KEY

Mr T

GRADE 11 APPLIED
UNIT A - QUADRATICS
PRACTICE TEST

As always you may use your green sheet course reference notes.
Show work for best marks
Round non-integers values to two decimal places.

1. **Complete the table** *and* **Manually** (no graphing calculator) graph the quadratic function:

$$y = -\frac{1}{2}x^2 + 4x$$

Work

Table:

x	y
-2	
0	0
3	7.5
4	8
5	7.5
8	0
10	

$= 0$

$-\frac{1}{2}(3)^2 + 4(3) = -4.5 + 12 = +7.5$

$-\frac{1}{2}(4)^2 + 4(4) = -8 + 16 = 8.$

$-\frac{1}{2}(5)^2 + 4(5) = -12.5 + 20 = +7.5$

$-\frac{1}{2}(8^2) + 4(8) = -32 + 32 = 0.$

a. State the vertex point:
(4 , 8)

b. State the **x–intercepts**:
(0 , 0) , (8 , 0)

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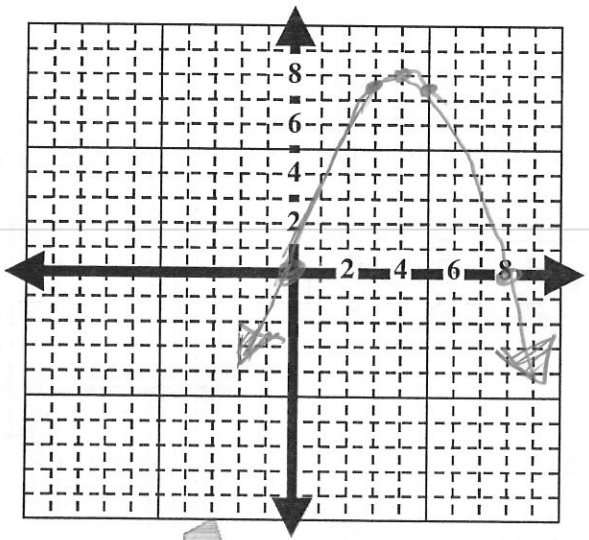
c. State the **y–intercept**:
(0 , 0)

d. State the equation of the axis of symmetry:
x = 4.



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2. **Now** you may use the graphing feature of a **graphing calculator**. Sketch the following two quadratic functions and label them **f** and **g.**

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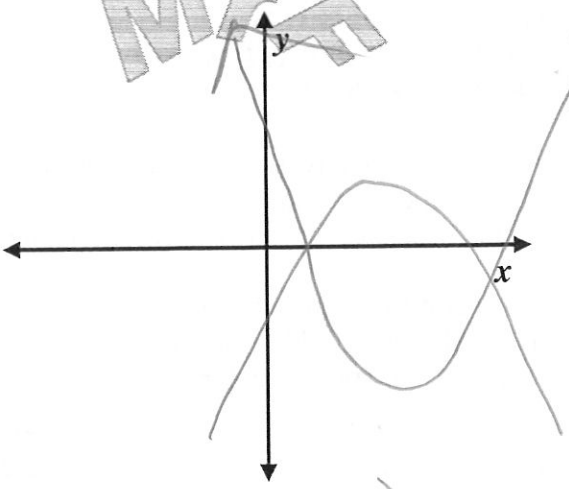
a. $y = f(x) = (x - 8)(x - 2)$

b. $y = g(x) = -\frac{1}{3}x^2 + 3x - 3$



sketch: no individual points to make accurate, just put significant points of the curve in the correct quadrant, copy from graphing tool if necessary*

3. For the above two graphs of quadratic functions state for each:

Vertex: f(x): (5 , -9) g(x): (4.5 , 3.75)

Line of Symmetry: for f(x); x = 5 **Line of Symmetry for g(x) ; x =** 4.5

y-intercept: f(x): (0 , 16) g(x): (,) (0, -3)

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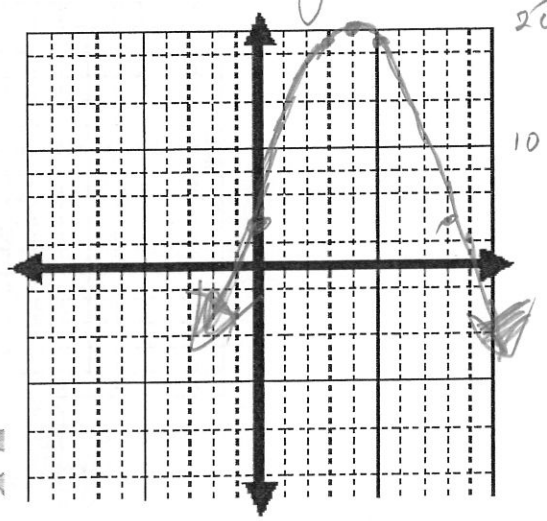
x-intercept(*s*): f(x): (8 , 0) (2 , 0) g(x): (,) (,) (1.15, 0) & (7.85, 0)

Domain: f(x): $-\infty < x < \infty$. g(x): $-\infty < x < \infty$.

