In preparation for the quiz on Thursday, solve each of these short problems in the space provided before looking at their solutions at the end of the document.

http://faculty.nwfsc.edu/web/math/storyd

All class assignments and other announcements will be posted on this web site.

1. Let \( P(-4, 2) \) and \( Q(2, -3) \) be two points in the plane.
   (a) Find the distance \( d(P, Q) \) between \( P \) and \( Q \).

   (b) Find the midpoint \( M \) between \( P \) and \( Q \).

2. Complete each of the two sentences below with correct entries.
   (a) The function \( g(x) = |x + 2| \) can be graphed from the library function \( f(x) = |x| \) by shifting it ___
       units _______________ (horizontally/vertically) __________ (left/right/up/down).
   (b) The function \( g(x) = 5 - x^2 \) can be graphed from the library function \( f(x) = x^2 \) by first reflecting it
       with respect to the ___ axis, then shifting it ___ units _______________ (horizontally/vertically)
       __________ (left/right/up/down).

3. The circle \( x^2 + y^2 = 25 \) passes through the point \( P(3, 4) \). Let \( \ell \) be the line passing though the origin
   and the point \( P \). Find the equation of the line perpendicular to line \( \ell \) and passing through point \( P \).

4. If the slope the a line is negative, then the line is
   □ increasing     □ decreasing     □ constant     □ none of these
Solutions to HW #2

1. (a) We use the distance formula
   \[ d(P,Q) = \sqrt{(2 + 4)^2 + (-3 - 2)^2} = \sqrt{61} \]
   to obtained the required answer.

1. (b) We use the midpoint formula
   \[ M = \left( \frac{-4 + 2}{2}, \frac{2 + (-3)}{2} \right) = \left( -1, \frac{-1}{2} \right) \]
   to obtained the required answer.

2. (a) The function \( g(x) = |x + 2| \) can be graphed from the library function \( f(x) = |x| \) by shifting it 2 units horizontally left.

2. (b) The function \( g(x) = 5 - x^2 \) can be graphed from the library function \( f(x) = x^2 \) by first reflecting it with respect to the \( x \) axis, then shifting it 5 units vertically upward.

3. The slope of the line perpendicular to \( \ell \) is \( m = -\frac{3}{4} \), the line must pass through \( (3, 4) \); thus, the line is
   \[ y - 4 = -\frac{3}{4}(x - 3) \implies y = -\frac{3}{4}x + \frac{25}{4} \]. Thus,
   \[ y = -\frac{3}{4}x + \frac{25}{4} \]
   This is the equation of the line tangent to the circle at \( P(3, 4) \).

4. If the slope the a line is negative, then the line is
   - ✔ increasing
   - maintaining decreasing
   - maintaining constant
   - maintaining none of these