

$$(1a) 2 \log_3 (x-2) - 4 = 0$$

$$\frac{2 \log_3 (x-2) = 4}{2}$$

$$\log_3 (x-2) = 2$$

$$3^2 = x-2$$

$$9 = x-2$$

$$x = 11$$

$$(1b) \log (3-x)^2 + 1 = 3$$

$$\frac{2 \log (3-x) = 2}{2}$$

$$\log_{10} (3-x) = 1$$

$$10^1 = 3-x$$

$$7 = -x$$

$$x = -7$$

$$(2a) 3(2)^{2x+1} - 4 = 8$$

$$\frac{3(2)^{2x+1} = 12}{3}$$

$$2^{2x+1} = 4$$

$$\log_2 4 = 2x+1$$

$$2 = 2x+1$$

$$1 = 2x$$

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

$$(2b) 5(e)^{x-6} + 1 = 27$$

$$\frac{5(e)^{x-6} = 25}{5}$$

$$e^{x-6} = 5$$

$$\log_e 5 = x-6$$

$$x = 6 + \ln 5$$

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

$$x - 2x(x+2) = 3x+6$$

$$\frac{x - 2x^2 - 4x = 3x+6}{+2x^2} \quad +2x^2$$

$$-3x = 2x^2 + 3x + 6$$

$$\frac{0 = 2x^2 + 6x + 6}{2} \quad \frac{0 = 2x^2 + 6x + 6}{2}$$

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

$$x = \frac{-3 \pm \sqrt{(3)^2 - 4(1)(3)}}{2(1)}$$

$$x = \frac{-3 \pm \sqrt{9-12}}{2}$$

$$x = \frac{-3 \pm \sqrt{-3}}{2} = \frac{-3 \pm i\sqrt{3}}{2}$$

No Real Solutions

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

$$4x-2 - (2x^2-x) = 3x^2$$

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

$$0 = 5x^2 - 5x + 2$$

$$x = \frac{-(-5) \pm \sqrt{(-5)^2 - 4(-5)(2)}}{2(5)}$$

$$x = \frac{5 \pm \sqrt{25+40}}{10}$$

$$x = \frac{5 \pm \sqrt{65}}{10}$$

$$(4a) \sqrt{\cot x} = \sqrt{3}$$

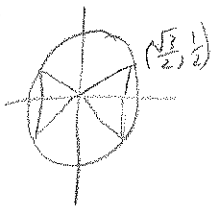
$$\cot x = \pm \sqrt{3}$$

$$\frac{\cos x}{\sin x} = \pm \sqrt{3}$$

$$\pm \frac{\sqrt{3}}{2} = \frac{\sqrt{3} \cdot 2}{2} = \sqrt{3}$$

$$\pm \frac{1}{2} = \frac{\sqrt{3}}{2} \cdot \frac{2}{1} = \sqrt{3}$$

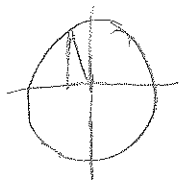
$$x = \frac{2\pi}{6}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{11\pi}{6}$$



