# MCR3U Unit 1 Supplement

Name: _____

1. Let $f(x)=2x^2-32$ .

   Let $g(x)=f(x-2)$

a) Find an expression for *g(x)* in standard form.

b) Factor *f(x)* and *g(x)* fully.

c) What is the relationship between the x-intercepts of *f(x)* and *g(x)*?

2. A function is said to be **even** if $f(x)=f(-x)$ .

a) Let $f(x)=x^2+6$ . Calculate $f(1)$ and $f(-1)$ . Are they equal?

b) What property of **even** functions allow the parity of *x* to be positive OR negative?

c) Let $p(x)=\cos x$ . Test a couple of different values for *x* and predict whether *cos x* is an even function or not.

3.

a) The line $x+y=3$ intersects the parabola $y=x^2+1$ at two points A and B. Determine the co-ordinates of A and B.

b) If C is the vertex of the given parabola, determine the area of $\Delta ABC$ .

4. If $f(x)=x^2-7x+k$ and $f(k)=-9$ , then what is k?

5. For the equation $(1-3k)x^2+3x-4=0$ to have real roots, the largest integral value of that $k$ may have is...?

6. An isoceles triangle has two fixed points at (5,0) and (-5,0). Its third vertex can be found anywhere along the y-axis at $(0,h)$ . A parabola has fixed *x*-intercepts of 5 and -5, and is always just tall enough to cover the entire triangle. Find an equation for the parabola, dependent on *h*.

7. Consider a parabola that has $x$-intercepts at 0 and 8, with a vertex at (4,32).

a) What is the slope between the points on the parabola $(3,30)$ and (4,32)?

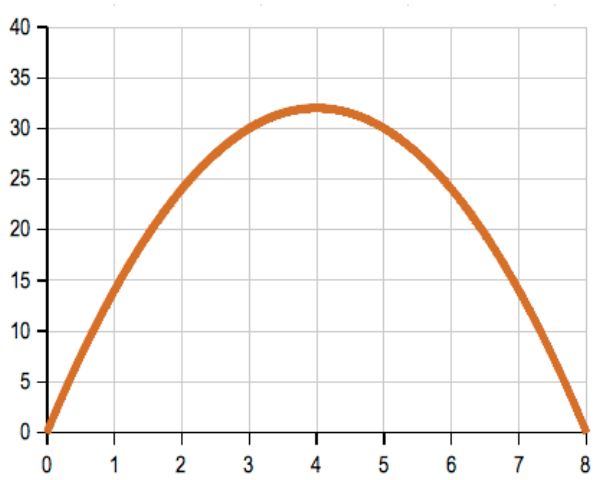
b) What is the slope between the points on the parabola $(3.9,31.98)$ and (4,32)?

c) What is the slope between the points on the parabola $(3.99,31.9998)$ and (4,32)?

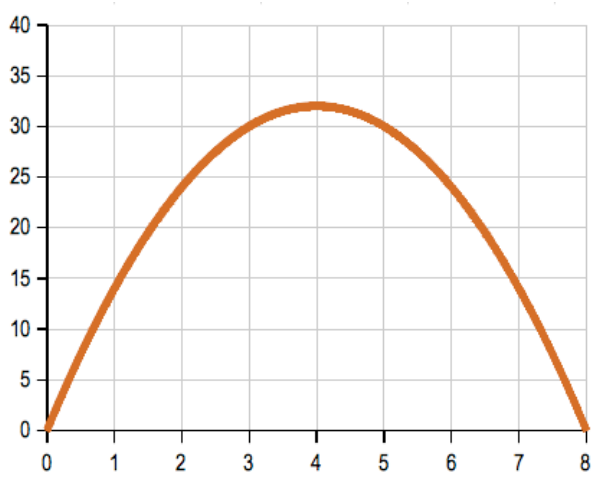
d) Using these values, predict the slope of the parabola at **exactly** (4,32).

e) Using your prediction from (d), find the $y$-intercept of the line that passes through (4,32) with that slope.

f) Draw your line on the grid below. What do you notice about how it intersects the parabola?




8. Consider a parabola that has $x$-intercepts at 0 and 8, with a vertex at (4,32).




What is the area bounded by the parabola and the x-axis, from $0 \le x \le 8$ ?