

p. 70

585-264-1290

34. a. $\ln(1/e) = -1$ b. $\log_{10} \sqrt{10} = 1/2$

36. a. $e^{\ln - 2 \ln 5} = e^{\ln(1/5^2)} = \frac{1}{25}$

b. $\ln(10e^{10}) - \ln e^{10} = 10$

48. a. $e^{2x+3} = 7$
 $2x+3 = \ln 7$ $x = \frac{-3 + \ln 7}{2}$

b. $\ln(5-2x) = -3$
 $5-2x = e^{-3}$ $5 - e^{-3} = 2x$ $x = \frac{5 - e^{-3}}{2}$

50. a. $\ln(\ln x) = 1$
 $\ln x = e$
 $x = e^e$

b. $e^{ax} = ce^{bx}$
 $ax = \ln(ce^{bx})$
 $ax = \ln c + \ln e^{bx}$
 $ax = \ln c + bx$
 $x = \frac{\ln c}{a-b}$

54. a. Need $2 + \ln x > 0$ and $\ln x > 0$

~~$2 + \ln x > 0$~~ $x > 0$

~~$2 + \ln x > 0$~~

$\ln x > -2$

$x > e^{-2}$

Domain $(\frac{1}{e^2}, \infty)$

54 b. $y = \ln(2 + \ln x)$

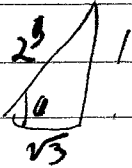
$$e^y = 2 + \ln x$$

$$e^{y-2} = \ln x \quad x = e^{e^{y-2}}$$

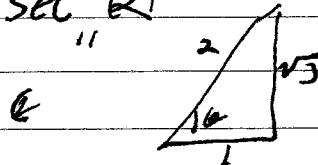
$$f^{-1}(x) = e^{e^x - 2}$$

$$\text{Domain } f^{-1} = (-\infty, \infty)$$

60. a. $\tan^{-1}(1/\sqrt{3}) = \pi/6$



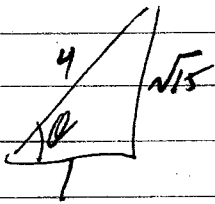
b. $\sec^{-1}(2)$



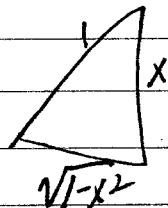
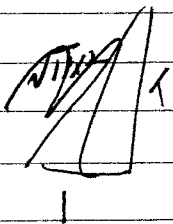
$$\pi/3$$

64. $\tan(\sec^{-1}4) = \sqrt{15}$

b.



66.

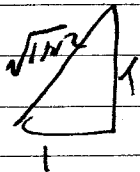


$$\tan(\sin^{-1}x) = \frac{x}{\sqrt{1-x^2}}$$

68. $\cos(2\arctan x)$

$$= \cos^2(\arctan x) - \sin^2(\arctan x)$$

67.



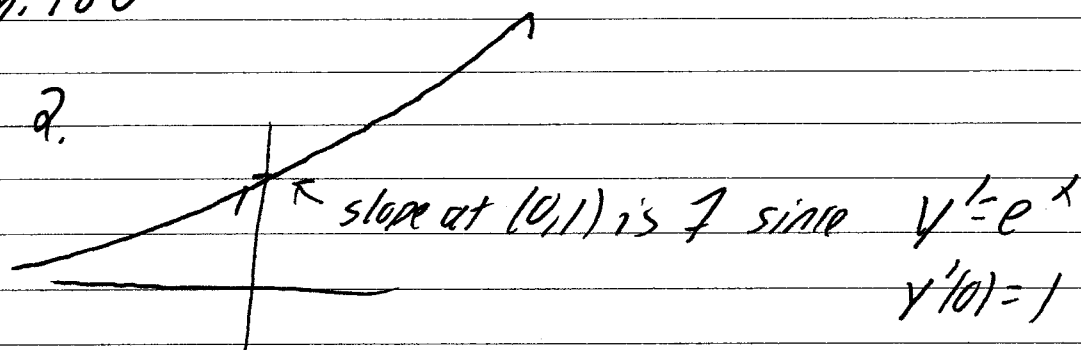
$$\sin(\arctan x) = \frac{x}{\sqrt{1+x^2}}$$

$$= \frac{1}{1+x^2} - \frac{x^2}{1+x^2}$$

$$= \frac{1-x^2}{1+x^2}$$

p. 180

2.



b. $f(x) = e^x$ is an exponential, $f(x) = x^e$ is a power.

c. e^x grows much faster.

e.

