505.)

a) $3f'(x) - g'(x)$

$3\underset{2}{f'(-1)} - \underset{1}{g'(-1)} \to 6-1 = \boxed{5}$

b.) $3[f(x)]^2 f'(x)[g(x)]^3 + [f(x)]^3 \cdot 3[g(x)]^2 \cdot g'(x)$, $x=0$

$3[-1]^2(-2)[-3]^3 + [-1]^3 \cdot 3[-3]^2 \cdot 4$

$3 \cdot -2\,(-27) + \quad -27 \cdot 4$

$-6(-27) + 4(-27) = -10(-27) = \boxed{270}$

c.) $g(f(x)) \rightsquigarrow g'(f(x)) \cdot f'(x)$

$g'(f(-1)) \cdot f'(-1)$

$g'(0) \cdot 2 \to 4 \cdot 2 = 8$

d.) $f'(g(x))\, g'(x)$

$f'(-1) \cdot 1$

$2 \cdot 1 = \boxed{2}$

e.) $\dfrac{f'(0)(g(0)+2) - f(0)g'(0)}{(g(0)+2)^2} = \dfrac{-2(-1) - (-1)(4)}{\underset{1}{(-3+2)^2}} =$

$2 + 4 = \boxed{6}$

f.) $g'(x+f(x)) \cdot (1+f'(x))$

$g'(0+f(0)) \cdot (1+f'(0))$

$g'(-1) \cdot (1 + -2)$

$1\,(-1) = \boxed{-1}$

521. (oops we did this in class)
11/27

"522".
a) $2x+2+4y^3y'+4y'=0$

$4y^3y'+4y'=-2x-2$

$y'(4y^3+4)=-2x-2$

$y'=-\dfrac{2x+2}{4y^3+4}$

$\boxed{-\dfrac{x+1}{2y^3+2}}$

b.) $y-1=m(x+2)$

plug $(-2,1)$ into $\frac{dy}{dx}$

$\left.\dfrac{dy}{dx}\right|_{(-2,1)}=-\dfrac{-1}{2+2}=\dfrac{1}{4}$ m

$\boxed{y-1=\frac{1}{4}(x+2)}$

c.) vert. tangent $\longrightarrow$ denom $y'=0$

$2y^3+2=0$

$2(y^3+1)=0$

$y^3=-1 \longrightarrow \underline{y=-1}$

plug in $y=-1$
Find $x$

$x^2+2x+1-4=5$

$x^2+2x-8=0$

$(x+4)(x-2)=0$

$x=-4 \quad x=2$

$(-4,-1)$
$(2,-1)$

"523."

a.) $2yy' = 0 + 1y + xy'$

$2yy' - xy' = y$

$y'(2y - x) = y \longrightarrow \boxed{y' = \frac{y}{2y-x}}$

b.) Slope $1/2 \longrightarrow$ set $y' = 1/2 \longrightarrow \frac{y}{2y-x} \times \frac{1}{2}$

$\cancel{2y} = \cancel{2y} - x$

$0 = -x \longrightarrow \underline{x = 0}$

find y by plugging $x=0$ into curve

$y^2 = 2 + \cancel{0y}$

$y^2 = 2 \longrightarrow y = \pm\sqrt{2} \longrightarrow \boxed{(0, \sqrt{2}) \quad (0, -\sqrt{2})}$

c.) Horiz. Tangent: $y'$ numerator $= 0$

$y = 0 \longrightarrow$ plug into curve

$0^2 = 2 + \cancel{0x}$

$0 = 2$ ... pleh?! guh?! impossible! so, no H.T.

596.) $3\csc(2x) + 3x \cdot -\csc(2x)\cot(2x) \cdot 2$

$3\csc(2x) - 6x\csc(2x)\cot(2x)$

$\boxed{3\csc(2x)\left[1 - 2x \cdot \cot(2x)\right]}$

597.) $y' = \frac{-5\csc^2(5x) \cdot 3x^2 - \cot(5x)6x}{9x^4}$

$\frac{-15x^2\csc^2(5x) - 6x\cot(5x)}{9x^4}$

$\frac{-3x(5x\csc^2(5x) + 2\cot(5x))}{9x^4}$

$\boxed{\frac{-x(5x\csc^2(5x) + 2\cot(5x))}{3x^3}}$

598. $y = (\cot 5x)^{1/2}$

$$\frac{dy}{dx} = \frac{1}{2}(\cot 5x)^{-1/2} \cdot -\csc^2(5x) \cdot 5$$

$$\boxed{\frac{-5\csc^2(5x)}{2\sqrt{\cot(5x)}}}$$

599. $y' = 24\cos(8x)\cos(8x) + 3\sin 8x \cdot -8\sin(8x)$

$24\cos^2(8x) - 24\sin^2(8x)$

$\boxed{24(\cos^2(8x) - \sin^2(8x))}$ or, $\boxed{24\cos(16x)}$

600. $y' = \dfrac{\frac{1}{x}\cdot \sin x - \ln x \cdot \cos x}{\sin^2 x} \cdot \dfrac{x}{x}$

