

1a) $\frac{x-4}{x^2-3x-4} = \frac{(x-4)}{(x-4)(x+1)} = \frac{1}{x+1} \quad x \neq 4$

1b) $\frac{x^3-8}{x-2} = \frac{(x-2)(x^2+2x+4)}{(x-2)} = x^2+2x+4 \quad x \neq 2$

1c) $\frac{5-x}{x^2-25} = \frac{-(x-5)}{(x-5)(x+5)} = \frac{-1}{x+5} \quad x \neq 5$

2) $\sin^2 x + \cos^2 x = 1$
 $1 + \cot^2 x = \csc^2 x$
 $\tan^2 x + 1 = \sec^2 x$

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

5b) $\frac{\frac{2}{x^2}}{\frac{10}{x^5}} = \frac{2}{x^2} \div \frac{10}{x^5}$
 $= \frac{2}{x^2} \cdot \frac{x^5}{10} = \frac{x^3}{5}$

3c) $\frac{12x^{-3}y^2}{18xy^{-1}} = \frac{12y^3}{18x^4} = \frac{2y^3}{3x^4}$ 3d) $(5a^{\frac{2}{3}})(4a^{\frac{3}{2}}) = 20a^{4\frac{2}{3} + \frac{3}{2}}$
 $= 20a^{13/6}$

3e) $(4a^{9/3})^{3/2} = 4^{3/2} a^{27/6} = 8a^{9/2}$ 3f) $\log_{10} \frac{1}{100} \Rightarrow 10^x = \frac{1}{100} \quad x = -2$

3g) $\ln e^7 = 7$ 3h) $27^{2/3} = 9$ 3i) $\log_{1/2} 8 \Rightarrow 2^{-x} = 2^3 \quad x = -3$

3j) $\ln 1 = 0$

4) $4x + 10yz - 3 = 0$
 $10yz = 3 - 4x$
 $z = \frac{3 - 4x}{10y}$

5) $f(x) = \{(3,5), (2,4), (1,7)\}$ $g(x) = \sqrt{x-3}$
 $h(x) = x^2 + 5$
 a) $h(g(x)) = (\sqrt{x-3})^2 + 5$
 $= x - 3 + 5$
 $= x + 2$

1) (5b) $g(h(-2)) =$ $g(9) = \sqrt{9-3} = \sqrt{6}$ (5c) $f'(x) = \{(5,3), (4,2), (7,1)\}$
 $h(-2) = (-2)^2 + 5 = 4 + 5 = 9$

(5d) Switch the x & y then solve for y.

$g(x) = \sqrt{x-3}$
 $x = \sqrt{y-3}$
 $x^2 + 3 = y \quad x \geq 0$

(6) $\sum_{n=2}^5 3n - 6 = [3(2) - 6] + [3(3) - 6] + [3(4) - 6] + [3(5) - 6] = 18$

(7a) $m = -2$ pt (3,4) $(y-4) = -2(x-3)$
 $y = -2x + 10$
 b) (1,-3) (-5,2) $m = \frac{-3-2}{1+5} = \frac{-5}{6} = -\frac{5}{6}$
 $(y+3) = -\frac{5}{6}(x-1)$ or $(y-2) = -\frac{5}{6}(x+5)$
 $\frac{22+12}{6} = -\frac{5}{6}x - \frac{12}{6}$

(7c) $m=0$ pt (4,2) $y=2$
 (7d) $\parallel 2x-3y=7$ pt (5,1)
 $\frac{2}{3}x - \frac{7}{3} = y$ $(y-1) = \frac{2}{3}(x-5)$
 $= \frac{2}{3}x - \frac{7}{3}$

(7e) \perp to $m = -2$ pt (3,4) $(y-4) = \frac{1}{2}(x-3)$
 $\frac{1}{2}x - \frac{3}{2} + \frac{8}{2} = y = \frac{1}{2}x + \frac{5}{2}$

8a) $\sin \frac{\pi}{2} = 1$ b) $\sin \frac{3\pi}{4} = \frac{\sqrt{2}}{2}$ c) $\cos \pi = -1$ d) $\cos \frac{7\pi}{6} = -\frac{\sqrt{3}}{2}$
 e) $\cos \frac{\pi}{3} = \frac{1}{2}$ f) $\tan \frac{\pi}{4} = 1$ g) $\tan \frac{2\pi}{3} = \sqrt{3}$ h) $\tan \frac{\pi}{2} = \phi$

9-10 Graph paper

11a) $2x^2 + 5x - 3 = 0$ $(2x-1)(x+3) = 0$
 $x = \frac{1}{2}$ $x = -3$
 11b) $(x-5)^2 = 9$
 $x-5 = \pm 3$
 $x-5 = 3$ $x-5 = -3$
 $x = 8$ $x = 2$
 11c) $(x+3)(x-3) > 0$
 $x = -3$ $x = 3$
 $x < -3$ $x > 3$

$$11d) \log X + \log(X-3) = 1$$

$$\log X(X-3) = 1$$


$$10^1 = X^2 - 3X - 1$$

$$0 = X^2 - 3X - 10$$

$$0 = (X-5)(X+2)$$

$$X = 5 \quad X = -2$$

reject



$$11e) |x-3| < 7$$

$$x-3 = 7 \quad -x+3 = 7$$

$$x = 10 \quad -4 = x$$

$$-4 \leq x \leq 10$$

$$11f) \ln x = 2 \pm 3$$

$$x = e^{2 \pm 3}$$

$$11g) 12x^2 = 3x$$

$$12x^2 - 3x = 0$$

$$3x(4x-1) = 0$$

$$x = 0 \quad x = \frac{1}{4}$$

$$11h) 27^{2x} = 9^{x-3}$$

$$(3^3)^{2x} = (3^2)^{x-3}$$

$$3^{6x} = 3^{2x-6}$$

$$6x = 2x - 6$$

$$4x = -6$$

$$x = -6/4 = -3/2$$

$$11i) x^2 - 2x - 15 \leq 0$$

$$(x-5)(x+3) \leq 0$$

$$x = 5 \quad x = -3$$

$$-3 \leq x \leq 5$$

$$12a) y = x^2 + 3x - 4 \quad y = 5x + 11$$

$$x^2 + 3x - 4 = 5x + 11$$

$$x^2 - 2x - 15 = 0$$

$$(x-5)(x+3) = 0$$

$$x = 5 \quad x = -3$$

$$(5, 36), (-3, 4)$$

$$12b) y = \cos x \quad y = \sin x$$

$$\left(\frac{\pi}{4}, \frac{\sqrt{2}}{2}\right)$$