$$(4b) \frac{\cos x = 4}{-8} = \frac{4}{-8}$$

$$\cos x = -\frac{1}{2}$$

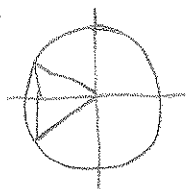
$$x = \frac{2\pi}{3}$$



$$(5a) \frac{1}{\cos x} (\cos x)^2 = -\frac{\sqrt{3}}{2}$$

$$\cos x = -\frac{\sqrt{3}}{2}$$

$$x = \frac{5\pi}{6}, \frac{7\pi}{6}$$



$$(5b) \frac{\sin x}{\cos x} \left(\frac{1}{\sin x} \right) = \frac{0}{-3}$$

$$\frac{1}{(\cos x)(\sin x)} = 0$$

NO solution

$$(6a) 2x - x^2 = x - 3$$

$$0 = x^2 - x - 3$$

$$x = \frac{-(-1) \pm \sqrt{(-1)^2 - 4(1)(-3)}}{2(1)}$$

$$x = \frac{1 \pm \sqrt{1+12}}{2}$$

$$x = \frac{1 \pm \sqrt{13}}{2}$$

$$(6b) x - 2x^2 = 4x - 4$$

$$0 = 2x^2 + 3x - 4$$

$$x = \frac{-3 \pm \sqrt{(3)^2 - 4(2)(-4)}}{2(2)}$$

$$x = \frac{-3 \pm \sqrt{9+32}}{4}$$

$$x = \frac{-3 \pm \sqrt{41}}{4}$$

$$(7a) \frac{(x + \frac{15}{6})(x + \frac{2}{6})}{-1(4x^2 - 25)}$$

$$\frac{(2x+5)(3x+1)}{-1(2x-5)(2x+5)}$$

$$\frac{3x+1}{-1(2x-5)}$$

$$\frac{3x+1}{-1(2x-5)}$$

$$(7b) \frac{3x(x-2)}{-1(x^2-4)}$$

$$\frac{3x(x/2)}{-1(x/2)(x+2)}$$

$$\frac{-3x}{x+2}$$

$$(8a) \frac{(x-2)x}{(x-2)x+1} - \frac{1(x+1)}{x-2(x+1)} + 2 \frac{(x-2)(x+1)}{(x-2)(x+1)}$$

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

$$\frac{3x^2 - 5x - 5}{(x-2)(x+1)}$$

$$(8b) \frac{(x+2)2}{(x+2)3} - \frac{x(3)}{x+2(3)} + \frac{1}{3(x+2)}$$

$$\frac{2x+4 - 3x + 1}{3(x+2)}$$

$$\frac{5-x}{3(x+2)}$$

$$(9a) \frac{\frac{\cos x}{\sin x} \left(\frac{\sin x}{1} \right)}{\frac{1}{(\cos x)^2}} = (\cos x)(\cos x)^2 = \cos^3 x$$

$$(9b) \frac{(\cos x)(\sin x)^2}{(\sin x)^2 (\cos x)^2} = \frac{(\cos x)(\cancel{\sin x})^2 (\cos x)^2}{(\cancel{\sin x})^2 (\cos x)^2} = \cos^3 x$$

$$(10a) (9^2)^{-\frac{3}{2}} = 9^{-3} = \frac{1}{9^3} = \frac{1}{729}$$

$$(10b) (10^2)^{\frac{5}{2}} = 10^5 = 100,000$$

$$(11a) 16^{\frac{3}{4}} = (4^2)^{\frac{3}{4}} = 4^3 = 64$$

$$(11b) (-8)^{-\frac{2}{3}} = ((-2)^3)^{-\frac{2}{3}} = (-2)^{-2} = \frac{1}{4}$$