600

$\boxed{\dfrac{1 - x\ln x \cdot \cot(x)}{x \cdot \sin x}}$

ok

$\boxed{\dfrac{\sin x - x\ln x \cdot \cos x}{x \cdot \sin^2 x}}$ $\sim$ $\dfrac{\sin(x)(1 - x\ln x \cdot \cot(x))}{x \sin^2 x}$

601.) $y' = 2\cos 3x \cdot -\sin 3x \cdot 3 - 2\sin 3x \cdot \cos 3x \cdot 3$

$-6\cos(3x)\sin(3x) - 6\cos(3x)\sin(3x)$

$\boxed{-12\cos(3x)\sin(3x)}$ $\sim$ or $-6\sin 6x$

602.) $\boxed{y' = e^{\sin(x)} \cdot \cos(x)}$

603.) $\boxed{y' = (3^{\cos x})(\ln 3)(-\sin x)}$

604. $\dfrac{1}{\sin 2x \cdot \ln 3} \cdot \cos 2x \cdot 2$ $\rightarrow$ $\dfrac{2\cos 2x}{\ln 3 \, \sin 2x}$ $\cot(2x)$ $\boxed{\dfrac{2}{\ln 3}\cot(2x)}$

605.) $y' = e^{\ln 3x} + x \cdot e^{\ln 3x} \cdot \frac{1}{\cancel{3x}} \cdot \cancel{3}$

$\boxed{y' = 6x}$

or

$y = x \boxed{\cancel{e^{\ln 3x}}} 3x \rightarrow 3x^2 \longrightarrow \boxed{6x}$

606.) $y' = 3e^{3x}\tan x + e^{3x}\sec^2 x$

$\boxed{e^{3x}(3\tan x + \sec^2 x)}$

607.) $y = e^{x^{-2}} \longrightarrow y' = e^{x^{-2}} \cdot -2x^{-3} \rightarrow \boxed{\frac{-2e^{x^{-2}}}{x^3}}$

608.) $y = e^{\frac{1}{4}x^2} \longrightarrow y' = e^{\frac{1}{4}x^2} \cdot \frac{1}{2}x \rightarrow \boxed{\frac{1}{2}x \cdot e^{\frac{1}{4}x^2}}$

609.) $y' = \frac{1}{\sec(x) + \tan x} \cdot \sec x \tan x + \sec^2 x$

$\frac{\sec(x)\tan x + \sec^2 x}{\sec(x) + \tan x} \rightarrow \frac{\sec(x)\cancel{(\tan x + \sec x)}}{\cancel{(\sec x + \tan x)}}$

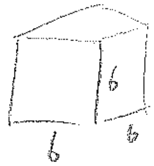
$\boxed{\sec(x)}$

610.) $y' = 1 \cdot e^{\tan x} + x \cdot e^{\tan x} \cdot \sec^2 x$

$\boxed{e^{\tan x}(1 + x \cdot \sec^2 x)}$

525. $V = 6^3 = \boxed{216u^3}$

$V = 6(6^2) = \boxed{216u^2}$

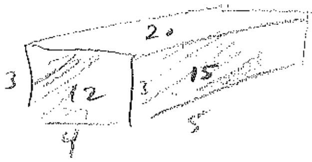



$\begin{array}{r} 36 \\ \times\ 6 \\ \hline 216 \end{array}$

$v = s^3$

$SA = 6s^2$

526.




$V = 3 \cdot 4 \cdot 5 = \boxed{60u^3}$

$SA: (20 + 12 + 15)2$

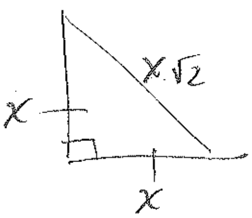
$(47)(2) \longrightarrow \boxed{94u^2}$

527. $5^2 + 12^2 = c^2$

$25 + 144 = c^2$

$169 = c^2 \longrightarrow c = \pm\sqrt{169} \longrightarrow \boxed{c = 13}$

528.




