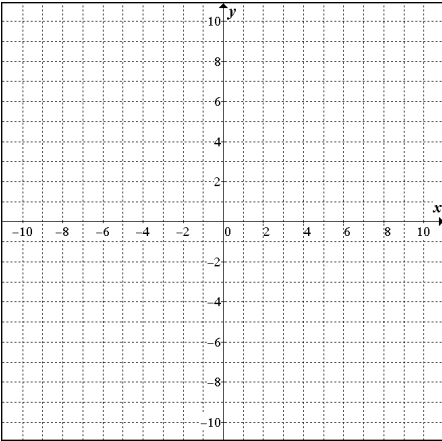
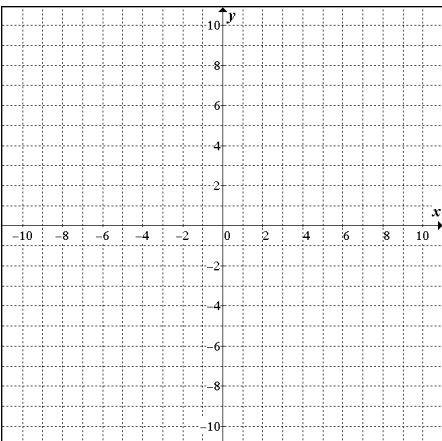
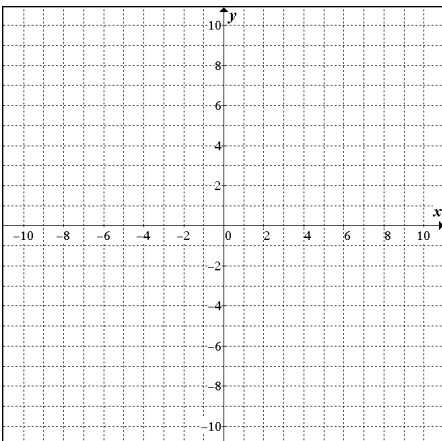


1. Fill in the blanks for each of the following quadratic functions.

- | | | |
|---------------------------------|-----------------------------|----------------------------|
| a) $y = (x+2)^2 - 3$ | vertex _____ | direction of opening _____ |
| b) $y = -(x-1)^2 - 3$ | axis of symmetry _____ | y-intercept _____ |
| c) $y = \frac{2}{3}(x-5)^2 + 6$ | min/max? _____ | min/max value _____ |
| | wide/nar/std? _____ | |
| d) $y = -x^2 - 1$ | vertex _____ | axis of symmetry _____ |
| e) $y = -2(x-2)^2 - 5$ | min/max? _____ | min/max point _____ |
| | direction of opening _____ | |
| f) $y = -(x+2)^2$ | y-intercept _____ | vertex _____ |
| g) $y = 4 - x^2$ | min/max? _____ | min/max value _____ |
| | direction of opening _____ | |
| h) $y = x^2 - 12x$ | x-intercepts (if any) _____ | vertex _____ |

2. Draw accurate graphs of the following functions. Clearly indicate at least 5 points used to plot the curve.

<p>a) $y = (x-3)(x+1)$</p> 	<p>b) $y = 2(x-4)^2 - 6$</p> 	<p>c) $y = -2x^2 + 4x - 3$</p> 
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3. Determine the equations of the following parabolas for the given information.

- vertex (0,0) passing through the point (2,1)
- vertex $(3, -\frac{1}{2})$ and y-intercept 4
- axis of symmetry $x = -7$, with a maximum value of 3, with the same shape as $y = x^2$
- minimum point of $(-1, -9)$ with x-intercepts of 2, -4
- with points (7,0), (10,6), (13,0) on the parabola.

4. A rectangular parking lot is to be fenced on three sides leaving the fourth side open to the street. If there is 800 metres of fencing available, determine the dimensions that would produce the maximum area.
5. Solve each of the following:
- a) $3x^2 - 8x + 2 = 0$ b) $(3x - 5)(x - 2) = 6$ c) $5x^2 - x - 4 = 0$
d) $x^2 - 5x = 6$ e) $2x(x + 7) = 5 - 2x$ f) $3(x - 1)^2 = 2x$
6. The square of a negative number is 17 more than 4 times the number. Determine the number, accurate to 3 decimal places.
7. Two numbers differ by 6. If their product is a minimum, determine these numbers.
8. A football is kicked so that its height after t seconds is given by, $h = 28t - 5t^2$. Determine the maximum height of the ball, and the length of time it is in the air.
9. A rectangular lot is 15 m longer than it is wide. If the area is 1000 m^2 , determine the length.
10. Find the x and y intercepts of the graph of $y = 3x^2 - 8x + 4$.
11. A baseball is hit into the air. Its height h , in metres, after t seconds is $h = -4.9(t - 2.8)^2 + 39$. (*Round to 2 decimal places.*)
- a) How high off the ground was the ball when it was hit? _____
- b) What is the maximum height of the ball? _____
- c) What is the height of the ball after 2.5 s? _____
- d) At 2.5 s, is the ball on its way up or down? _____
- e) To 2 decimal places, when does the ball hit the ground? _____
12. Complete the table:

