SHORT ANSWER GRAB-BAG

1. Rewrite all expressions with positive exponents and combine all terms with the same base. (aka "simplify").

   (a) $\sqrt[3]{x^{-2}}$ $= \left(x^{-2}\right)^{1/3} = x^{-2/3}$

   (b) $b^{(n-1)}(3b^2)^n$ $= 3^n \cdot b^{n-1} \cdot b^{2n} = 3^n\, b^{3n-1}$

   (c) $\frac{6x^2y}{\sqrt{4x^{-2}y^3}}$ $= \frac{6x^2y}{2x^{-1}y^{3/2}} = \frac{3x^3}{y^{1/2}}$

2. For the function $f(x) = \frac{2}{x}$, write $f(3) - f(3+h)$ as a single fraction.

$$f(3)-f(3+h) = \frac{2}{3} - \frac{2}{3+h} = \frac{2(3+h)-2(3)}{3(3+h)} = \frac{6+2h-6}{3(3+h)}$$

$$= \frac{2h}{3(3+h)}$$

3. Expand $(\sqrt{x}-3)(\sqrt{x}+3)$.

   $= x - 9$

4. Solve for x in the equation $1 + e^{2-x} = 4$.

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

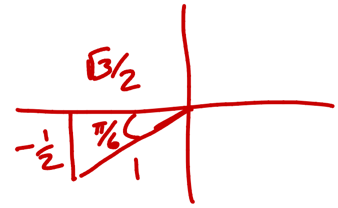
$$2 - x = \ln 3$$

$$\boxed{x = 2 - \ln 3}$$

5. Evaluate:

   (a) $\ln(e^{0.24}) + \ln(1)$ $= 0.24 + 0 = 0.24$

   (b) $\sin(7\pi/6)$ $= -\frac{1}{2}$



6. Solve $x^2 = 6 - x$ for x.

$x^2 + x - 6 = 0$

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

$\boxed{x = -3 \text{ or } x = 2}$

7. Write an equation of the line through the point $(1, 3)$ parallel to the line $8x + 2y = 17$.

$8x + 2y = 17$ or $y = -4x + 17/2$

So $m = -4$

$\boxed{\text{line: } y - 3 = -4(x-1)}$

8. Are the following statements true or false? Explain.

   a. $(\sqrt{5}a - b)^2 = 5a^2 + b^2$ F. $(\sqrt{5}a - b)^2 = 5a^2 - 2\sqrt{5}ab + b^2$

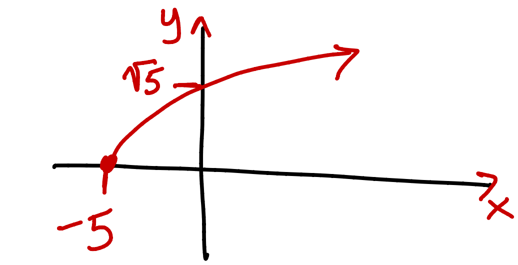
   b. $\sqrt{9x^2 + 4} = 3x + 2$. F. Try $x=1$. $\sqrt{9 \cdot 1^2 + 4} = \sqrt{13}$ but $3 \cdot 1 + 2 = 5$

   c. $\dfrac{a+2}{d+a} = \dfrac{a}{a} + \dfrac{2}{d} = 1 + \dfrac{2}{d}$ F. Try $a = 0$. Then $\frac{a+2}{d+a} = \frac{2}{d} \neq 1 + \frac{2}{d}$

   d. $\dfrac{c^2 + \sqrt{6}}{c} = \dfrac{c^2}{c} + \dfrac{\sqrt{6}}{c} = c + \dfrac{\sqrt{6}}{c}$ T. $\frac{c^2 + \sqrt{6}}{c} = \left(\frac{1}{c}\right)(c^2 + \sqrt{6}) = \frac{c^2}{c} + \frac{\sqrt{6}}{c} = c + \sqrt{6}/c$