$A = \frac{1}{2}x^2 = 8$

$x^2 = 16$

$x = 4$

Hyp.

$\boxed{4\sqrt{2}}$

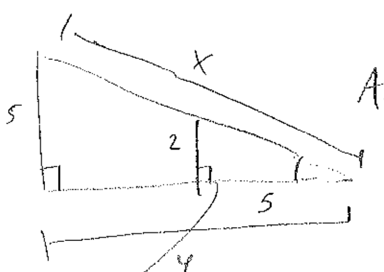
529. $h = 4r$

$V = \pi r^2 h \rightarrow \pi r^2 \cdot 4r \rightarrow 4\pi r^3 = 500\pi$

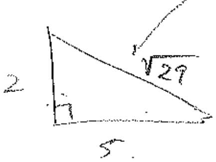
$r^3 = 125$

$\boxed{r = 5}$

530.




AA~

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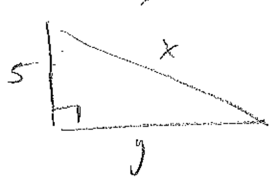



$\frac{2}{5} = \frac{5}{y}$

$2y = 25$

$\boxed{y = 12.5}$

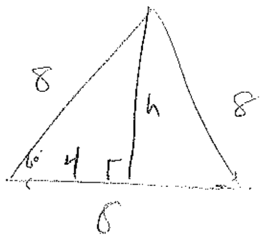
$\boxed{BC}$

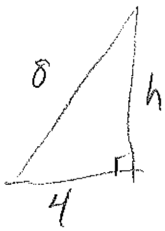
$\frac{2}{5} = \frac{\sqrt{29}}{x}$

$2x = 5\sqrt{29}$

$\boxed{x = \frac{5}{2}\sqrt{29}}$

531.




$4^2 + h^2 = 8^2$

$h^2 = 48$

$h = \sqrt{48} \sim 4\sqrt{3}$

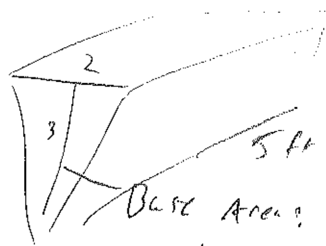
$A = \frac{1}{2} b \cdot h = \frac{1}{2}(8)\cdot(4\sqrt{3})$

$\boxed{16\sqrt{3}}$

532. $A_{\triangle} = \frac{1}{2}\pi r^2$

$\frac{1}{2}\pi(10^2) \rightarrow 50\pi$

533.) $V_{prism} = B \cdot h$




Base Area:

$\frac{1}{2}\cdot 2 \cdot 3 = \underline{3\,ft^2}$

$\longrightarrow$ $V = (3\,ft^2)(5\,ft)$

$\boxed{15\,ft^3}$

534. $V = \frac{1}{3}\pi r^2 h$ $\quad h = 4r$

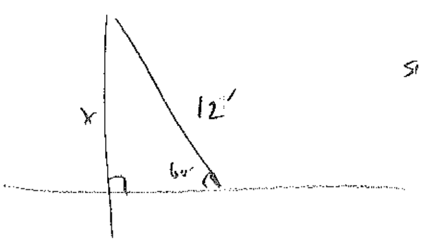
$\frac{1}{3}\pi r^2 \cdot 4r$

$\frac{3}{4}\left(\frac{4}{3}\cancel{\pi} r^3 = 324\cancel{\pi}\right)\frac{3}{4}$

$r^3 = 243$

$r = \sqrt[3]{243}$

535.



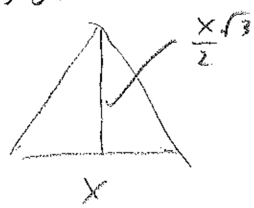

$\sin 60 = \frac{x}{12}$

$12 \cdot \sin 60$

$12 \cdot \frac{\sqrt{3}}{2}$

$\boxed{6\sqrt{3}\ ft}$

536.




$A = \frac{1}{2}\cdot x \cdot \frac{x}{2}\sqrt{3}$

$\frac{1}{4}x^2\cancel{\sqrt{3}} = 4\cancel{\sqrt{3}}$

$\frac{1}{4}x^2 = 4$

$x^2 = 16$

$x = 4 \longrightarrow \boxed{h = 2\sqrt{3}}$