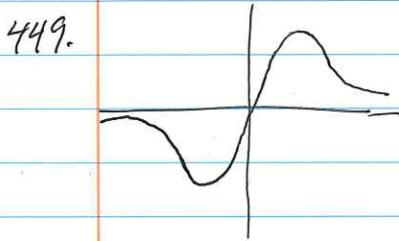


THE RULES: Power
Product
Quotient
Chain

(P)

447. a) $a+b=2$
b) $a=-3, b=5$

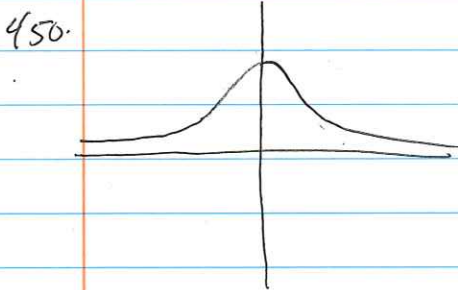
448. a) -2 b.) $2/25$ c.) $-1/2$ d.) -7



$$\frac{dy}{dx} = \frac{4-4x^2}{(x^2+1)^2}$$

$$\frac{dy}{dx} \Big|_{(0,0)} = 4 \rightarrow \text{line } y-0 = 4(x-0) \Rightarrow y = 4x$$

$$\frac{dy}{dx} \Big|_{(1,2)} = 0 \rightarrow \text{line } y-2 = 0(x-1) \Rightarrow y = 2$$



$$\frac{dy}{dx} = \frac{-16x}{(x^2+4)^2}$$

$$\frac{dy}{dx} \Big|_{(2,1)} = -1/2 \rightarrow \text{tan. line } y-1 = -1/2(x-2)$$

or $y = -1/2x + 2$

451. $A'(z) = 12(3z-5)^3$
(Chain rule)

452. $g'(u) = (45u^4 - 18u^2 - 9)(3u^5 - 2u^3 - 3u - 1/3)^2$ Chain

453. $b'(y) = -12y^2(y^3-5)^{-5} \rightarrow \left[\frac{-12y^2}{(y^3-5)^5} \right]$ Chain

454. $c'(d) = \frac{5}{3}(5d^2-1)^{2/3} \cdot 10d \rightarrow \left[\frac{50d}{3} \sqrt[3]{(5d^2-1)^2} \right]$ Chain

(p²)

455. $u'(p) = \frac{6p(p^3 + 2p - 6) - (3p^2 - 5)(3p^2 + 2)}{(p^3 + 2p - 6)^2}$ quotient rule

$\rightarrow \frac{-3p^4 + 21p^2 - 36p + 10}{(p^3 + 2p - 6)^2}$

456. $v'(x) = \frac{-15}{2} x^2 (5x^3)^{-3/2} \rightarrow \frac{-15x^2}{2\sqrt{125x^9}}$ rewrite, then power, chain rule

457. $f'(x) = \frac{x^{-2/3} + \frac{5}{3}x^{-4/3}}{3\sqrt[3]{x^2} + 5} \rightarrow \frac{3\sqrt[3]{x^2} + 5}{3\sqrt[3]{x^4}}$ power rule

458. $g'(z) = \frac{z}{\sqrt{(36-z)^3}}$ power rule

459. $p'(t) = \frac{1}{\sqrt{(3-2t)^3}}$ power/chain

460. $h'(u) = \frac{1}{2}(u-1)^{-1/2} \cdot (2u+3)^{1/3} + \frac{2}{3}(u-1)^{1/2} \cdot (2u+3)^{2/3}$
 \downarrow vonboo
 $\frac{10u+5}{6\sqrt{u-1} \cdot \sqrt[3]{4u^2+12u+9}}$ product rule, chain rule

461.

461. $f'(x) = \frac{15}{(x+5)^2}$ quotient rule

462. $g'(y) = \frac{6}{(3-2y)^2}$ quotient rule.

463. rewrite as $\frac{(x+5)^2}{(x-5)^2}$, then use quotient rule; chain rule.

463.
$$p'(x) = \frac{2(x+5)(x-5)^2 - 2(x-5)(x+5)^2}{(x-5)^4} \xrightarrow[\text{wizening}]{\text{top log}}$$
 $\frac{20x + 100}{(x-5)^3}$

464. $m'(x) = \frac{7}{(1-3x)^2}$ quotient rule

465. $f'(x) = -6x^{-3} - \frac{2}{3}x$ power rule

466. $g(x) = \frac{8x^2 + 22x - 21}{5x - 3}$ rewrite, then do quotient rule.

$$g'(x) = \frac{(16x + 22)(8x^2 - 6x - 43)}{(5-3x)^2}$$

467. $F'(x) = 270x^{24} - 5x^{-4/5} - 144x^{-13}$

$$F'(x) = 270x^{24} - \frac{5}{\sqrt[5]{x^4}} - \frac{144}{x^{13}}$$
 power rule