READY, SET, GO! Name Key Period Date

READY

Topic: Symmetry and Distance

The given functions provide the connection between possible areas, *A(x)*, that can be created by a rectangle for a given side length, *x*, and a set amount of perimeter. You could think of it as the different amounts of area you can close in with a given amount of fencing as long as you always create a rectangular enclosure.

1. $A(x) = x(10 - x)$

Find the following:

a. A(3) = $\boxed{21}$
3(10−3)
3(7)
21

b. A(4) = $\boxed{24}$
4(10−4)
4(6)
24

c. A(6) = $\boxed{24}$
6(10−6)
6(4)

d. $A(x) = 0$
0 = x(10−x)
$\boxed{x=0}$ 10−x=0
$\boxed{x=10}$

e. When is A(x) at its maximum? Explain or show how you know.
A(5) = 5(10−5)
= 5(5)
= 25
At 5 A(x) is at a maximum of 25.

2. $A(x) = x(50 - x)$

Find the following:

a. A(10) = $\boxed{400}$
10(50−10)
10(40)
400

b. A(20) = $\boxed{600}$
20(50−20)
20(30)
600

c. A(30) = $\boxed{600}$
30(50−30)
30(20)

d. $A(x) = 0$
0 = x(50−x)
$\boxed{x=0}$ 50−x=0
$\boxed{x=50}$

e. When is A(x) at its maximum? Explain or show how you know.
A(25) = 25(50−25)
= 25·25
= 625
At 25 A(x) has a maximum of 625.

3. $A(x) = x(75 - x)$

Find the following:

a. $A(20) =$
20(75−20)
20(55)
$\boxed{1100}$

b. $A(35) =$
35(75−35)
35(40)
$\boxed{1400}$

c. $A(40) =$
40(75−40)
40(35)
$\boxed{1400}$

d. $A(x) = 0$
0 = x(75−x)
$\boxed{x=0}$ 75−x=0
$\boxed{x=75}$

e. When is A(x) at its maximum? Explain or show how you know.
A(37.5) = 37.5(75−37.5)
= 37.5(37.5)
= 1406.25
At 37.5 A(x) has a maximum of 1406.25.

4. $A(x) = x(48 - x)$

Find the following:

a. A(10) =
10(48−10)
10(38)
$\boxed{380}$

b. A(20) =
20(48−20)
20(28)
$\boxed{560}$

c. A(28) =
28(48−28)
28(20)
$\boxed{560}$

d. $A(x) = 0$
0 = x(48−x)
$\boxed{x=0}$ 48−x=0
$\boxed{x=48}$

e. When is A(x) at its maximum? Explain or show how you know.
A(24) = 24(48−24)
= 24(24)
= 576
At 24 A(x) has a maximum of 576.

SET

Topic: Solve Quadratic Equations Efficiently

For each of the given quadratic equations find the solutions using an efficient method. State the method you are using as well as the solutions. You must use at least three different methods.

5. $x^2 + 17x + 60 = 0$

$(x+12)(x+5)=0$

$\boxed{x=-12}$ $\boxed{x=-5}$

6. $x^2 + 16x + 39 = 0$

$(x+13)(x+3)=0$

$\boxed{x=-13}$ $\boxed{x=-3}$

7. $x^2 + 7x - 5 = 0$

$x^2+7x+\frac{49}{4}=5+\frac{49}{4}$

$\sqrt{(x+\frac{7}{2})^2}=\sqrt{\frac{69}{4}}$

$x=-\frac{7}{2}\pm\frac{\sqrt{69}}{2}$

$\boxed{x=\frac{-7\pm\sqrt{69}}{2}}$

8. $3x^2 + 14x - 5 = 0$

$(3x-1)(x+5)=0$

$3x-1=0$ $x+5=0$

$\boxed{x=\frac{1}{3}}$ $\boxed{x=-5}$

9. $x^2 - 12x + 36 = -8 + 36$

$\sqrt{(x-6)^2}=\sqrt{26}$

$x-6=\pm\sqrt{26}$

$\boxed{x=6\pm\sqrt{26}}$

10. $x^2 + 6x = 7$

$x^2+6x-7=0$

$(x+7)(x-1)=0$

$x+7=0$ $x-1=0$

$\boxed{x=-7}$ $\boxed{x=1}$

Summarize the process for solving a quadratic by the indicated strategy. Give examples along with written explanation, also indicate when it is best to use this strategy.

11. Completing the Square

① Put into vertex form then solve
(Best when $a=1$ and b is even)

12. Factoring

Factors easily. Set each linear factor = 0 then solve each for x.

