Name_____ Per: _____

Honors 1

Quadratics Unit 2 Practice Test and Chapter 9

Factor each trinomial.

1. $3x^2 - 11x - 20$

$3\left(x^2 - \frac{11}{3}x - \frac{20}{3}\right)$

$3\left(x^2 - \frac{11}{3}x - \frac{60}{9}\right)$

x^2	$-15x$
$4x$	-60

$3\left(x + \frac{4}{3}\right)\left(x - \frac{15}{3}\right)$

$3\left(x + \frac{4}{3}\right)(x-5) = (3x+4)(x-5)$

2. $4x^2 - 13x + 10$

$4\left(x^2 - \frac{13}{4}x + \frac{10}{4}\right)$

$4\left(x^2 - \frac{13}{4}x + \frac{40}{16}\right)$

x^2	$-8x$
$-5x$	40

$4\left(x - \frac{5}{4}\right)\left(x - \frac{8}{4}\right)$

$4\left(x - \frac{5}{4}\right)(x-2) = (4x-5)(x-2)$

can use mental math also, but I showed the fraction technique

3. $2x^2 + 22x + 56$

$2(x^2 + 11x + 28)$

* everything divisible by 2

$2(x+4)(x+7)$

Solve the equation *by factoring.*

4. $3x^2 + 17x + 20 = 0$

$3\left(x^2 + \frac{17}{3}x + \frac{20}{3}\right) = 0$

$3\left(x^2 + \frac{17}{3}x + \frac{60}{9}\right) = 0$

$3\left(x + \frac{5}{3}\right)\left(x + \frac{12}{3}\right) = 0$

$3\left(x + \frac{5}{3}\right)(x+4) = 0$

$x = -\frac{5}{3}$ $\quad x = -4$

Mental Math: $(3x+5)(x+4) = 0$

5. $-3x^2 - 16 = -26x$

$-3x^2 + 26x - 16 = 0$

$-3\left(x^2 - \frac{26}{3}x + \frac{16}{3}\right) = 0$

$-3\left(x^2 - \frac{26}{3}x + \frac{48}{9}\right) = 0$

$-3\left(x - \frac{2}{3}\right)\left(x - \frac{24}{3}\right) = 0$

so $x = \frac{2}{3}$ $\quad x = 8$

Mental Math: $0 = 3x^2 - 26x + 16$

$0 = (3x-2)(x-8)$

Graph the equation.

6. $y = 2x^2 - 9x + 9$

Mental math $0 = (2x-3)(x-3)$

$y = 2\left(x^2 - \frac{9}{2}x + \frac{9}{2}\right)$

$y = 2\left(x^2 - \frac{9}{2}x + \frac{18}{4}\right)$

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

$0 = 2\left(x - \frac{3}{2}\right)(x-3)$

$x = \frac{3}{2}$ $\quad x = 3$

*Or use quadratic formula to solve

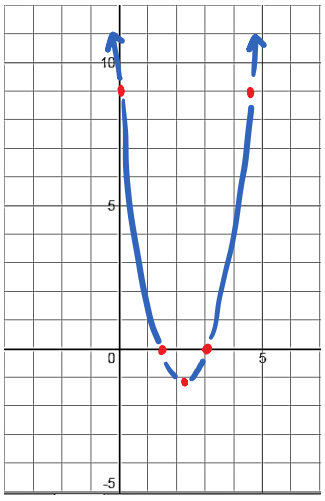
$0 = 2x^2 - 9x + 9$

$x = 1.5$

$x = 3$

$V_x = \frac{1.5+3}{2} = 2.25$

$V_y = 2(2.25)^2 - 9(2.25) + 9 = -1.125$



a. Zeros: $x = 1.5$ $\quad x = 3$

b. Vertex = (2.25 , -1.125)

c. y – intercept = (0, 9)

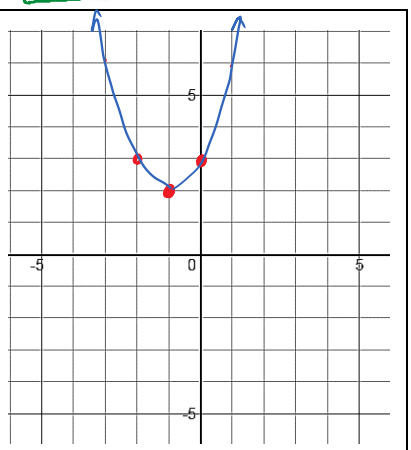
7. $y = x^2 + 2x + 3$

Can't factor so use $V_x = \frac{-b}{2a}$

$V_x = \frac{-2}{2(1)} = \frac{-2}{2} = -1$

$V_y = (-1)^2 + 2(-1) + 3$

$= 1 - 2 + 3 = 2$



a. Vertex = (-1 , 2)

b. Y-intercept = (0, 3)

Solve.