Range: f(x): $y \geq -9$ g(x): $y \leq 3.75$.

4. Find the quadratic function from the following points:

x	0	3	4	5	8
y	4	19	20	19	4



Count by 2's in y-scale

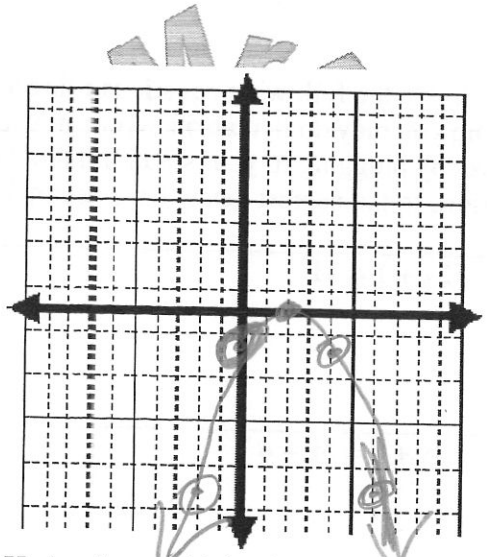
R^2 is: 1

The quadratic equation is;

$y =$ $-1x^2 + 8x + 4$

5. Find the quadratic function from the following points:

x	0	2	5	10	
y	-2	0	-4.5	-32	



R^2 is: 1

The quadratic equation is:

y = $-0.5x^2+2x-2$.

6. Brandon installs eaves troughs and soffits. He has been told that if he wants to maximize his income he has to charge just the right optimum price. If he charges too little then he doesn't earn lots of money, if he charges too much then he has no customers. He read in **Roofers Monthly** (**$4.95** at Shoppers) that his daily profit can be calculated from the formula:

daily profit = $10.5m - 0.25m^2$;

where profit is dollars per day and '***m***' is the price he charges per ***m*eter** of eaves trough. What is the price he should charge to optimize his profit and what will his daily profit be?

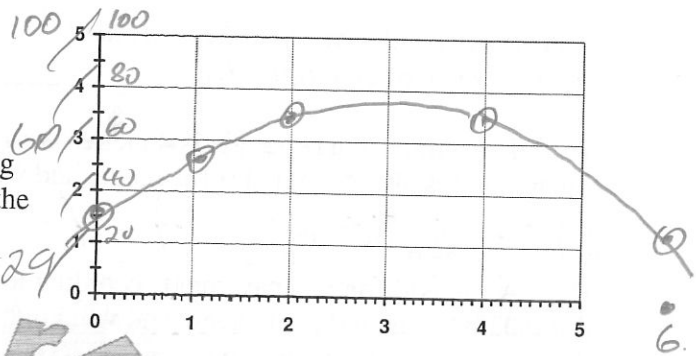
Optimum price, m, to charge: $21

Optimum Daily Profit: $110.25

7. Cameron is trying to calculate the equation for falling bodies (on earth). He knows the curve for height as a function of time is quadratic, the more time they spend falling the faster they go! From the roof of the AbCentre he throws a ball **upward** and measures with a stop watch the following data:

Time [secs]	0	1.05	2.0	4.02	6.1
Height [m]	30	53.4	70	70	25

a. plot and graph your **data plot** (the observed data points) *and* the resultant **function graph** to the right.



b. what is your equation for bodies falling on the earth and is it a good fit? (of course the calculator uses **y**'s and **x**'s, you use **h**'s and **t**'s). **h** = $-5t^2+30t+29$

c. when is the ball at a height of **20** meters? **t** = 6.26 seconds.

8. Solve the following equations using a graphing tool. If you know how to solve with algebra you may do that **also** to confirm your results. Don't forget to always check your answer by plugging in your solution(s) to the original equation! Round any non-integer solutions to the nearest penny (two decimal places)

a. $2x + 1 = 11$	x = 5
b. $3x + 1 = 3x - 4$ *trick!*	x = No solution parallel lines!
c. $(x - 2)^2 = 9$ $x-2 = \pm 3$ $x = 2 \pm 3$ *lol!*	x = 5 or -1
d. $x^2 - 4x - 2 = 3$ $x^2 - 4x - 5 = 0$. $(x-5)(x+1) =$	x = 5 or -1
e. $-4.9t^2 + 30t = 20$ *a baseball question!*	t = 0.76 secs or 5.36 secs.
f. $x(x - 1)(x + 2)(x + 4) = 0$ *This is new! A quartic equation, exponent of 4. A squared quadratic , lol*	x = 0, 1, -2, -4

9. The **length** of a rectangle is **4** metres *more than* its **width**. The area of the rectangle is **30** square metres, **30m²**. What is the length and width of the rectangle?

$w = 3.83$ m $A = l \cdot w = (w+4)(w)$.

10. A car skids on wet pavement according to the formula **distance= 0.02 * speed²**; or **d = 0.02*v²;** where **d** is in meters and **v** in km/hr. How far does a car skid at **80**km/h? ____ 128 m!

What speed was the car going if it leaves a skid mark of **55** meters? _____

→ 52.44 km/hr!