ which is negative so the x-coordinate of the rel. min is 1/k.

17. f(-1)= -2 and f(1)= 0, which gives slope 1. f' = $3x^2-2x=1$ when x= -1/3 or x= 1, but the MVT says that the value of x=1 is not part of the conclusion, so x= -1/3.

18. 3(6) + $\int_0^2 4dx$ = 18+8 = 26.

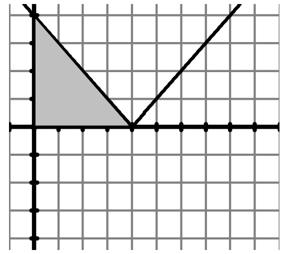
19. For f(x)=3kx+1, f(1)+f(2)+f(3)+f(4) = 3k+1 + (6k+1) + (9k+1) + (12k+1) = 30k+4 = 154 gives k=5.

20. $u=x^2+1, du=2xdx$, $\int_1^4 u^{1/2}(.5du)$ = $\frac{1}{2}\cdot\frac{2}{3}u^{3/2}\Big|_1^4=\frac{1}{3}(8-1)=7/3$.

21. f(2)= 1 and tangent line has slope 6x-6 = 6. y-1= 6(x-2) has x-intercept 11/6.

22. m = 2(4)/3 = 8/3. Normal slope = -3/8.

23. The area described by the integral is two triangles like the shaded one shown. So the integral gives area 2(1/2)(4)(4) = 16.



24. f"=1 means f' = x+c and f = $\frac{1}{2}x^2 + cx + k$ and when x=1 we get 0.5+c+k=4. When x= -1, we get 0.5 – c+k= 5. Add to get 1+2k = 9 and so k=4. So f(0) = k = 4.

25. Every fourth derivative is cosx so the 40th derivative is cosx. $f^{(41)}(x) = -\sin x = -\sin\frac{\pi}{6} = -\frac{1}{2}$.