(60)

YEAR 10: ALGEBRA

NAME _____

SOLUTIONS

1) Factorise

a) $3x+6$
$= 3(x+2)$

b) x^2-16
$= x^2-4^2$
$= (x+4)(x-4)$

c) x^2+4x
$= x(x+4)$

d) x^2+5x+6
$= (x+3)(x+2)$

x	+
+6	+5

e) $x^2-2x-15$
$= (x-5)(x+3)$

x	+
-15	-2

f) $x^2-7x+12$
$= (x-4)(x-3)$

x	+
+12	-7

(12)

2) Solve these equations

a) $x^2-6x=0$
$x(x-6)=0$
either $x=0$ or $x-6=0$
$x=6$

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

x	+
+4	-5

either $x-4=0$ or $x-1=0$
$x=4$ $x=1$

(6)

3) Factorise

a) $2x^2+5x+2$

x	+
+4	+5

$= 2x^2+4x+x+2$
$= 2x(x+2)+1(x+2)$
$= (x+2)(2x+1)$

b) $3x^2-7x+2$

x	+
+6	-7

$= 3x^2-6x-x+2$
$= 3x(x-2)-1(x-2)$
$= (x-2)(3x-1)$

(6)

4) Solve these equations (HINT: Use your answers from Q(3))

a) $2x^2+5x+2=0$
$(x+2)(2x+1)=0$
either $x+2=0$ or $2x+1=0$
$x=-2$ $x=-1/2$

b) $3x^2-7x+2=0$
$(x-2)(3x-1)=0$
either $x-2=0$ or $3x-1=0$
$x=2$ $x=1/3$

(4)

5) Solve to 2 decimal places

$2x^2 - 4x - 3 = 0$ $\quad a = 2 \quad b = -4 \quad c = -3$

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

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

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$$x = \frac{4 \pm \sqrt{16 + 24}}{4}$$

$$x = \frac{4 \pm \sqrt{40}}{4}$$

either $x = \frac{4 + \sqrt{40}}{4}$ or $x = \frac{4 - \sqrt{40}}{4}$

$x = \frac{4 + 6.325}{4}$ $\quad x = \frac{4 - 6.325}{4}$

$x = 2.58$ $\quad x = -0.58$

6) Solve these equations

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

either $x + 2 = 0$ or $x - 3 = 0$

$x = -2$ $\quad x = 3$

b) $x^2 = 5x$

$x^2 - 5x = 0$

$x(x-5) = 0$

either $x = 0$ or $x - 5 = 0$

$x = 5$

c) $(x-3)(x+4) = 18$

$x^2 + 4x - 3x - 12 = 18$

$x^2 + x - 30 = 0$

$(x+6)(x-5) = 0$

x	+
-30	+1

either $x + 6 = 0$ or $x - 5 = 0$

$x = -6$ $\quad x = 5$

d) $4x^2 = 6x + 4$

$\div 2 \quad 2x^2 = 3x + 2$

(13)

$2x^2 - 3x - 2 = 0$

$(2x+1)(x-2) = 0$

either $2x + 1 = 0$ or $x - 2 = 0$

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

7) Simplify $\frac{2}{(x+1)} + \frac{3}{(x-2)}$

$$= \frac{2(x-2)}{(2x+1)(x-2)} + \frac{3(x+1)}{(x+1)(x-2)}$$

$$= \frac{2(x-2) + 3(x+1)}{(x+1)(x-2)}$$

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$$= \frac{2x - 4 + 3x + 3}{(x+1)(x-2)} = \frac{5x - 1}{(x+1)(x-2)}$$

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8) Solve the equation

$$\frac{6}{y} + \frac{3}{(y+1)} = \frac{4}{1}$$

$$\frac{6(y+1)}{y(y+1)} + \frac{3y}{y(y+1)} = \frac{4y(y+1)}{y(y+1)}$$

$$6(y+1) + 3y = 4y(y+1)$$

$$6y + 6 + 3y = 4y^2 + 4y$$

$$0 = 4y^2 - 5y - 6$$

$$0 = (4y+3)(y-2)$$

either $4y+3=0$ or $y-2=0$

$y = -3/4$ $y = 2$

(5)

9) Solve the equation

$$\frac{5}{(x-2)} - \frac{3}{(x+2)} = \frac{2}{1}$$

$$\frac{5(x+2)}{(x-2)(x+2)} - \frac{3(x-2)}{(x-2)(x+2)} = \frac{2(x-2)(x+2)}{(x-2)(x+2)}$$

$$5(x+2) - 3(x-2) = 2[x^2 + 2x - 2x - 4]$$

$$5x + 10 - 3x + 6 = 2x^2 - 8$$

$$0 = 2x^2 - 2x - 24$$

$\div 2$ $\quad 0 = x^2 - x - 12$

$$0 = (x-4)(x+3)$$

either $x-4=0$ or $x+3=0$

$x = 4$ $x = -3$

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