

### Placement Quiz Solutions

Each problem, one through six, was worth four points for a total of 24.

Students with scores less than or equal to 10 are required to see me to get full credit for the quiz.

1.

$$\begin{aligned}\sin\left(\frac{\pi}{2}\right) &= 1, \\ \frac{x^2 x^{-1/3}}{x^{-a}} &= x^{2-(1/3)+a} = x^{a+5/3}, \\ \frac{\frac{zy}{x-1}}{\frac{y}{x-1}} &= \frac{zy}{x-1} \frac{x-1}{y} = z, \quad \text{and} \\ \ln(a+b) &= \ln(a+b) \quad (\text{i.e. no simplification}).\end{aligned}$$

2. If  $f(x) = 2x^2 - 1$  then

$$\begin{aligned}\frac{f(x+h) - f(x)}{h} &= \frac{[2(x+h)^2 - 1] - [2x^2 - 1]}{h} = \frac{2(x^2 + 2xh + h^2) - 1 - 2x^2 + 1}{h} \\ &= \frac{2x^2 + 4xh + 2h^2 - 2x^2}{h} = 4x + 2h\end{aligned}$$

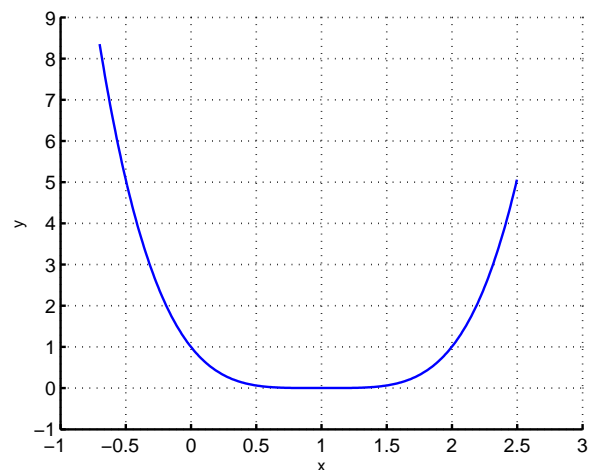
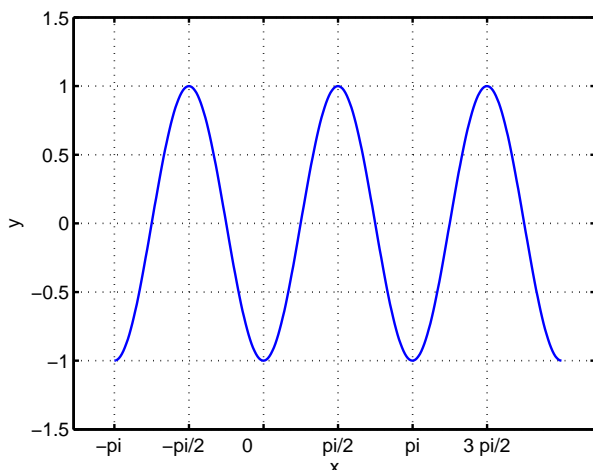
3. Find the common denominator:

$$\frac{1}{x-1} - \frac{1}{x} = \frac{x}{(x-1)x} - \frac{x-1}{(x-1)x} = \frac{x - (x-1)}{(x-1)x} = \frac{1}{(x-1)x}.$$

4. The equation for the line passing through  $(1, 4)$  and  $(2, 0)$  has slope  $m = \frac{0-4}{2-1} = -4$  and general form  $y - y_0 = m(x - x_0)$  so the equation is

$$y - 4 = -4(x - 1) \quad \text{or} \quad y = -4x + 8.$$

5 & 6. Not sketches, but rather computer-generated graphs of  $h(x) = -\cos(2x)$  and  $g(x) = (x-1)^4$ ,



respectively.