4.1 Graphical Solutions of Quadratics (GDC)

ex 1 Find the roots of $-x^2+8x-16=0$

graphically

GDC: $Y_1 = -x^2+8x-16$

calc zeroes

(4, 0)

factoring

$-x^2+8x-16=0$

$x^2-8x+16=0$

$(x-4)(x-4)=0$

$x=4$

(4, 0)

quad formula

$x = \frac{-8 \pm \sqrt{8^2-4(-1)(-16)}}{2(-1)}$

$x = \frac{-8 \pm 0}{-2}$

$x=4$

ex 2 $f(x) = 100+15x-x^2$

GDC: $Y_1 = 100+15x-x^2$

calc zeroes

(-5, 0) (20, 0)

$100+15x-x^2=0$

$x^2-15x-100=0$

$(x-20)(x+5)$

$x=20 \quad x=-5$

$x = \frac{15 \pm \sqrt{(-15)^2-4(1)(-100)}}{2}$

$x = \frac{15 \pm \sqrt{625}}{2}$

$x = \frac{15 \pm 25}{2}$

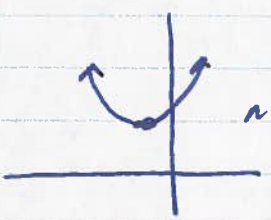
$x = \frac{40}{2} \quad x = \frac{-10}{2}$

$x=20 \quad x=-5$

ex 3 Solve $2x^2+x+2=0$

vertex $-\frac{1}{4}$

$Y = 15/8$



b^2-4ac

$1-16$ negative $\therefore$ no real roots

ex 4 pg 213 GDC $Y_1 = 0.0025(x-100)^2-10$

calc zeros

$x=36.8 \quad x=163.2$

distance between is 126.4 m

Hilary

Do 1-10 pgs 215-216

4.1 pg 215-216 1-10

1. a) 1 b) 2 c) 0 d) 2

2 a) $x=0$ (0,0)

b) $x^2+5x+4=0$
$(x+1)(x+4)=0$
$(-1,0)(-4,0)$

c) none
b^2-4ac
$4-16$
-12

d) $.25x^2-1.25x-6=0$
$x^2-5x-24=0$
$(x+3)(x-8)=0$
$(-3,0)(8,0)$

3. a) $(x-8)(x+3)$
$(8,0)(-3,0)$

b) $2r^2+6r=0$
$2r(r+3)=0$
$(0,0)(-3,0)$

c) b^2-4ac
$4-20$
-16 (no roots)

d) $5x^2-5x-30=0$
$x^2-x-6=0$
$(x-3)(x+2)=0$
$(3,0)(-2,0)$

e) $0=z^2-4z+4$
$(z-2)(z-2)$
$z=2$
$(2,0)$

f) b^2-4ac
$16-40$
-24
no roots.

4. a) $n^2=10$
$n=\pm\sqrt{10}$
$(3.2,0)(-3.2,0)$

b) $3x^2+9x-12=0$
$x^2+3x-4=0$
$(x+4)(x-1)=0$
$x=-4 \quad x=1$
$(-4,0)(1,0)$

c) $w^2-4w+3=0$
$(w-3)(w-1)=0$
$(3,0)(1,0)$

d) $2d^2+20d+32=0$
$d^2+10d+16=0$
$(d+8)(d+2)=0$
$(-8,0)(-2,0)$

e) b^2-4ac
$36-24$
12
$\sqrt{12}$ → non rational roots
$Y_1=x^2+6x+6$
calc zero
$x=-1.3, -4.7$

f) $m^2-10m+21=0$
$(m-7)(m-3)=0$
$m=7 \quad m=3$

5. $h=-0.02d^2+2.6d-66.5$
GDC calc zero
$d=35, d=95$ ∴ 60 yards.

6. $x+y=9$ $xy=20$

$y=9-x$ $x(9-x)=20$

$-x^2+9x=20$

a) $-x^2+9x-20=0$

$x^2-9x+20=0$

$(x-4)(x-5)=0$

b) $x=4$ $x=5$ 4 and 5

7. $x(x+2)=168$

$x^2+2x-168=0$

$(x+14)(x-12)=0$

$x=-14$ or $x=12$

$-14, -12$ or $12, 14$

8. $h=-0.09x^2+x+1.2$

a) height = 0 (water leaving ground / hitting ground)

b) $Y_1=-0.09x^2+x+1.2$

GDC calc zero (also gives -1.1 m)

$x=12.2$ 12.2 m # context.

9. $h=-4.9(t-3)^2+47$

a) $h=0$ (firewalk reaching ground)

b) $Y_1=-4.9(x-3)^2+47$

GDC calc zero $x=-0.1$ (discard)

$x=6.1$ 6.1 seconds.

10. $h=-0.75d^2+0.9d+1.5$

a) $-0.75d^2+0.9d+1.5=0$

b) $Y_1=-0.75x^2+0.9x+1.5$

GDC calc zero $x=-0.9$ (discard)

$x=2.1$ 2.1 m