9. Graph each function below and state its domain and range. Label your graphs.

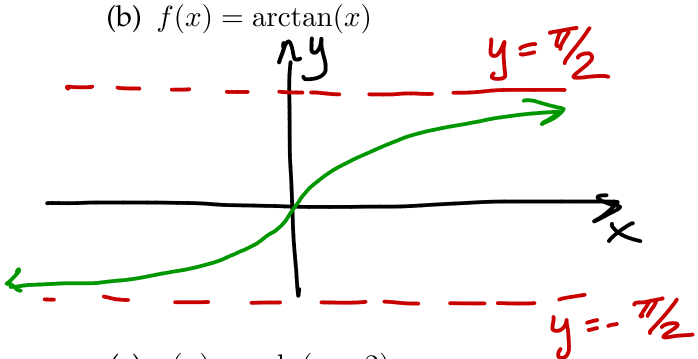
(a) $h(x) = \sqrt{x+5}$



domain: $[-5, \infty)$

range: $[0, \infty)$

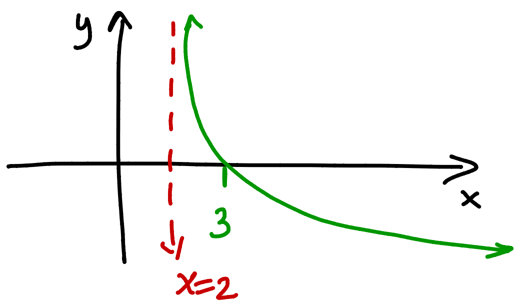
(b) $f(x) = \arctan(x)$



domain: $(-\infty, \infty)$

range: $(-\frac{\pi}{2}, \frac{\pi}{2})$

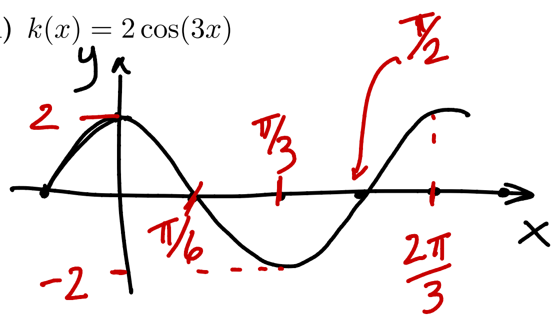
(c) $g(x) = -\ln(x-2)$



domain: $(2, \infty)$

range: $(-\infty, \infty)$

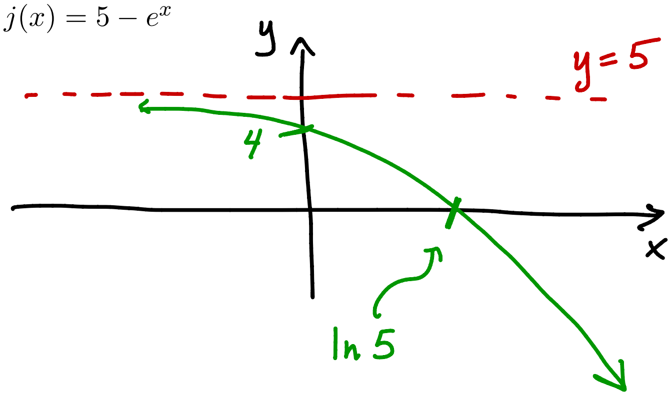
(d) $k(x) = 2\cos(3x)$



domain: $(-\infty, \infty)$

range: $[-2, 2]$

(e) $j(x) = 5 - e^x$



domain: $(-\infty, \infty)$

range: $(-\infty, 5)$

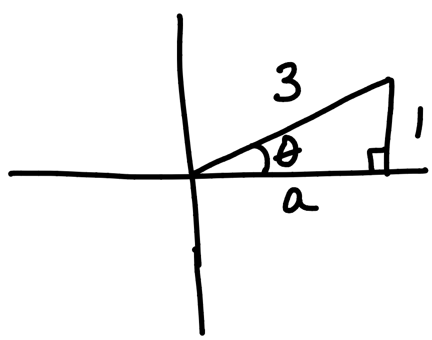
1. Find the domain of $H(t) = \sqrt{4 - 13t^2}$

We want $4 - 13t^2 \geq 0$.

OR $\frac{4}{13} \geq t^2$

So the domain $\left[\frac{-2}{\sqrt{13}}, \frac{2}{\sqrt{13}}\right]$

2. Assume θ is in the first quadrant and $\sin\theta = \frac{1}{3}$. Find $\tan\theta$.

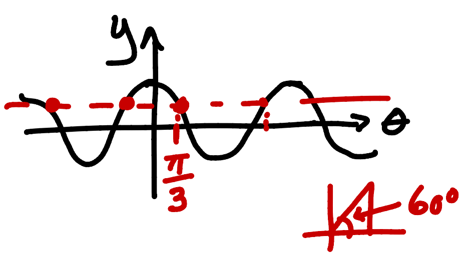


So $a^2 + 1^2 = 3^2$

$a^2 = 8$

$a = 2\sqrt{2}$

Now $\tan\theta = \frac{\text{opp}}{\text{adj}} = \frac{1}{2\sqrt{2}}$



3. (BONUS:) For each equality below, find θ and explain why the answers are different.

(a) $\cos(\theta) = 1/2$

$\theta = 2\pi k + \frac{\pi}{3}$ or $2\pi k - \frac{\pi}{3}$

where k integer

(b) $\arccos(1/2) = \theta$

$\theta = \frac{\pi}{3}$

Part b is asking for the output of a function. So there is only one value. Part a is asking for all θ-values so that $\cos\theta = \frac{1}{2}$