**Math 145 Sec S08N01 - Quiz 4** **Name:** SOLUTIONS.
**Feb 18 2008** **Stu#:**

**(1)[4 points]** Suppose the points $(-2, 1)$ and $(3, -4)$ are on the graph of $y = f(x)$. Find the corresponding points if the graph of $f$ is shifted 1 unit up and 4 units to the left,

$(-2,1)$ & $(3,-4)$ are on graph of $y = f(x)$.
Transformations results in graph of $y = f(x+4)+1$,
so corresponding points are

$(-2-4, 1+1)$ & $(3-4, -4+1)$,

i.e. $(-6,2)$ & $(-1,-3)$

**(2)[3 points]** The graph of $f(x) = x^4$ is reflected in the $x$-axis and shifted left 7 units. Find the equation of the resulting graph (do not graph.)

Transformations result in graph of $y = -f(x+7)$,

i.e. $y = -(x+7)^4$

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(3)[**4 points**] Find the point of intersection of $f(x) = 4x + 7$ and $g(x) = \frac{1}{3}x + \frac{10}{3}$.

$y = 4x + 7$ ; $y = \frac{1}{3}x + \frac{10}{3}$

$\therefore 3y = x + 10$

$x = 3y - 10$

$\therefore y = 4(3y - 10) + 7$

$y = 12y - 40 + 7$

$11y = 33$

$y = 3$

$\therefore x = 3y - 10$

$x = 3(3) - 10$

$x = -1$

$\therefore$ Point of intersection is $(-1, 3)$

(4)[**3 points**] Find the ~~maximum~~ minimum value of $f(x) = 3x^2 - 8x + 1$.

$$f(x) = 3\left[x^2 - \frac{8}{3}x + \frac{1}{3}\right]$$
$$= 3\left[\left(x - \frac{8}{6}\right)^2 - \left(\frac{8}{6}\right)^2 + \frac{1}{3}\right]$$
$$= 3\left[\left(x - \frac{4}{3}\right)^2 - \left(\frac{4}{3}\right)^2 + \frac{1}{3}\right]$$
$$= 3\left(x - \frac{4}{3}\right)^2 \underbrace{- \frac{13}{3}}_{\text{minimum}}$$

$\therefore$ minimum of $f$ is $\frac{-13}{3}$.