

Key

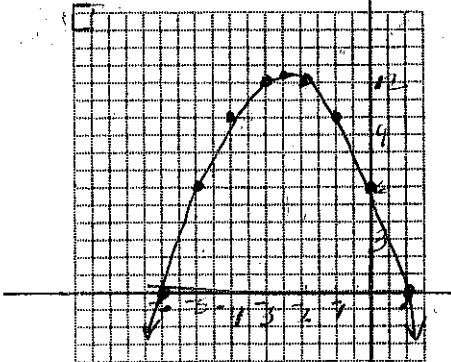
NOTE: NO Calculators will be allowed on this quiz!!!!

You will need to match these terms with their descriptions:

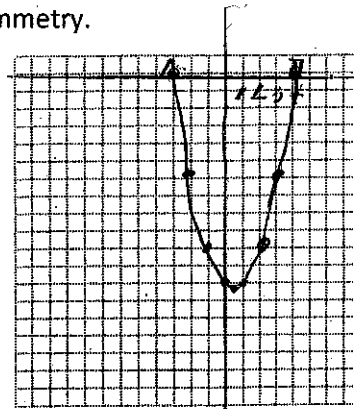
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|---------------|--------------------|------------------|---------------|
| Linear term | Constant term | Axis of symmetry | Maximum value |
| Minimum value | Vertex | Quadratic term | Roots |
| Parabola | Quadratic function | | |

Consider $f(x) = -x^2 - 5x + 6$ & $g(x) = x^2 - x - 12$. Find the following for each function:

- 1) y-intercept: $f(x)$: 6; $g(x)$: -12
- 2) Eqn of the axis of symmetry: $f(x)$: $x = -2.5$; $g(x)$: $x = 1/2$ $\frac{5}{-2}$ $\frac{1}{2}$
- 3) X-coordinate of the vertex: $f(x)$: $-5/2$; $g(x)$: $1/2$
- 4) Graph each function labeling the y-intercept, vertex, & axis of symmetry.



x	y
-5/2	12.25
-2	12
-1	10
-3	12
-4	10
-5	6
0	6
1	0



x	y
1/2	-12.25
0	-12
-1	-10
1	-12
2	-10
-2	-6
3	-6
-3	0
4	0

Consider: $f(x) = 2x^2 - 8x + 9$ & $g(x) = 5x^2 - 20x + 3$. Find each of the following for each function:

- 5) domain: $f(x)$: all \mathbb{R} #6 $g(x)$: all \mathbb{R} #14 $-\frac{b}{2a} = \frac{8}{4} = 2$ $\frac{20}{10} = 2$
- 6) range: $f(x)$: $\{y | y \geq 1\}$ $g(x)$: $\{y | y \geq -17\}$ $2(4) - 16 + 9 = 1$ $20 - 40 + 3 = -17$
- 7) maximum or minimum value of the function: $f(x)$: 1; $g(x)$: -17

Write an equation in STANDARD FORM with the given roots. SHOW WORK!!!

8) 1/3 & 4
 $(3x-1)(x-4)$
 $3x^2 - 12x - x + 4$
 $3x^2 - 13x + 4$

9) 3/2 & 5
 $(2x-3)(x-5)$
 $2x^2 - 13x + 15$

10) The length of a rectangle is two feet more than its width. If the area of the rectangle is 195 square feet, what are the dimensions of the rectangle? WRITE A QUADRATIC EQUATION & SOLVE IT. SHOW ALL WORK!!!

$x(x+2) = 195$
 $x^2 + 2x - 195 = 0$
 $(x+15)(x-13) = 0$
 $x = -15 \quad x = 13$

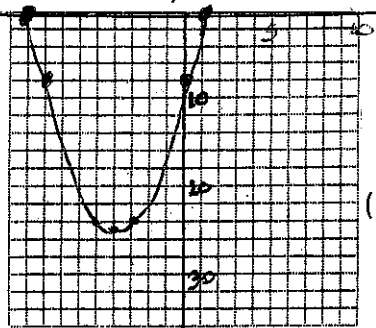
width = 13 ft
length = 15 ft

Solve each equation by graphing. If exact roots cannot be found, state the consecutive integers between which the roots are located.