13. Quadratic Formula

$x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$ use when other methods are not easily calculated.

GO

Topic: Graphing Quadratics and finding essential features of the graph. Solving systems of equations.

Graph the quadratic function and supply the desired information about the graph.

14. $f(x) = x^2 + 8x + 13$

$f(x)=(x^2+8x+16)+13+16$

$=(x+4)^2+29$

$\sqrt{-29}=\sqrt{(x+4)^2}$

$\pm i\sqrt{29}=x+4$

a. Line of symmetry:

$x=-4$

b. x-intercepts:

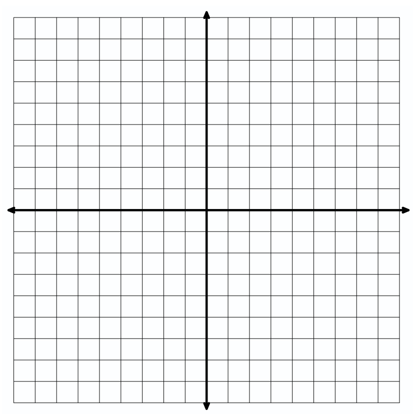
none

c. y-intercept:

$(0,13)$

d. vertex:

$(-4,29)$



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15. $f(x) = x^2 - 4x - 1$

$f(x) = (x^2 - 4x + 4) - 1 - 4$

$= (x-2)^2 - 5$

a. Line of symmetry:

$x = 2$

b. x-intercepts:

$0 = (x-2)^2 - 5$

$\sqrt{5} = \sqrt{(x-2)^2}$

$\pm\sqrt{5} = x - 2$

$(2+\sqrt{5}, 0)$ $(2-\sqrt{5}, 0)$

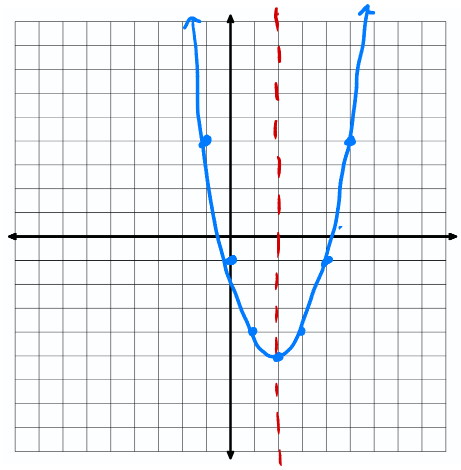
c. y-intercept:

$(0, -1)$

d. vertex:

$(2, 5)$

x	f(x)
−1	4
0	−1
1	−4
2	−5
3	−4
4	−1
5	4



Solve each system of equations using an algebraic method and check your work!

16.

$$\begin{cases} 3x + 5y = 15 \\ 3x + 2y = 6 \end{cases}$$

$-3x - 2y = -6$

$7y = 9$

$\boxed{y = \frac{9}{7}}$

$3x - 2y = 6$

$3x - 2\left(\frac{9}{7}\right) = 6$

$3x - \frac{18}{7} = 6$

$3x = 6 + \frac{18}{7}$

$3x = \frac{42}{7} + \frac{18}{7}$

$3x = \frac{60}{7}$

$\boxed{x = \frac{20}{7}}$

$\left(\frac{20}{7}, \frac{9}{7}\right)$

17.

$$\begin{cases} y = -7x + 12 \\ y = 5x - 36 \end{cases}$$

$5x - 36 = -7x + 12$

$5x + 7x = 36 + 12$

$12x = 48$

$x = 4$

$y = 5(4) - 36$

$y = -16$

$\boxed{(4, -16)}$

18.

$$\begin{cases} y = 2x + 12 \\ y = 10x - x^2 \end{cases}$$

Set=0 $\rightarrow$ $2x + 12 = 10x - x^2$

$x^2 - 8x + 12 = 0$

$(x-6)(x-2) = 0$

$x = 6$ $x = 2$

$y = 2(6) + 12$ $y = 2(2) + 12$

$y = 24$ $y = 16$

$\boxed{(6, 24)}$ $\boxed{(2, 16)}$

19.

$$\begin{cases} y = 24x - x^2 \\ y = 8x + 48 \end{cases}$$

$24x - x^2 = 8x + 48$

$0 = x^2 - 16x + 48$

$0 = (x-12)(x-4)$

$x = 12$ $x = 4$

$y = 8(12) + 48$ $y = 8(4) + 48$

$y = 144$ $y = 80$

$\boxed{(12, 144)}$ $\boxed{(4, 80)}$