1 a) Show that the factors of $(x+1)^2-(y-1)^2$ are $(x+y)$ and $(x-y+2)$.

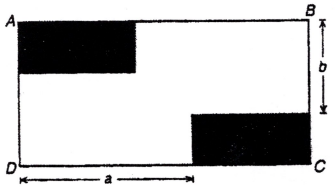
b) Which of the following polynomials have $(x+1)$ as a factor?

$B(x) = 2x^2 + 2$ $C(x) = 3x^2 - 3$ $D(x) = x^2 - xy + x - y$

2 **RECTANGLES!**

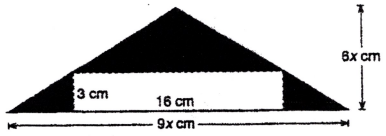
Two isometric rectangles have been drawn in rectangle *ABCD* shown at the right. The area of rectangle *ABCD* is given by the expression $(ab + 2a + 5b + 10)$m².

What are the dimensions of the two isometric rectangles?



3 **CUT-OUT**

A 16 cm by 3 cm rectangle is cut out of a right isosceles triangle.



a) Which expression corresponds to the area of the initial triangle?

b) What is the area of the rectangle?

c) Express the area of the shaded surface as a product of factors.

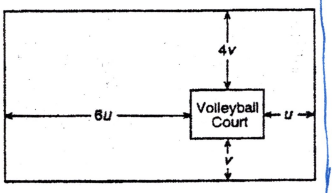
4 Which of the following polynomials have $(x+2)$ as a factor?

$M(x) = ax + 2a + 2bx + 4b$ $N(x) = 3x + 6$ $O(x) = 2x^2 + 2x$

5 **LET'S PLAY!**

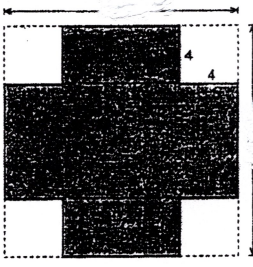
A volleyball court is set up in a public park as shown at the right. The area of the park corresponds to the expression $(35uv + 42u + 100v + 120)$ m².

What are the dimensions of the rectangle that correspond to the volleyball court?



6 **FLATTENED**

The drawing at the right depicts a flattened cardboard box whose base is square in shape. The units of the lengths are in centimetres.



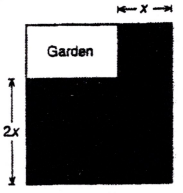
a) What is the height of the cardboard box?

b) What is the area of the surface that must be subtracted from the original square to obtain the shaded area?

c) Determine, as a product of factors, the algebraic expression that corresponds to the area of the shaded surface.

7 A garden is planted in one corner of a rectangular field. The area of the field is given by the expression $(2x^2 + 15x + 28)$ m².

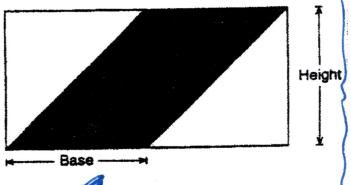
What is the area of the rectangular surface occupied by the garden?



8 **A UNIQUE CREST**

The flag of the nature club at school is depicted at the right. The area of the given parallelogram is provided by the expression $\left(\frac{2x^2+15x+7}{2}\right)$ cm².

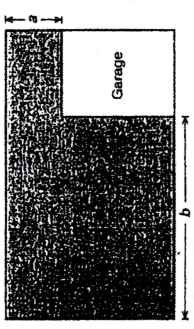
Find two first degree binomials that correspond to the length of the base and the height of the parallelogram. (Use the method of completing the square.)



parallelogram is black part only

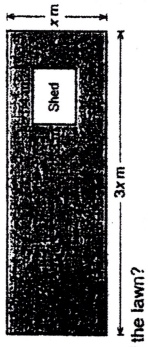
9 The drawing at right shows where a garage is located in the blueprint of a house. The total area of the house corresponds to the expression $(ab + 6a + 8b + 48)$ m².

What are the garage's dimensions? (actual number)



10 **THE SHED**

The dimensions of a rectangular lawn are $3x$ m by x m. A shed is installed whose dimensions are 3 m by 4 m and the rest is lawn.



a) Which expression corresponds to the area of the lawn?

b) What is the area of the base of the shed?

c) Determine, in the form of a product of factors, the algebraic expression that corresponds to the area of the lawn.

11 a) Show that expression $(x^2 - 25) + (x-5)^2$ is equivalent to $2x(x-5)$.

b) What values should be assigned to the variable (n) so that the product $(n^2+1)(n+2)(n-3)$ is zero?

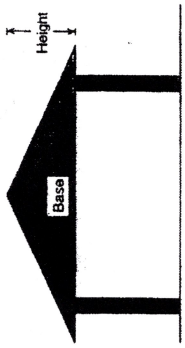
12 Factor the trinomials using the method of your choice.

a) $x^2 + 5x + 4$ *b)* $2a^2 - 4a - 16$

c) factor them each AGAIN using ANOTHER method... to show that you have done it correctly

13 **THE CHALET**

The front of a chalet located at the entrance of a park is represented by the figure at right. The area of the triangular front is given by the expression $\left(\frac{2x^2+15x+7}{2}\right)$ m².

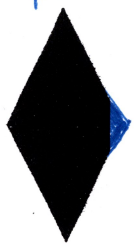


Find two first degree binomials that correspond to the length of the base and the height of the triangle. (Use the technique of completing the square.)

