Reading Responses and Reflection 2 – Due 6pm Sun. Apr. 13

Precalculus Reading

1. The standard form of a quadratic function is $f(x) = ax^2 + bx + c$. The vertex form (also called the transformation form) of a quadratic function is $f(x) = a(x - (h))^2 + k$. Note that the a in the standard form is the same as the a in the vertex form. In the following questions use the ^ symbol to indicate a superscript, e.g. type b^2 to mean b^2

1. a) Give an expression for the parameter h in terms of the parameters a, b, or c.
1. b) What does h tell you about the graph of the quadratic function?
1. c) Give an expression for the parameter k in terms of the parameters a, b, or c.
1. d) What does k tell you about the graph of the quadratic function?
1. e) What is f(0) in terms of a, b, and c?
1. f) What is f(h) in terms of a, h, and k?

2. Look at the quadratic function graphed for Exercise 1 on p. 172 to answer the following questions.

2. a) What are the coordinates of the vertex?
2. b) What is the y-intercept?
2. c) Estimate the x-intercepts (also called the roots).

3. Look at the second half of Example 2 on p. 164, from "...we can expand the formula and simplify terms:". Look at each step of the subsequent algebra, and re-write it into your notes, filling in any missing steps that make it clearer to you. Note that the first expression $g(x) = ½ (x+2)^2 - 3$ is really the vertex form $g(x) = ½ (x- (-2))^2 + (-3)$ for the parabola.

3. a) Identify any steps where you have trouble following the algebra and be specific in your description (example: Between steps 3 and 4, the parenthesis disappeared and I'm not sure what happened to them). Make sure you have these in your notes also, and bring your notes to Monday's class sessions.
3. b) Evaluate g(3).

4. The discussion that begins on the bottom of p. 169 and continues through p. 170 shows how to find the x-intercepts (also called the roots) of a general quadratic function. Look at each step of this process (both algebra steps and the discussion) and re-write it into your notes, filling in any missing steps that make it clearer to you.

4. a) Identify any steps where you have trouble following the algebra and be specific in your description. (Write in your notes, bring to class)
4. b) Is the formula $f(x) = a (x + b/(2a))^2 + (c - b2/4a)$ at the bottom of p169 in

Standard form Vertex form Standard form using vertex form parameters Vertex form using standard form parameters

Physics Reading

1. Pay particular attention to the discussion "Notation: t, x, v, a" on p. 51 - 52 and make sure you have in your notes the physical meanings of each of the symbols in Eq. (2.24). Similarly, review Eqs. (2.52), (2.53), and (2.54) on p. 57, copy these important special case of constant acceleration equations into your notes, and make sure you have included the physical meaning of all the symbols.

1. a) Look at the statement of the problem in Example 2.12, part (a) on p. 57. Try not to look at the worked out solution if you can. Which of the following quantities do you know from the problem statement? Check all that apply.

t x_o x or x_f $\Delta x = x - x_o$ v_o v or v_f $\Delta v = v - v_o$ a

1. b) What are you being asked to find in Example 2.12 (a)? Check all that apply.

t x_o x or x_f $\Delta x = x - x_o$ v_o v or v_f $\Delta v = v - v_o$ a

1. c) Which of the following equations would you use to answer the question in Example 2.12 (a)? Check all that apply.

$x = x_o + v_o t + ½ a t^2$ $v = v_o + a t$ $v^2 = v_o^2 + 2 a (x - x_o) = v_o^2 + 2 a \Delta x$ Not enough information to answer.

1. d) Look over the solution to Example 2.12. What questions do you have? (Write in notes, bring to class)

2. Consider two balls that have identical size and shape. One ball is made of lead and is about 4 times more massive than the second ball which is made of aluminum. Both balls are released from rest at the same time from shoulder height above flat ground. Neglect air resistance. Which ball hits the ground first?

lead ball aluminum ball hit at the same time

3. A ball is launched straight up in the air starting from the ground, reaches its maximum height, and comes straight down landing back on the ground. Neglect air resistance.

3. a) On its way up, which of the following are true about the directions of the acceleration and the velocity? Check all that apply.

v points up v is 0 v points down a points up a is 0 a points down

3. b) At the moment when it is at the very top (at its maximum height), which of the following are true about the directions of the acceleration and the velocity? Check all that apply.

v points up v is 0 v points down a points up a is 0 a points down

3. c) On its way down, which of the following are true about the directions of the acceleration and the velocity? Check all that apply.

v points up v is 0 v points down a points up a is 0 a points down