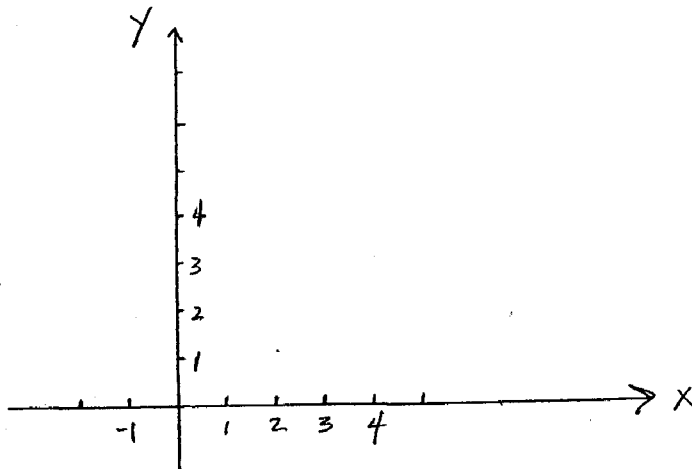


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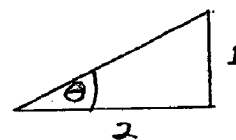
Prof. J. D'Archangelo

1. a) Find an equation for the line going through the point $(2, 2)$ and perpendicular to the line $2y - x = 2$.

b) Graph and label both lines in part a) on the given set of axes.



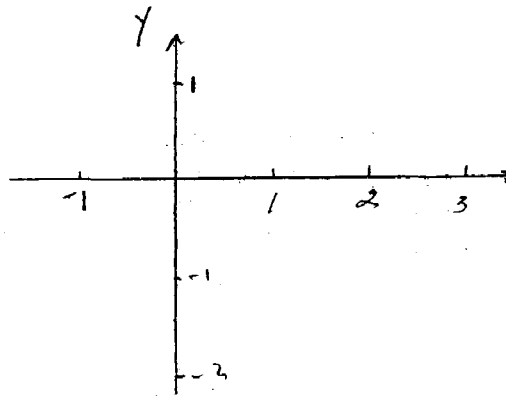
2. a) For the right triangle shown, which trigonometric function applied to θ gives a result of $\frac{\sqrt{5}}{2}$?



b) For the triangle in part a), find the angle θ (in radians) to two decimal places.

3. Let $f(x)$ be the second degree polynomial satisfying $f(1) = f(2) = 0$; $f(0) = -2$.

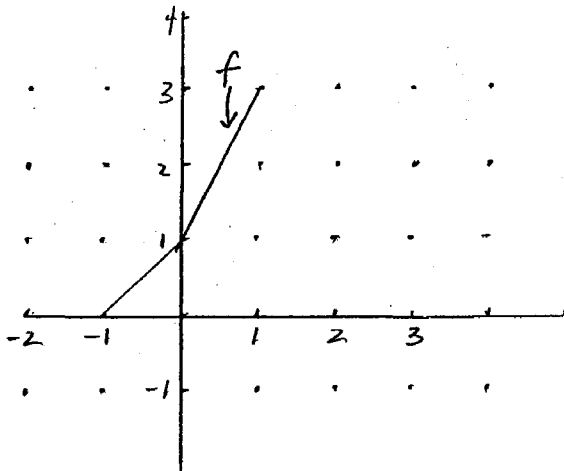
a) Sketch the graph of $y = f(x)$ on the axes to the right.



b) Find a formula for $y = f(x)$.

c) Find the range for the function $y = f(x)$.

4. The graph of a function $y = f(x)$ is shown below.



On the same axes as $y = f(x)$,

a) Plot the graph of $y = f^{-1}(x)$ (inverse), and

(label your graphs.)

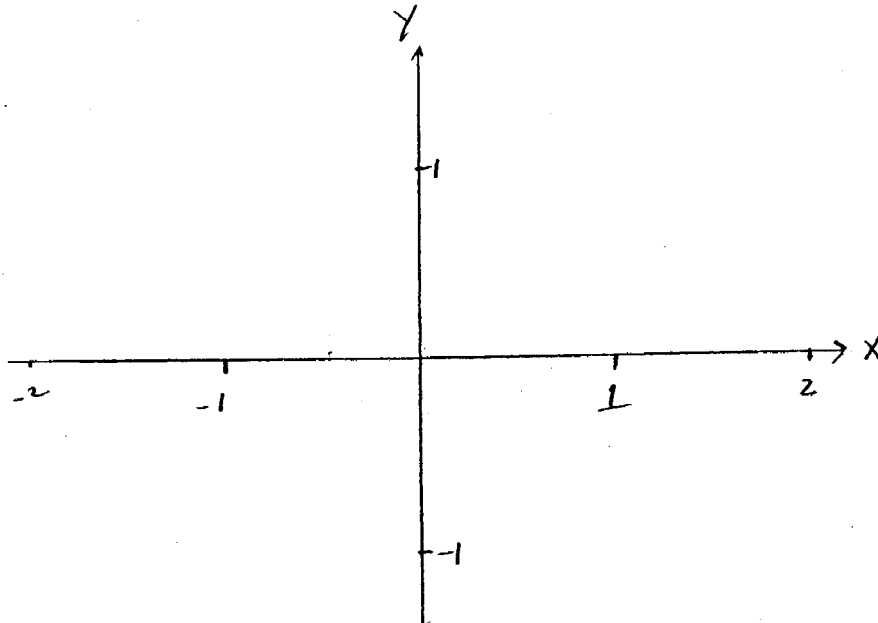
b) plot the graph of $y = -f(x) + 1$.

5. If $f(x) = \sqrt{x}$ and $g(x) = 2 - x$,

a) find $(g \circ f)(x)$ and give its domain and range,

b) find $(f \circ g)(x)$ and give its domain and range.

6. Use your calculator and graph $y = x^3 + x$ and $y = \cos(2x)$ on the same axes below and determine any points of intersection accurate to 1 decimal place.



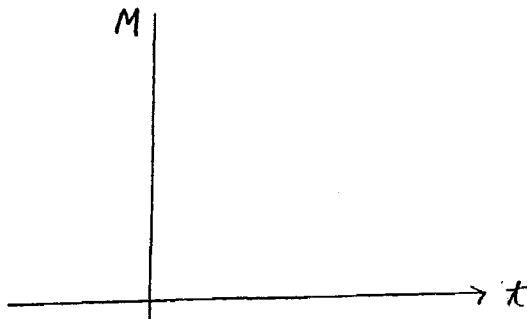
7. a) If $\log_a(x) = 2$ and $\log_a(y) = 3$, find $\log_a(a^4 x^3 / y)$.

b) Solve for x to two decimal places if $9 = 4 + 5(e^{2x} - 3)$.

8. If we start with 10 grams of radio-active material, and it decreases by $\frac{1}{2}$ every 4 days (half-life),

a) How much material is left after 8 days?

b) Sketch a graph of the amount of material M versus the time t .



c) Find a formula for the amount M as a function of t .

d) At what time will the material equal 0.1 grams?