Lesson 5

READY, SET, GO! Name Key Period Date

READY

Topic: Recognizing Quadratic Equations

Identify whether or not each equation represents a quadratic function. Explain how you knew it was a quadratic.

1. $x^2 + 13x - 4 = 0$

Quadratic or no? Quadratic

Justification: Standard Form has x^2 term.

2. $3x^2 + x = 3x^2 - 2$ $x = -2$

Quadratic or no? No

Justification: Simplifies to $x = -2$ which is linear.

3. $x(4x - 5) = 0$ $4x^2 - 5 = 0$

Quadratic or no? Quadratic

Justification: Standard form has x^2 term.

4. $(2x - 7) + 6x = 10$ $8x$

Quadratic or no? No

Justification: Simplifies to a linear equation.

5. $2^x + 6 = 0$

Quadratic or no? No

Justification: Exponential Variable exponent

6. $32 = 4x^2$

Quadratic or no? Quadratic

Justification: There is an x^2 term.

SET

Topic: Changing from standard form of a quadratic to vertex form.

Change the form of each equation to vertex form: $y = a(x - h)^2 + k$. State the vertex and graph the parabola. Show at least 3 accurate points on each side of the line of symmetry.

7. $y = x^2 - 4x + 1$

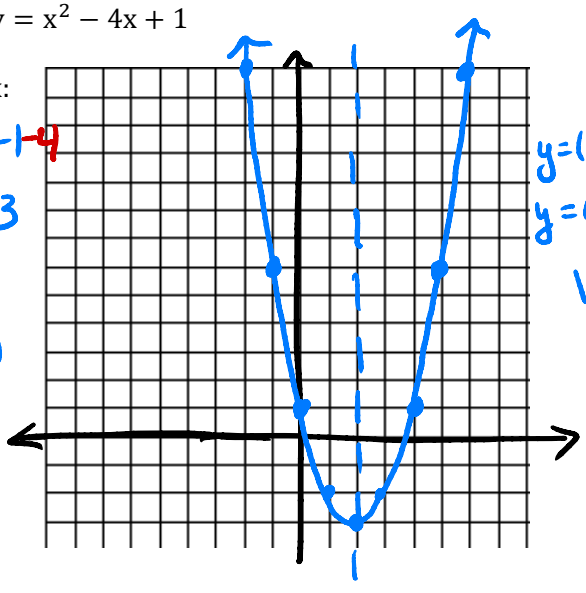
vertex:

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

$y = (x - 2)^2 - 3$

Vertex $(2, -3)$

A.O.S. $x = 2$



8. $y = x^2 + 2x + 5$

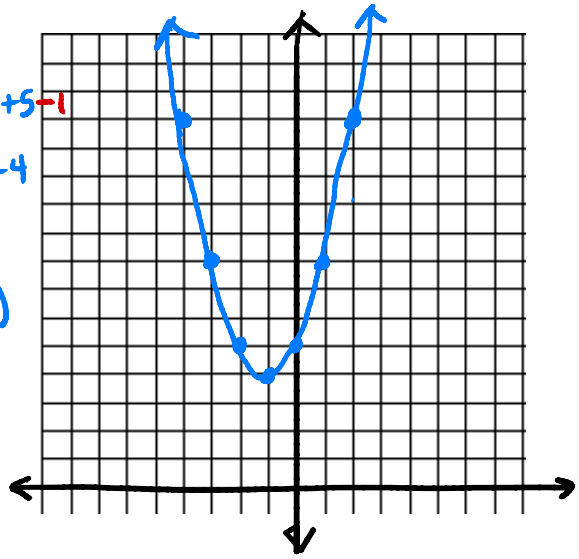
vertex:

$y = (x^2 + 2x + 1) + 5 - 1$

$y = (x + 1)^2 + 4$

Vertex $(-1, 4)$

A.O.S. $x = -1$



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9. $y = x^2 + 3x + \frac{13}{4}$

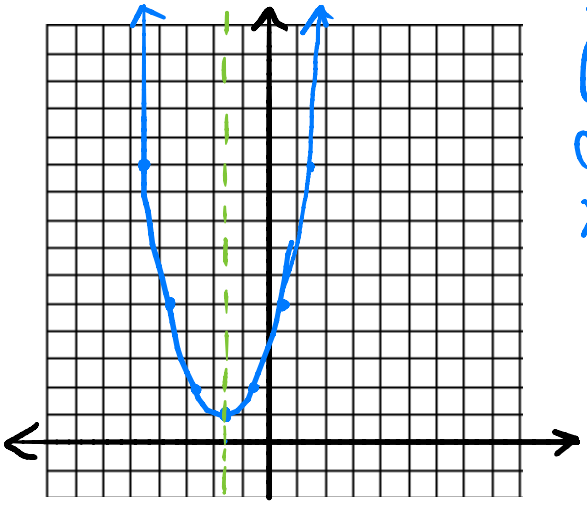
$y = (x^2 + 3x + \frac{9}{4}) + \frac{13}{4} - \frac{9}{4}$