14. $R(t) = 5t^{-3/5}$ $R'(t) = -3t^{-8/5}$

24. $y = \frac{x^2 - 2\sqrt{x}}{x}$ $y' = 1 - 2x^{-3/2}$
 $y' = 1 + x^{-3/2}$

26. $g(u) = \sqrt{2}u + \sqrt{3}u^{1/2} = \sqrt{2}u + \sqrt{3}u^{1/2}$

$g'(u) = \sqrt{2} + \frac{\sqrt{3}}{2}u^{-1/2}$

34. $y = x^4 + 2x^2 - x$ at $(1, 2)$ $y' = 4x^3 + 4x - 1$

$y'(1) = 7$

$y - 2 = 7(x - 1)$

$$50. \quad s = 2t^3 - 7t^2 + 4t + 1$$

$$a. \quad v = 6t^2 - 14t + 4$$

$$a = 12t - 14$$

$$b. \quad a(t) = \boxed{-2 \text{ m/s}^2}$$

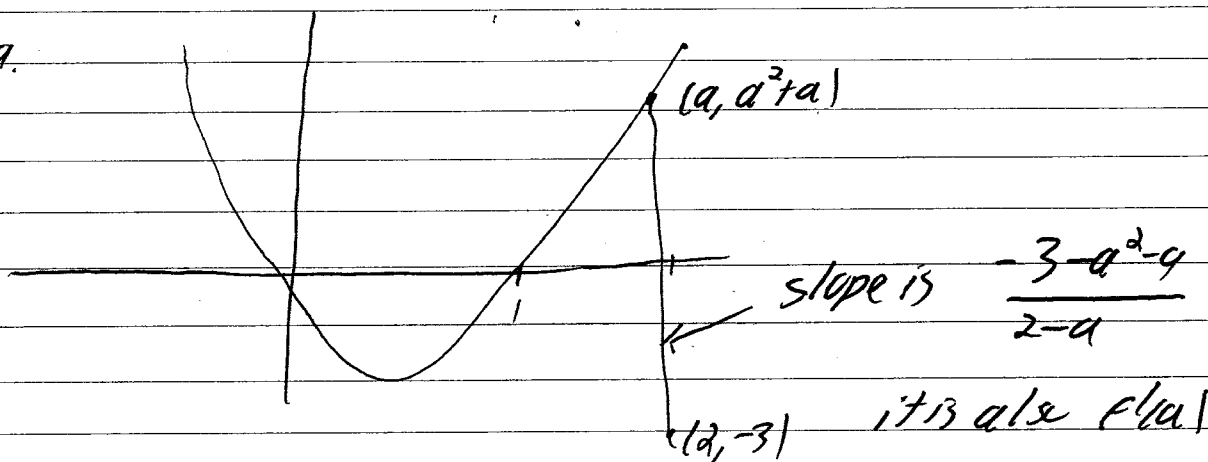
$$52. \quad f'(x) = 3x^2 + 6x + 1$$

$$0 = 3x^2 + 6x + 1$$

$$x = \frac{-6 \pm \sqrt{24}}{6}$$

$$= \boxed{-1 \pm \frac{\sqrt{6}}{3}}$$

60. a.



$$f' = 2x + 1$$

$$f'(a) = 2a + 1$$

$$2a + 1 = \frac{3 - a^2 - 9}{2 - a}$$

$$-2a^2 + 3a + 2 = -3 - a^2 - 9$$

$$0 = a^2 - 4a - 5 = (a - 5)(a + 1)$$

$$a = 5, a = -1$$

p. 187

$$4. \quad g(x) = \sqrt{x} e^x \quad g'(x) = \frac{1}{2\sqrt{x}} e^x + \sqrt{x} e^x$$

$$6. \quad y = \frac{e^x}{1+x} \quad y' = \frac{(1+x)e^x - e^x}{(1+x)^2}$$

$$30. \quad f(x) = \frac{x}{3+e^x} \quad f'(x) = \frac{3+e^x - xe^x}{(3+e^x)^2}$$

$$= \frac{3+(1-x)e^x}{(3+e^x)^2}$$

$$f''(x) = \frac{(3+e^x)^2((1-x)e^x - e^x) - (3+(1-x)e^x)^2(3+e^x)e^x}{(3+e^x)^4}$$

$$32. \quad y = \frac{e^x}{x} \text{ at } (1, e)$$

$$y' = \frac{xe^x - e^x}{x^2} \quad y'(1) = \frac{e - e}{1} = 0$$

$$\boxed{y = e}$$

$$48. a. \quad P'(2) = F(2)G'(2) + F'(2)G(2) = 4(1/2) + 0 = \boxed{2}$$

$$b. \quad Q'(7) = \frac{G(7)F'(7) - F(7)G'(7)}{G(7)^2} = \frac{1 \cdot \frac{1}{4} - 5(\frac{2}{3})}{1} = \frac{1}{4} - \frac{10}{3} = \boxed{\frac{43}{12}}$$

60 cont~

$a=5$ point $(5, 30)$ slope 11

$$\boxed{y-30=11(x-5)}$$

$a=-1$ point $(-1, 0)$ slope -1

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

b Using $(2, 7)$ instead of $(2, -3)$ gives

$$-2a^2 + 3a + 2 = 7 - a^2 - a$$

$$a^2 - 4a + 5 = 0$$

$\Delta < 0$ No real roots!

NO ONE WORKS!

