EXAM REVIEW

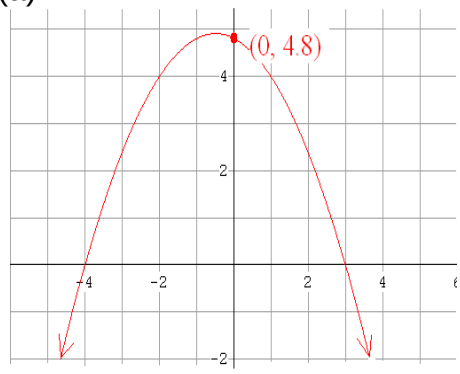
CHAPTER 3: Quadratic Models: Standard & Factored Forms

1. Write each of the following in standard form.
   (a) $f(x) = (3x+1)(x-2)$
   (b) $f(x) = (2+3x)(x-3)$

2. Write each of the following in factored form.
   (a) $f(x) = x^2 - 16$
   (b) $f(x) = x^2 + 3x - 18$
   (c) $f(x) = 5x^2 - 20$

3. Determine the zeros, the axis of symmetry, and the maximum and minimum value for each of the following quadratic equations. Show your work.
   (a) $f(x) = 3x^2 - 3x$
   (b) $f(x) = -\frac{1}{2}x^2 - x - \frac{3}{2}$
   (c) $f(x) = -4x^2 - 12x + 7$

4. Write the corresponding quadratic equation for each of the following functions.
   Leave your answer in factored form.
   (a)



   (b)

   The function has zeros at $x = 2$ and $x = 7$ and passes through the point $(0, -4)$

5. Can all quadratic equations be solved by factoring? Explain.

6. Solve for x by factoring. Show your work.

   (a) $4x^2 + 4x - 3 = 0$ (b) $x^2 + 6x - 3 = -3$

7. A firecracker is fired from the ground. The height of the firecracker at a given time is modelled by the function $h(t) = -5t^2 + 40t$, where $h(t)$ is the height in metres and t is time in seconds.
   (a) When will the firecracker hit the ground?
   (b) What is the maximum height of the firecracker?
   (c) When does the firecracker reach a maximum height?
   (d) When will the firecracker reach a height of $75\ m$?

8. The population of a city $P(t)$ is modeled by the function $P(t) = 0.5t^2 + 10t + 200$, where $P(t)$ is the population in thousands and t is time in years. NOTE: $t = 0$ represents the year 2000. According to the model,

   (a) in what year will the population reach 312 000?
   (b) will the population reach over 2 million people by the year 2050? Show your work.

9. A quadratic equation has zeros $x = -4$ and $x = 2$. The minimum height is -5 units. Find the y-intercept for this quadratic equation (correct to 2 decimal places).

10. A toy rocket sitting on a tower is launched vertically upward. Its height y at time t is given in the table.

Time (in seconds)	***Height (in metres)***
0	16
1	49
2	60
3	85
4	88
5	81
6	64
7	37
8	0

   (a) Sketch this curve on a grid.
   (b) What is a possible equation for the curve of good fit? Show your work.

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