yr 10 Advance - Brigidine College - 2007

Quadratic Equations

Name:

Solve these showing working and leaving answer in simplest surd form where necessary.

a) $(3x-2)(x+3)=0$

b) $x^2+2x-15=0$

c) $x^2=x$

d) $4x^2+19x=5$

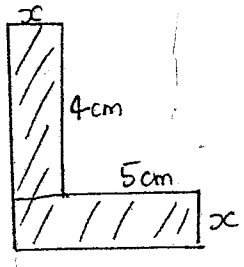
e) $(3x-4)^2=8$

Q2. Solve by completing the square.

$x^2+12x-28=0$

Q3. Solve $2(x+2)=\frac{1}{x}$

Q4 Solve for x if the area is 19 cm^2.



Q5 Solve for x

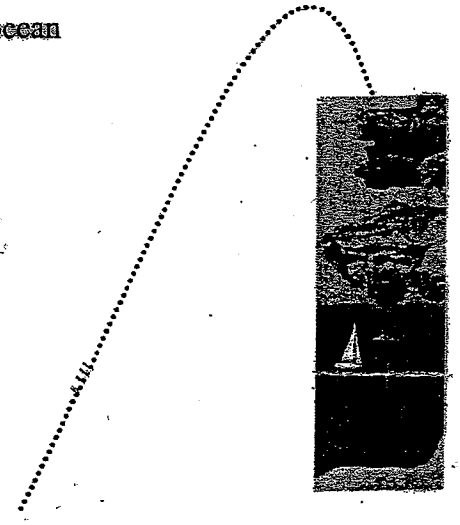
$$\frac{3}{2x} + \frac{4}{3x} + \frac{5}{4x} = x$$

Q6

A stone is thrown from the top of a cliff to land in the ocean and its height **h** above sea level is given by

$$\mathbf{h = 84 + 13t - 2t^2}$$

at any time **t**, where **h** is in metres and **t** is in seconds.



a. What is the height of this cliff?

b. How long will it take for the stone to land in the ocean?

Quadratic Equations

17/18

Name:

Solve these showing working and leaving answer in simplest surd form where necessary.

a) $(3x-2)(x+3)=0$

$x=\frac{2}{3}$ $x=-3$ ✓ ✓

b) $x^2+2x-15=0$

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

$x=-5$ $x=3$ ✓ ✓

c) $x^2=x$

$x^2-x=0$

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

$\left(x-\frac{1}{2}\right)^2=\left(\frac{1}{2}\right)^2$

$x-\frac{1}{2}=\pm\frac{1}{2}$

$x=1$ $x=0$ ✓ ✓

d) $4x^2+19x=5$

$4x^2+19x-5=0$

$(4x-1)(x+5)=0$

$x=\frac{1}{4}$ $x=-5$ ✓ ✓

e) $(3x-4)^2=8$

$3x-4=\pm\sqrt{8}$

$3x=\pm\sqrt{8}+4$

$x=\frac{\pm\sqrt{8}+4}{3}$

$x=\frac{4\pm2\sqrt{2}}{3}$ ✓ ✓

Q2 Solve by completing the square.

$x^2+12x-28=0$

$x^2+12x=28$

$x^2+12x+6^2=28+6^2$

$(x+6)^2=64$

$x+6=\pm8$

$x=2$ ✓ $x=-14$ ✓

Q3 Solve $2(x+2)=\frac{1}{x}$

$2x+4=\frac{1}{x}$

$2x^2+4x=1$

$2x^2+4x-1=0$

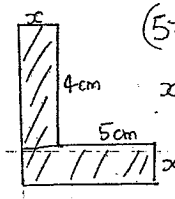
$a=2$ $b=4$ $c=-1$

$x=\frac{-4\pm\sqrt{16-4\times-1\times2}}{2\times2}$

$x=\frac{-4\pm\sqrt{24}}{4}$ ✓

$x=\frac{-4\pm\sqrt{15}}{4}$ ✓

Q4 Solve for x if the area is 19 cm².



$(5+x)\times x+4\times x=19$

$x^2+5x+4x=19$

$x^2+9x=19=0$

$a=1$ $b=9$ $c=19$

$x=\frac{-9\pm\sqrt{81-4\times-19}}{2}$

$x=\frac{-9\pm\sqrt{157}}{2}$

$x=\frac{-9+\sqrt{157}}{2}$

$x\approx1.76$ cm ✓ ✓

Q5 Solve for x

$\frac{3}{2x}+\frac{4}{3x}+\frac{5}{4x}=x$ (×12, ×12x, ×12x)

$12x=18+16+15$

$12x=49$

$x=\frac{49}{12}$ ✓

Q6

A stone is thrown from the top of a cliff to land in the ocean and its height **h** above sea level is given by

$$h = 84 + 13t - 2t^2$$ (h in m, t in secs)

at any time **t**, where **h** is in metres and **t** is in seconds.

a. What is the height of this cliff?

1 m

$h=84+13t-2t^2$ →

$2t^2-13t-84=h$

$t=\frac{13\pm\sqrt{169-4\times2\times-84}}{4}$ → $t=\frac{13\pm29}{4}$

working out for b)

b. How long will it take for the stone to land in the ocean?

$t=\frac{13\pm29}{4}$

if $h=0$

$t=10.5$ seconds ✓ ✓

$2t^2-13t=84$

$\frac{2}{2}t^2-\frac{13}{2}t+\left(\frac{13}{2}\right)^2=\frac{84}{2}+\left(\frac{13}{2}\right)^2$

$t^2-\frac{13}{2}t+\left(\frac{13}{4}\right)^2=$

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