8. $8x^2 - 50 = 0$

$8x^2 = 50$

$\sqrt{x^2} = \sqrt{\frac{50}{8}}$

$x = \pm\sqrt{\frac{25}{4}} = \pm\frac{5}{2}$

9. $(x+5)^2 + 8 = 44$

$\sqrt{(x+5)^2} = \sqrt{36}$

$x+5 = \pm 6$

$x+5 = 6$ or $x+5 = -6$

$x = 1$ $\quad x = -11$

10. $2(x-2)^2 - 7 = 91$

$\frac{2(x-2)^2}{2} = \frac{98}{2}$

$\sqrt{(x-2)^2} = \sqrt{49}$

$x-2 = \pm 7$

$x-2 = 7$ $\quad y = 9$

$x-2 = -7$ $\quad x = -5$

11. Find the value of c that makes each trinomial a perfect square.

$x^2 + 26x + \underline{169} = (x+13)^2$

x^2	$13x$
$13x$	169

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

$x^2 + 5x + \underline{6.25} = (x+2.5)^2$

12. Solve the equation **by completing the square**.

$x^2 + 3x + 21 = 22$

x^2	$1.5x$
$1.5x$	2.25

$x^2 + 3x = 1$

$x^2 + 3x + 2.25 = 3.25$

$\sqrt{(x+1.5)^2} = \sqrt{3.25}$

$x + 1.5 = \pm 1.80$

$x = 0.3$ $\quad x = -3.3$

13. Convert from standard form to vertex form. State where the vertex is located.

$y = x^2 + 12x + 32$

x^2	$6x$
$6x$	36

$y - 32 = x^2 + 12x$

$y - 32 + 36 = x^2 + 12x + 36$

$y + 4 = (x+6)^2$

$y = (x+6)^2 - 4$ $\quad$ Vertex: $(-6, -4)$

14. Solve by the quadratic forumula **and show your steps**.

$4x^2 + 5x = 6$

$4x^2 + 5x - 6 = 0$

$x = \frac{-5 \pm \sqrt{25 - 4(4)(-6)}}{8}$

$x = \frac{-5 \pm \sqrt{25 + 96}}{8}$

$x = \frac{-5 \pm \sqrt{121}}{8} = \frac{-5 \pm 11}{8}$

$x = \frac{-5+11}{8}$ $\quad x = \frac{6}{8} = \frac{3}{4}$

$x = \frac{-5-11}{8}$ $\quad x = \frac{-16}{8} = -2$

15. Solve by any method of your choice.

$\frac{1}{2}(x+4)^2 + 10 = 42$

$\frac{1}{2}(x+4)^2 = 32$

$\sqrt{(x+4)^2} = \sqrt{64}$

$x + 4 = \pm 8$

$x = 4$ $\quad x = -12$

16. Solve by any method of your choice.

$\frac{(x+3)^2}{x} = \frac{-7}{5}$

$5(x+3)^2 = -7x$

$5(x+3)(x+3) = -7x$

$5(x^2 + 6x + 9) = -7x$

$5x^2 + 30x + 45 = -7x$

$5x^2 + 37x + 45 = 0$

Quad Formula with $a=5, b=37, c=45$

$x = -1.53$ $\quad x = -5.87$

17. Find the value of *A* in the function so that the function *f(x)* has an x-intercept at $x = 4$ and a vertex at $(1, -9)$:

$f(x) = x^2 - 2x + A$

Option 1

$f(x) = x^2 - 2x + A$

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

since x-int @ 4 and b = -2

so $f(x) = x^2 - 2x - 8$

$A = -8$

Option 2

plug $(1, -9)$ in

$-9 = 1^2 - 2(1) + A$

$-9 = 1 - 2 + A$

$-9 = -1 + A$

$-8 = A$

18. State whether each situation has a positive, negative or zero discriminant.

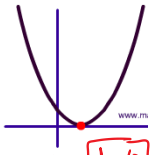
$y = 3x^2 - 4x + 7$

$d = b^2 - 4ac$

$d = (-4)^2 - 4(3)(7)$

$d = 16 - 84 = -68$

$d < 0$, no x-ints



1 x-int $\Rightarrow d = 0$

Two x-intercepts $\Rightarrow d > 0$