NAME: _____ PERIOD: _____ DATE: _____

Homework Problem Set

Solve the following equations.

1. $(2x - 1)(x + 3) = 0$

$x = \frac{1}{2}$ or $x = -3$

2. $(t - 4)(3t + 1)(t + 2) = 0$

$t = 4, -\frac{1}{3}, -2$

3. $x^2 - 9 = 0$

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

$x+3=0 \quad x-3=0$

$x = -3$ or 3

4. $(x^2 - 9)(x^2 - 100) = 0$

$(x+3)(x-3)(x+10)(x-10)=0$

$x = 3$ or -3 or 10 or -10

$x^2 = 9$
$x = 3$ or -3
$x^2 = 100$
$x = 10$ or -10

5. $x^2 - 9 = (x - 3)(x - 5)$

$x^2 - 9 = x^2 - 8x + 15$
$-24 = -8x$
$3 = x$

6. $x^2 + x - 30 = 0$

$(x+6)(x-5) = 0$

$x = -6$ or 5

7. $p^2 - 7p = 0$

$p(p-7) = 0$

$p = 0$ or 7

8. $p^2 - 7p = 8$

$p^2 - 7p - 8 = 0$
$(p-8)(p+1) = 0$

$p = 8$ or -1

9. $3x^2 + 6x + 3 = 0$

$3(x^2 + 2x + 1) = 0$
$3(x+1)(x+1) = 0$

$x = -1$

10. $2x^2 - 9x + 10 = 0$

	$2x$	5
x	$2x^2$	$5x$
2	$4x$	10

$(2x+5)(x+2) = 0$

$x = -\frac{5}{2}$ or -2

11. $x^2 + 15x + 40 = 4$

$x^2+15x+36=0$

$(x+12)(x+3)=0$

$x=-12$ or -3

12. $7x^2 + 2x = 0$

$x(7x+2)=0$

$x=0$ or $-\frac{2}{7}$

13. $7x^2 + 2x - 5 = 0$

$(x+1)(7x-5)=0$

$x=-1$ or $\frac{5}{7}$

14. $b^2 + 5b - 35 = 3b$

$b^2+2b-35=0$

$(b+7)(b-5)=0$

$b=-7$ or 5

15. $6r^2 - 12r = 18$

$6r^2-12r-18=0$

$6(r^2-2r-3)=0$

$6(r-3)(r+1)=0$

$r=3$ or -1

16. $2x^2 + 11x = x^2 - x - 32$

$x^2+12x+32=0$

$(x+8)(x+4)=0$

$x=-8$ or -4

17. Write an equation (in factored form) that has solutions of $x = 2$ or $x = 3$.

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

C can be any constant

possible answers

$5(x-2)(x-3)=0$

$-7(x-2)(x-3)=0$

18. Write an equation (in factored form) that has solutions of $a = 0$ or $a = -1$.

$Ca(x+1)=0$

C can be any constant

possible answers

$5a(a+1)=0$

$8a(a+1)=0$

19. Quinn looks at the equation $(x - 5)(x - 6) = 2$ and says that since the equation is in factored form it can be solved as follows:

$$(x - 5)(x - 6) = 2$$

$$x - 5 = 2 \text{ or } x - 6 = 2$$

$$x = 7 \text{ or } x = 8.$$

Explain to Quinn why this is incorrect. Show her the correct way to solve the equation.

To solve this equation, we need to rewrite as a factored equation equal to zero

$x^2 - 11x + 30 = 2$
$x^2 - 11x + 28 = 0$
$(x-7)(x-4) = 0$
$x = 7$ or 4

For each problem, determine the *x*-intercepts, the vertex and the *y*-intercept.

20. $y = -2(x + 5)^2 + 18$

$\frac{-18}{-2} = \frac{-2(x+5)^2}{-2}$
$\sqrt{9} = \sqrt{(x+5)^2}$
$\pm 3 = x + 5$
$3 = x + 5$ or $-3 = x + 5$
$x = -2$ or -8

x-intercepts: -2 and -8

vertex: (-5, 18)

y-intercept: -32

Substitute 0 for x
$y = -2(0+5)^2 + 18$
$y = -2(25) + 18$
$y = -32$

21. $y = -(x - 5)^2$

$\frac{0}{-1} = \frac{-1(x-5)^2}{-1}$
$0 = (x-5)^2$
$0 = x - 5$
$x = 5$

x-intercepts: 5 and 5

vertex: (5, 0)

y-intercept: -25

$y = -(0-5)^2$
$y = -25$

22. $y = \frac{1}{3}(x - 1)^2 - 3$

$0 = \frac{1}{3}(x-1)^2 - 3$
$3 = \frac{1}{3}(x-1)^2$
$9 = (x-1)^2$
$\pm 3 = x - 1$
$3 = x - 1$ $\quad -3 = x - 1$
$x = 4$ or -2

x-intercepts: 4 and -2

vertex: (1, -3)

y-intercept: $-\frac{8}{3}$

$y = \frac{1}{3}(0-1)^2 - 3 = -\frac{8}{3}$

23. $y = \frac{3}{4}(x + 4)^2 - \frac{27}{16}$

$0 = \frac{3}{4}(x+4)^2 - \frac{27}{16}$

$\frac{27}{16} = \frac{3}{4}(x+4)^2$

$\frac{9}{4} = (x+4)^2$

$\pm\frac{3}{2} = x+4$

$x+4 = \frac{3}{2} \quad x+4 = -\frac{3}{2}$

$x = -\frac{5}{2}$ or $x = -\frac{11}{2}$

x-intercepts: $-\frac{5}{2}$ and $-\frac{11}{2}$

vertex: $(-4, -\frac{27}{16})$

y-intercept: $\frac{165}{16}$

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

$0 = -\frac{1}{3}(x+1)^2 + 3$

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

$9 = (x+1)^2$

$\pm 3 = x+1$

$3 = x+1 \quad -3 = x+1$

$x = 2$ or -4

x-intercepts: 2 and -4

vertex: $(-1, 3)$

y-intercept: $\frac{8}{3}$

25. $y = 4(x + 2)^2 - 4$

$0 = 4(x+2)^2 - 4$

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

$1 = (x+2)^2$

$\pm 1 = x+2$

$1 = x+2 \quad -1 = x+2$

$x = -1$ or -3

x-intercepts: -1 and -3

vertex: $(-2, -4)$

y-intercept: 12

26. $y = -(x + 2)^2 + 25$

x-intercepts: 3 and -7

vertex: $(-2, 25)$

y-intercept: 21

27. $y = \frac{1}{2}(x + 3)^2 - 18$

x-intercepts: 3 and -9

vertex: $(-3, -18)$

y-intercept: $-\frac{27}{2}$

28. $y = -\frac{1}{3}(x - 1)^2 + 27$

x-intercepts: 10 and -8

vertex: $(1, 27)$

y-intercept: $\frac{80}{3}$