

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Classwork

1.  $a=1$   
 $b=-2$   
 $c=-12$

$$x = \frac{-(-2) \pm \sqrt{(-2)^2 - 4(1)(-12)}}{2(1)} = \frac{2 \pm \sqrt{52}}{2} = \frac{\cancel{2} \pm \cancel{2}\sqrt{13}}{\cancel{2}} = 1 \pm \sqrt{13}$$

2.  $\frac{1}{2}r^2 - 6r = 2$   $a = \frac{1}{2}$   $b = -6$   $c = -2$

$$x = \frac{-(-6) \pm \sqrt{(-6)^2 - 4(\frac{1}{2})(-2)}}{2(\frac{1}{2})} = \frac{6 \pm \sqrt{36+4}}{1} = 6 \pm \sqrt{40} = 6 \pm 2\sqrt{10}$$

3.  $2p^2 + 8p = 7$   
 $a=2$   
 $b=8$   
 $c=-7$

$$x = \frac{-8 \pm \sqrt{8^2 - 4(2)(-7)}}{2(2)} = \frac{-8 \pm \sqrt{64+56}}{4} = \frac{-8 \pm \sqrt{120}}{4} = \frac{-\cancel{8} \pm \cancel{4}\sqrt{30}}{\cancel{4} \cdot 2} = \frac{-4 \pm \sqrt{30}}{2}$$

4.  $2y^2 + 3y - 5 = 4$   
 $2y^2 + 3y - 9 = 0$   
 $a=2$   
 $b=3$   
 $c=-9$

$$x = \frac{-3 \pm \sqrt{3^2 - 4(2)(-9)}}{2(2)}$$

$$x = \frac{-3 \pm \sqrt{9+72}}{4}$$

$$x = \frac{-3 \pm \sqrt{81}}{4} = \frac{-3 \pm 9}{4} \begin{cases} \frac{-3+9}{4} = \frac{6}{4} = \frac{3}{2} \\ \frac{-3-9}{4} = \frac{-12}{4} = -3 \end{cases}$$

## Problem Set

1.  $z^2 - 3z - 8 = 0$

$$\begin{aligned} a &= 1 \\ b &= -3 \\ c &= -8 \end{aligned}$$

$$x = \frac{-(-3) \pm \sqrt{(-3)^2 - 4(1)(-8)}}{2(1)}$$

$$x = \frac{3 \pm \sqrt{9 + 32}}{2} = \frac{3 \pm \sqrt{41}}{2}$$

2.  $2q^2 - 8 = 3q$

$$2q^2 - 3q - 8 = 0$$

$$\begin{aligned} a &= 2 \\ b &= -3 \\ c &= -8 \end{aligned}$$

$$x = \frac{-(-3) \pm \sqrt{(-3)^2 - 4(2)(-8)}}{2(2)}$$

$$x = \frac{3 \pm \sqrt{73}}{4}$$

3.  $\frac{1}{3}m^2 + 2m + 8 = 5$

$$\frac{1}{3}m^2 + 2m + 3 = 0$$

$$\begin{aligned} a &= \frac{1}{3} \\ b &= 2 \\ c &= 3 \end{aligned}$$

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

$$\frac{-2}{\frac{2}{3}} = -3$$

double root