$$(12a) m = \frac{-6-4}{2-3} = \frac{-10}{-1} = 10$$

$$(12b) m = \frac{-4-5}{-2-1} = \frac{-9}{-3} = 3$$

$$(13a) m = \frac{-3-3}{4-2} = \frac{-6}{2} = -3$$

$$(14a) -6 = \frac{-3}{4}(8) + b$$

$$4 = -2(-3) + b$$

$$4 = -6 + b$$

$$+6 \quad +6$$

$$10 = b$$

$$y = -2x + 10$$

$$5 = 3(1) + b$$

$$5 = 3 + b$$

$$-3 \quad -3$$

$$b = 2$$

$$y = 3x + 2$$

$$y = -3$$

$$(13b) m = \frac{5-5}{-4-2} = \frac{0}{-2} = 0$$

$$y = 5$$

$$-6 = -6 + b$$

$$+6 \quad +6$$

$$b = 0 \quad y = \frac{-3}{4}x$$

$$(14b) -4 = 3(1) + b$$

$$-3 \quad -3$$

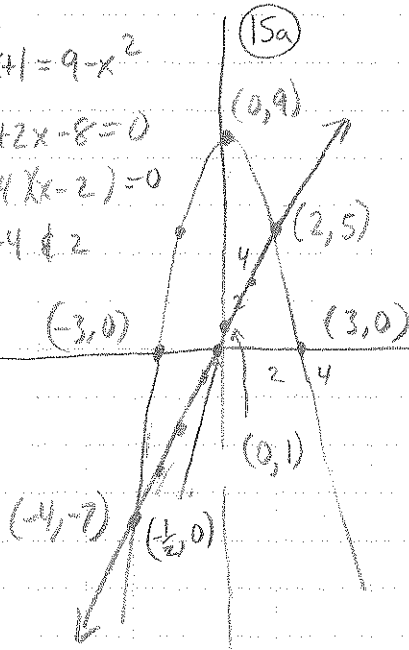
$$b = -7 \quad y = 3x - 7$$

$$2x+1=9-x^2$$

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

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

$$x=-4 \text{ \& } 2$$

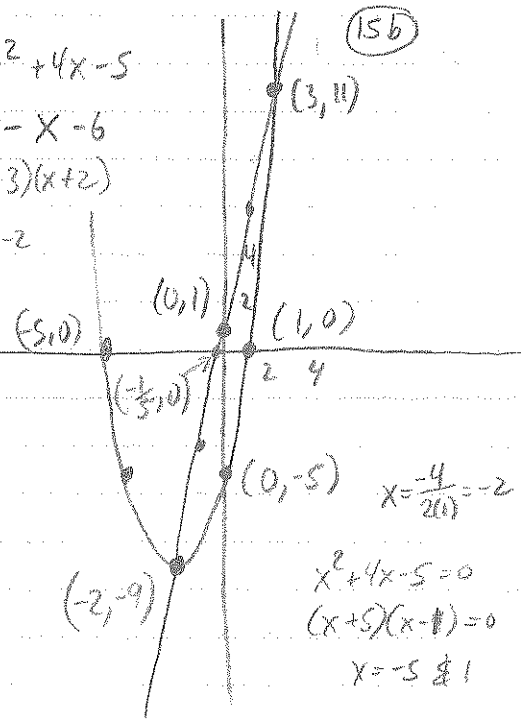


$$5x+1=x^2+4x-5$$

$$0=x^2-x-6$$

$$0=(x-3)(x+2)$$

$$x=3 \text{ \& } -2$$



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

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

$$(x+5)(x-1)=0$$

$$x=-5 \text{ \& } 1$$

$$16a) \frac{1}{\cos\left(\frac{3\pi}{4}\right)} = \frac{1}{-\frac{\sqrt{2}}{2}} = -\frac{2}{\sqrt{2} \cdot \sqrt{2}} = \frac{-2\sqrt{2}}{2} = -\sqrt{2}$$

$$16b) \frac{\cos \pi}{\sin \pi} = \frac{-1}{0} \text{ (undefined)}$$

$$17a) \frac{1}{\sin\left(\frac{\pi}{4}\right)} = \frac{1}{\frac{\sqrt{2}}{2}} = \sqrt{2}$$

$$17b) \cos\left(\frac{4\pi}{3}\right) = -\frac{\sqrt{3}}{2}$$

$$18a) \frac{\cos\left(\frac{2\pi}{3}\right)}{\sin\left(\frac{2\pi}{3}\right)} = \frac{-\frac{1}{2}}{\frac{\sqrt{3}}{2}} = -\frac{1}{2} \cdot \frac{2}{\sqrt{3}} = \frac{-1 \cdot \sqrt{3}}{\sqrt{3} \cdot \sqrt{3}} = \frac{-\sqrt{3}}{3}$$

$$18b) \frac{\sin\left(\frac{5\pi}{6}\right)}{\cos\left(\frac{5\pi}{6}\right)} = \frac{\frac{1}{2}}{-\frac{\sqrt{3}}{2}} = \frac{\sqrt{3}}{3}$$

$$19a) (5-(-2))^2 - 3(5-(-2))$$

$$(7)^2 - 3(7)$$

$$49 - 21 = 28$$

$$19a) 2((-1)^2 - 3(-1)) - 5$$

$$2(1+3) - 5$$

$$2(4) - 5 = 3$$

$$19b) (5-x)^2 - 3(5-x) - (x^2-3x)$$

$$(25 - 10x + x^2) - 15 + 3x - x^2 + 3x$$

$$-4x + 10$$

$$19b) 3(5-x) - ((5-x)^2 - 3(5-x)) + 2$$

$$15 - 3x - (25 - 10x + x^2 - 15 + 3x) + 2$$

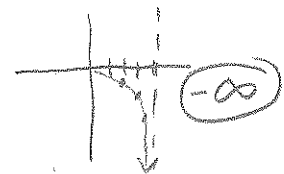
$$\underline{15 - 3x - 25 + 10x - x^2 + 15 - 3x + 2}$$

$$-x^2 + 4x + 7$$

$$20a) 3(-2)^2 - 4(-2) = 3(4) + 8 = 20$$

$$20b) \lim_{x \rightarrow 3} \frac{(x+3)(x+2)}{3(x+3)} = \frac{-3+2}{-1} = -1$$

$$20c) \begin{array}{c|ccc} x & 2 & 3 & 3.5 \\ y & \frac{3}{-2} & \frac{3}{-1} & \frac{3}{-1.5} \\ & (-1\frac{1}{2}) & (-3) & (-2) \end{array}$$



$$20d) \lim_{x \rightarrow 4^+} \frac{(x-4)(x+4)}{-1(x-4)} = \frac{4+4}{-1} = -8$$