11) 1, -9 $x^2 = -8x + 9$ (11) → $x^2 + 8x - 9$

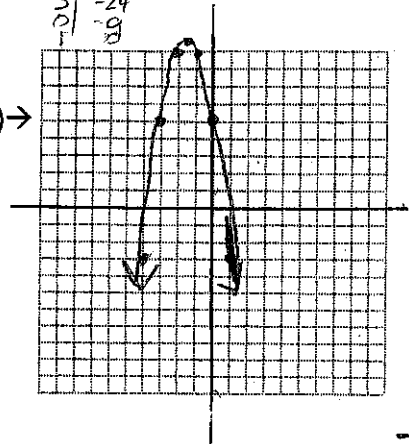
btwn -3 & 4 also

12) btwn 0 & 1 $-2x^2 - 6x + 5 = 0$



$$\begin{array}{r|l} x & 4 \\ \hline 1 & -25 \\ 2 & -24 \\ 3 & -24 \\ 4 & -10 \\ 5 & 9 \end{array}$$

(12) →



13) $(3a + 7)(a + 1)$ Factor completely: $3a^2 + 10a + 7$

14) $(4x - 3)(16x^2 + 12x + 9)$ Factor completely: $64x^3 - 27$ $a = 4x$
 $b = 3$

15) $(3y + 7z^2)(3y - 7z^2)$ Factor completely: $9y^2 - 49z^4$

16) $5ax(x - 3a)$ Factor completely: $5ax^2 - 15a^2x$ $5ax(x - 3a)$

17) $(x - y)(x - y + z)$ Factor completely: $(x^2 - 2xy + y^2) + (xz - yz)$
 $(x - y)^2 + z(x - y)$

$$\begin{array}{r|l} x & 4 \\ \hline -3/2 & 9.5 \\ -1 & 9 \\ -2 & 9 \\ -3 & 5 \\ 0 & 5 \\ 1 & 3 \\ 4 & -3 \end{array}$$

18) $-3/2, 6$ Solve by factoring: $2x^2 - 9x = 18$. $2x^2 - 9x - 18 = 0$
 $(2x + 3)(x - 6) = 0$

19) $2/3, -4$ Solve by factoring: $-3x^2 = 10x - 8$ $-3x^2 - 10x + 8 = 0$
 $(3x - 2)(x + 4) = 0$ $3x^2 + 10x - 8 = 0$

20) 3, 4 Solve by factoring: $5x^2 - 35x = -60$ $5x^2 - 35x + 60 = 0$
 $5(x^2 - 7x + 12) = 0$
 $(x - 3)(x - 4) = 0$

21) Sam's store sells 100 t-shirts per week at a rate of \$10 per shirt. Sam estimates that he will sell 5 fewer shirts for each \$1 increase in price. What price will maximize Sam's t-shirt income? What will the maximum income be?

Let $x = \# \$1$ price ↑
price → \$5⁰⁰
max inc → \$1,125

$$(100 - 5x)(10 + x)$$

$$1000 + 100x - 50x - 5x^2$$

$$0 = 1000 + 50x - 5x^2$$

$$1000 + 250 - 125 = 1125$$

$$\frac{-b}{2a} = \frac{-50}{-10} = 5$$

22) A souvenir shop sells about 200 mugs each month for \$6 each. The owner estimates that for each \$0.50 increase in price he will sell about 10 fewer coffee mugs per month. How much should the owner charge to maximize his income from mug sales? What is the maximum monthly income the owner can expect to make from the mugs?

Let $x = \# 50¢$ price ↑
Charge = \$8/mug
MAX MO. INC = \$/280

$$(200 - 10x)(6 + .50x)$$

$$1200 + 100x - 60x - 5x^2$$

$$1200 + 40x - 5x^2$$

$$1200 + 40(4) - 5(4)^2$$

$$1200 + 160 - 80$$

$$1200 + 80$$

$$\frac{-b}{2a} = \frac{-40}{-10} = 4$$

$$\frac{16}{5}$$