14 A piece of fabric is in the shape of a rhombus. It's area corresponds to the expression $\left(\frac{2x^2+26x+84}{2}\right)$ m².

What first degree binomials represent the length of the diagonals of the rhombus?

(Reminder: Area of a rhombus: $\frac{D \cdot d}{2}$)



Answers

#1.

a) $(x+1)^2 - (y-1)^2$ ← difference of squares

$= ((x+1)+(y-1))((x+1)-(y-1))$ ← factor

$= (x+1+y-1)(x+1-y+1)$ ← remove brackets

$= (x+y)(x-y+2)$ ← simplify

* need help? try: $(x-7)^2 - (2x+4)^2$ and see me

b)

$2x^2+2$

$= 2(x^2+1)$

NO!

$3x^2-3$

$= 3(x^2-1)$

$= 3(x-1)(x+1)$

YES!

$x^2 - xy + x - y$

$= x(x-y) + 1(x-y)$

$= (x+1)(x-y)$

YES!

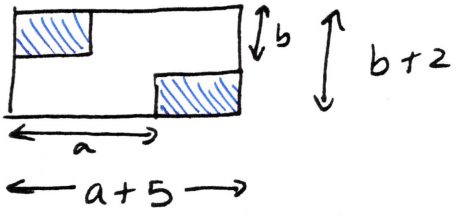
#2

$ab + 2a + 5b + 10$

$= a(b+2) + 5(b+2)$

$= (a+5)(b+2)$

∴

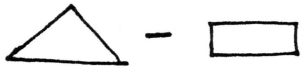


Then the missing measures are 5 and 2. m.

#3

a) $\frac{(9x)(6x)}{2} = \frac{54x^2}{2} = \boxed{27x^2}\ cm^2$

b) $16 \times 3 = \boxed{48\ cm^2}$

c)  $27x^2 - 48$

$3(9x^2-16)$

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

#4

$ax + 2a + 2bx + 4b$
$= a(x+2) + 2b(x+2)$
$= (a+2b)(x+2)$

YES!

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

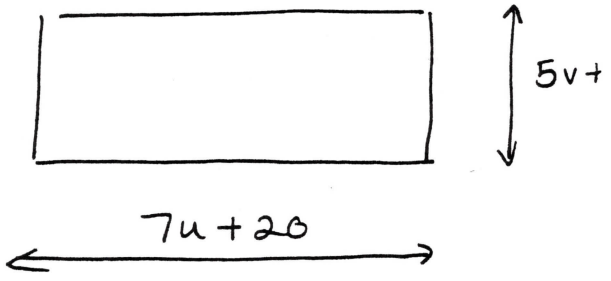
YES!

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

NO!

#5

$35uv + 42u + 100v + 120$
$= 7u(5v+6) + 20(5v+6)$
$= (7u+20)(5v+6)$



$\therefore$ Answer. $20\ m \times 6\ m$

#6

a) 4 cm

b) $64\ cm^2$
$(4 \times 4) \times 4$

c) $a^2 - 64$
$(a+8)(a-8)\ cm^2$

#7

$2x^2 + 15x + 28$
$= 2x^2 + 8x + 7x + 28$
$= 2x(x+4) + 7(x+4)$
$= (2x+7)(x+4)$

$\therefore$ $7\ m \times 4\ m$

#8. $A = \dfrac{2x^2 + 15x + 7}{2}$

$\therefore A = x^2 + \frac{15}{2}x + \frac{7}{2}$

$A = b \times h$
$= (\ b\ )(\ h\ )$

$\therefore$ factor area to get (base)(height)

$\therefore \ldots (x + \frac{15}{4})^2 - \frac{169}{16}$

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

#9

$ab + 6a + 8b + 48$
$a(b+6) + 8(b+6)$
$(a+8)(b+6)$

$\therefore$ $8\ m \times 6\ m$

#10 a) $(3x)(x) = 3x^2\ m^2$

b) $12\ m^2$

c) $3x^2 - 12$
$3(x^2 - 4)$
$(3)(x-2)(x+2)\ m^2$

#11 a) either factor or expand

b)

$n = -2$ $n = 3$

#12

a) $x^2 + 5x + 4$

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

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

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

b) $2a^2 - 4a - 16$

$= 2a^2 - 8a + 4a - 16$

$= 2a(a-4) + 4(a-4)$

$= (2a+4)(a-4)$

$= (2)(a+2)(a-4)$

#13

$A_\Delta = \frac{2x^2+15x+7}{2} = \frac{b \times h}{2}$

$= \frac{2x^2+14x+1x+7}{2}$

$= \frac{2x(x+7)+1(x+7)}{2}$

$= \frac{(2x+1)(x+7)}{2} \rightarrow \frac{b \times h}{2}$

$\therefore (2x+1)$ and $(x+7)$

m m

base x height

(14) $A = \frac{2x^2+26x+84}{2} = \frac{D \times d}{2}$

$= \frac{2(x^2+13x+42)}{2} \rightarrow (D \cdot d)$

$= \frac{(2)(x^2+7x+6x+42)}{2}$

$= \frac{(2)(x(x+7)+6(x+7))}{2}$

$= \frac{(2)(x+6)(x+7)}{2} \rightarrow (D \cdot d)$

$\therefore (2x+12)$ and $(x+7)$

OR $(x+6)$ and $(2x+14)$