#	Equation	Equation of axis of symmetry	Optimum Value	Is optimum value a max or a min?	y-intercept
a	$y = 2x^2 - 4$				
b	$y = 2(x - 4)^2$				
c	$y = -2x^2 - 4x$				
d	$y = 2(9 - x)(x - 5)$				

13. For each quadratic equation, indicate the number of real roots which exist: 0, 1 or 2.
- a) $x^2 + 5x + 7 = 0$ _____ b) $x^2 + 5x - 7 = 0$ _____ c) $x^2 - 22x + 121 = 0$ _____
d) $3x^2 + x + 7 = 0$ _____ e) $49x^2 - 112x + 64 = 0$ _____ f) $3x^2 - 10x + 4 = 0$ _____
g) $100x^2 - 50x + 3 = 0$ _____ h) $100x^2 - 50x + 7 = 0$ _____ i) $75x^2 + 2x - 30 = 0$ _____

Date: _____

14. Match each of the equations given below with one of the parabolas in either of the graphs. Place the number corresponding to the correct parabola beside the matching equation. *Hint: Start with the simplest of the equations and try to find graphs to match them.*

a) $y = 3(x-3)^2$ _____	b) $y = -3x^2 - 3$ _____	c) $y = -3(x+3)^2$ _____
d) $y = x^2 + 3$ _____	e) $y = (x+3)^2$ _____	f) $y = (x-3)^2$ _____
g) $y = -x^2 - 3$ _____	h) $y = -\frac{1}{3}(x-3)^2$ _____	i) $y = -\frac{1}{3}x^2 + 3$ _____

15. Give the equation of each parabola at left.

a: _____

b: _____

c: _____

d: _____

e: _____

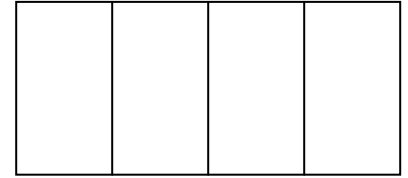
f: _____

g: _____

h: _____

16. Find the points of intersection of the line $y = \frac{1}{3}x - \frac{7}{3}$ ① and the circle $(x+3)^2 + (y-5)^2 = 65$ ②.

17. A field is enclosed and divided into 4 sections by using fences as shown in the diagram. If a total of 900 m of fencing is available, what is the maximum total area which can be enclosed and what are its dimensions?



Answers:

1. a) $-2, -3$, up b) $x = 1, -4$ c) min, 6, wide d) $(0, -1), x = 0$
 e) max, $(2, -5)$, down f) $-4, (-2, 0)$ g) max, 4, down h) 0, 12 ; $(6, -36)$

3. a) $y = \frac{1}{4}x^2$ b) $y = \frac{1}{2}(x-3)^2 - \frac{1}{2}$ c) $y = -(x+7)^2 + 3$
 d) $y = (x+1)^2 - 9$ e) $y = -\frac{2}{3}(x-10)^2 + 6$

4. 200 m \times 400 m

5. a) $\frac{4 \pm \sqrt{10}}{3}$ b) $\frac{11 \pm \sqrt{73}}{6}$ c) $1, -\frac{4}{5}$ d) 6, -1 e) $\frac{-8 \pm \sqrt{74}}{2}$ f) $\frac{4 \pm \sqrt{7}}{3}$

6. -2.583 7. 3, -3 8. 39.2 m; 5.6 s 9. 40 m 10. $2, \frac{2}{3}$; 4

11. a) 0.58 m b) 39 m c) 38.56 m d) up e) 5.62 s

12.	Equation	Equation of axis of symmetry	Optimum Value	Is optimum value a max or a min?	y-intercept
a	$y = 2x^2 - 4$	$x = 0$	-4	min	-4
b	$y = 2(x-4)^2$	$x = 4$	0	min	32
c	$y = -2x^2 - 4x$	$x = -1$	2	max	0
d	$y = 2(9-x)(x-5)$	$x = 7$	8	max	-90

13. a) 0 b) 2 c) 1 d) 0 e) 1 f) 2 g) 2 h) 0 i) 2

14. a) 9 b) 6 c) 12 d) 1 e) 8 f) 10 g) 5 h) 14 i) 3

15. a) $y = 4x^2$ b) $y = 2x^2 - 5$ c) $y = -\frac{2}{9}x^2$ d) $y = \frac{4}{5}(x-4)^2 - 9$
 e) $y = -\frac{1}{2}(x+2)^2 - 8$ f) $y = -\frac{1}{16}(x+3)^2 - 7$ g) $y = -\frac{1}{36}(x+4)^2 - 6$ h) $y = \frac{7}{2}(x+7)^2 - 5$

16. $(-2, -3); (1, -2)$

17. 20250 m² ; 90 m \times 225 m