***Pre-Calculus 11***

***Unit 3: Solving Quadratic Equations***

***Worksheet 3.4 – The Quadratic Formula***

1. Solve using the quadratic formula. Give exact answers as integers, fractions, or simplest radical form (ie. no decimals)

a) $2x^{2}-5x+2=0$ b) $3n^{2}-11n-14=0$ c) $f^{2}-6f+4=0$

 d) $x^{2}+7x+3=0$ e) $6t^{2}-t-1=0$ f) $5h^{2}+7h+2=0$

 g) $ 6m^{2}-7m+2=0$ h) $a^{2}-a+5=0$ i) $w^{2}+3w-1=0$

2. Solve using the quadratic formula.

 a) $25q^{2}+70q+49=0$ b) $12v^{2}-192=0$ c) $3r^{2}-4r=0$

 d) $5x^{2}+12x+9=0$ e) $16d^{2}+40d+25=0$ f) $y^{2}-4=0$

3. Solve using the quadratic formula.

 a) $\frac{5}{2}x^{2}-\frac{3}{2}x-\frac{1}{4}=0$ b) $\frac{2n^{2}}{3}-\frac{n}{3}=2$ c) $\frac{x^{2}}{2}=x+\frac{5}{2}$

4. Solve using the quadratic formula. Express answers to the nearest hundredth.

 a) $0.2z^{2}-z-3.2=0$ b) $1.2x^{2}=1.4x-1$ c) $0.1=-2.2y^{2}-2.4y$

5. Solve using the quadratic formula. Answer in simplest radical form.

 a) $2x^{2}+6x+2=0$ b) $z^{2}-6z+7=0$ c) $9m^{2}-6m-1=0$

5. Solve using the quadratic formula.

 a) $\left(n-4\right)\left(n-2\right)=12$ b) $\left(2x-1\right)\left(3x+5\right)=\left(x+2\right)\left(2x-1\right)$

 c) $3m^{2}-\left(5m+1\right)\left(2m-3\right)=3$ d) $2\left(w-2\right)\left(w+1\right)-\left(w+3\right)=0$

6. A photograph measuring 16 cm by 12 cm is to be surrounded by a mat before framing. The

 width of the mat is to be the same on all sides of the photograph. The area of the mat is equal

 to the area of the photograph. Find the width of the mat, to the nearest tenth of a centimeter.

7. The hypotenuse of a right triangle measures 20 cm. The sum of the lengths of the other two

 sides is 28 cm. Find the lengths of these two sides.

8. Solve for x.

1. $px^{2}+qx+r=0$ b) $3x^{2}+nx-5=0$ c) $x^{2}+\left(3m-2n\right)x=6mn$

9. Journal Prompt: Now that you know the quadratic formula and completing the square, you need to be able to derive the Quadratic Formula on your own. Starting with , write out the proof, and at each step describe in words what you are doing.

***Solutions***

1. a) $x=2, x=\frac{1}{2}$ b) $n=\frac{14}{3}, n=-1$ c) $f=3\pm \sqrt{5}$

 d) $x=\frac{-7\pm \sqrt{37}}{2}$ e) $t=\frac{1}{2}, t=-\frac{1}{3}$ f) $h=-\frac{2}{5}, h=-1$

 g) $m=\frac{2}{3}, m=\frac{1}{2}$ h) no real roots i) $w=\frac{-3\pm \sqrt{13}}{2}$

2. a) $q=-\frac{7}{5}$ b) $v=\pm 4$ c) $r=\frac{4}{3}, r=0$

 d) no real roots e) $d=-\frac{5}{4}$ f) $y=\pm 2$

3. a) $x=\frac{3\pm \sqrt{19}}{10}$ b) $n=2, n=-\frac{3}{2}$ c) $x=1\pm \sqrt{6}$

4. a) $z=7.22, z=-2.12$ b) no real roots c) $y=-1.05, y=-0.04$

5. a) $\frac{-3\pm \sqrt{5}}{2}$ b) $3\pm \sqrt{2}$ c) $m=\frac{1\pm \sqrt{2}}{3}$

6. a) $\frac{6\pm \sqrt{52}}{2}$ b) $x=\frac{1}{2}, x=-\frac{3}{2}$ c) $x=0, x=\frac{13}{7}$

 d) $w=\frac{3\pm \sqrt{65}}{4}$ 7. $2.85cm$ 8. $16cm by 12cm$

9. a) $x=\frac{-q\pm \sqrt{q^{2}-4pr}}{2p}$ b) $x=\frac{-n\pm \sqrt{n^{2}+60}}{6}$ c) $x=2n, x=-3m$