$y = (x + \frac{3}{2})^2 + 1$

vertex:

Vertex $(-1.5, 1)$

a.o.s. $x = -1.5$



10. $y = \frac{1}{2}x^2 - x + 5$

$y = (\frac{1}{2}x^2 - 1x\ ) + 5$

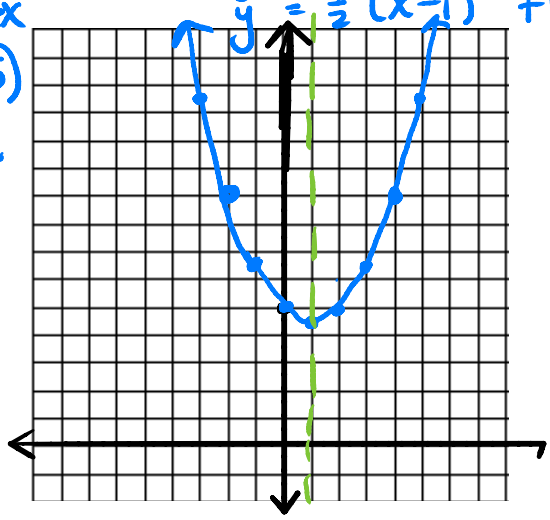
$y = \frac{1}{2}(x^2 - 2x + 1) + 5 - \frac{1}{2}$

$y = \frac{1}{2}(x-1)^2 + 4.5$

vertex:

Vertex $(1, 4.5)$

a.o.s. $x = 1$



11. One of the parabolas in problems 9 – 10 should look "wider" than the others. Identify the parabola. Explain why this parabola looks different.

#10 is wider because it is getting vertically shrunk by $\frac{1}{2}$.

Fill in the blank by completing the square. Leave the number that completes the square as an improper fraction. Then write the trinomial in factored form.

12. $x^2 - 11x + \underline{\frac{121}{4}}$ $(x - \frac{11}{2})^2$

13. $x^2 + 7x + \underline{\frac{49}{4}}$ $(x + \frac{7}{2})^2$

14. $x^2 + 15x + \underline{\frac{225}{4}}$ $(x + \frac{15}{2})^2$

15. $x^2 + \frac{2}{3}x + \underline{\frac{1}{9}}$ $(x + \frac{1}{3})^2$

16. $x^2 - \frac{1}{5}x + \underline{\frac{1}{100}}$ $(x - \frac{1}{10})^2$

17. $x^2 - \frac{3}{4}x + \underline{\frac{9}{64}}$ $(x - \frac{3}{8})^2$

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GO

Topic: Writing recursive equations for quadratic functions.

Identify whether the table represents a linear or quadratic function. If the function is linear, write both the explicit and recursive equations. If the function is quadratic, write only the recursive equation.

18.

x 0	$f(x)$ 3	
1	0	
2	3	+3
3	6	+3
4	9	+3
5	12	+3

Type of function: Linear

Equation(s): Explicit: $f(x) = 3x - 3$

Recursive $\begin{cases} f(1) = 0 \\ f(x) = f(x-1) + 3 \end{cases}$

19.

x 0	$f(x)$	1st diff.	2nd diff.
1	7	+0	+3
2	10	+3	+3
3	16	+6	+3
4	25	+9	+3
5	37	+12	+3

Type of function: Quadratic

Equation(s): Recursive $\begin{cases} f(1) = 7 \\ f(x) = f(x-1) + 3x - 3 \end{cases}$

20.

x 0	$f(x)$ 6	1st diff
1	8	
2	10	+2
3	12	+2
4	14	+2
5	16	+2

Type of function: Linear

Equation(s): Explicit: $f(x) = 2x + 6$

Recursive: $\begin{cases} f(1) = 8 \\ f(x) = f(x-1) + 2 \end{cases}$

21.

x 0	$f(x)$	1st diff.	2nd diff.
1	28	+10	+2
2	40	+12	+2
3	54	+14	+2
4	70	+16	+2
5	88	+18	+2

Type of function: Quadratic

Equation(s): Recursive: $\begin{cases} f(1) = 28 \\ f(x) = f(x-1) + 2x + 8 \end{cases}$