***Pre-Calculus 11***

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

***Worksheet 3.2 – Solving Quadratic Equations by Factoring***

1. Which equations are quadratic?

a) $2x+1=3x-7$ b) $\left(x+3\right)\left(x+2\right)=0$

c) $x^{2}=-3x-2$ d) $x^{2}+2=x^{3}+1$

2. Solve each quadratic equation.

a) $\left(x+3\right)\left(x+4\right)=0$ b) $\left(x+5\right)\left(3x-4\right)=0$

c) $2\left(x+4\right)=0$ d) $3x\left(x-8\right)=0$

3. Solve by factoring.

 a) $m^{2}-12m+35=0$ b) $4c^{2}-49=0$

 c) $y^{2}-11y=0$ d) $2x^{2}-7x-15=0$

4. Solve by factoring.

 a) $m^{2}+8m=3m+24$ b) $x\left(x-6\right)=2(x-8)$

 c)$ \left(2x-1\right)\left(x-3\right)=(x+1)(x-2)$ d)$ \left(2p-1\right)^{2}-3=(p-2)(p-1)$

5. Solve by factoring.

 a) $x^{4}-13x^{2}+36=0$ b) $p^{4}+5p^{2}-6=0$

 c) $2x^{4}-5x^{2}+3=0$ d) $3m^{4}-14m^{2}-5=0$

6. Write an equation with the given roots.

 a) $-5, -3$ b) $\frac{1}{3},\frac{2}{3}$ c) $4, -\frac{1}{2}$ d) $0, \frac{4}{3}$

7. Solve by factoring.

 a) $x=\sqrt{3x-2}$ b) $\sqrt{31-x}=x-1$ c) $\sqrt{4x^{2}-7}+2=3x-1$

8. Find two consecutive integers with a product of 156.

9. What number and its square differ by 30?

10. \*The hypotenuse of a right triangle is 29 cm. If the other two sides differ by 1 cm, what are

 their lengths?

11. \*When a football is kicked with a vertical speed of 20 m/s, its height, h metres, after t seconds

 is given by the formula: $h=20t-5t^{2}$.

 How long after the kick is the football at a height of 15 m?

12. \*A rectangular garden has dimensions 6 m by 8 m. Leonard wants to build a path around the

 garden. He has $120 m^{2}$ of bricks. How wide is the pathway?

13. Solve by factoring.

 a) $(3x+5)^{2}=(9x-1)^{2}$ b) $(2x+1)^{2}-3\left(2x+1\right)-4=0$

 c) $3(x-1)^{2}-8\left(x-1\right)+5=0$

14. If one root is 5, find the value of k and the other root.

1. $x^{2}-3x+k=0$ b) $x^{2}+kx+40=0$

c) $x^{2}+kx+25=0$ d) $x^{2}-2x+k=0$

15. \*Solve for *x*.

1. $x^{2}-ax=0$ b) $x^{2}-\left(a+b\right)x+ab=0$

c) $x^{2}+ax=ab+bx$ d) $x^{2}-2pq=p^{2}+q^{2}$

16. Journal Prompt: When you solve a quadratic equation by factoring, why must one side of the equation be 0?

***Solutions***

1. a) $not quadratic $ b) $quadratic $ c) $quadratic$ d) $not quadratic$

2. a) $x=-3, x=-4$ b) $x=-5, x=\frac{4}{3}$ c) $x=-4$ d) $x=0, x=8 $

3. a) $m=7, m=5$ b) $c=-\frac{7}{2}, c=\frac{7}{2}$ c) $y=11, y=0$ d) $x\frac{-3}{2}, x=5$

4. a) $m=-8, m=3$ b) $x=4, x=4$ c) $x=5, x=1$ d) $p=\frac{4}{3}, p=-1$

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

6. a) $x^{2}+8x+15=0$ b) $9x^{2}-9x+2=0$ c) $2x^{2}-7x-4=0$ d) $3x^{2}-4x=0$

7. a) $x=2, x=1$ b) $x=6$ c) $x=\frac{8}{5}, x=2$

8. $12, 13 or -12,-13$

9. $6 or -5$

10. $20cm and 21cm$

11. $1 second and 3 seconds$

12. $3m wide$

13. a) $x=-\frac{1}{3}, x=1$ b) $x=\frac{3}{2}, x=-1$ c) $x=\frac{8}{3}, x=2$

14. a) $k=-10, x=-2$ b) $k=-13, x=8$ c) $k=-10, x=5$ d) $x=-3, k=-15$

15. a) $x=a$ b) $x=a, x=b$ c) $x=-a, x=b $ d) $x=-p-q, x=p+q$