

Geometry Applications

Shape	Area (all space inside)	Perimeter (length all around edges)
Rectangle	$A = LW$	$P = L + w + L + W$ $P = 2L + 2W$
Triangle	$A = \frac{1}{2}bh$	Add up all sides
Parallelogram	$A = bh$	Add up all sides
Square	$A = LW = s \cdot s = s^2$	$P = s + s + s + s$ $P = 4s$
Circle	$A = \pi r^2$	$C = 2\pi r$

L : length; W : width; b : base length; h : height; s : side length; r : radius; C : circumference

Find the polynomial that represents the area of the shape with...

Ex. 1 triangle $b = 3x + 1$ and $h = 2x - 4$

You Try 2 triangle $b = 6x - 4$ and $h = 5x + 2$ *Foii*

$$A = \frac{1}{2}(\text{base})(\text{height})$$

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

$$A = \frac{1}{2}(6x^2 - 12x + 2x - 4)$$

$$A = \frac{1}{2}(6x^2 - 10x - 4) =$$

$$\boxed{3x^2 - 5x - 2}$$

$$A = \frac{1}{2}b \cdot h$$

$$A = \frac{1}{2}(6x-4)(5x+2)$$

$$A = 30x^2 + 12x - 20x - 8$$

$$\frac{30x^2}{2} - \frac{8x}{2} - \frac{8}{2}$$

$$\boxed{15x^2 - 4x - 4}$$

What expressions represent the length and width of a rectangle with...

Ex. 3 area is $k^2 - 8k + 16$

You Try 3 area is $9p^2 - 81$

$$A = (\text{length})(\text{width})$$

$$A = (k-4)(k-4)$$

$$A = (k-4)^2$$

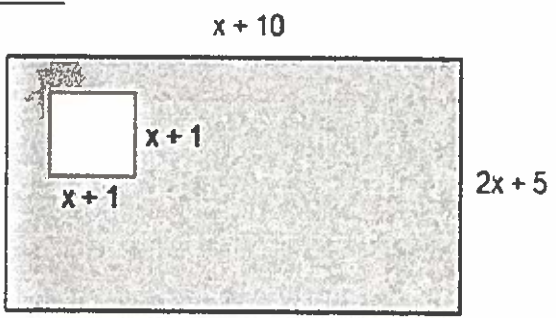
square!

$$(3p-9)(3p+9)$$

not a square!

What polynomial represents the area of the shaded region?

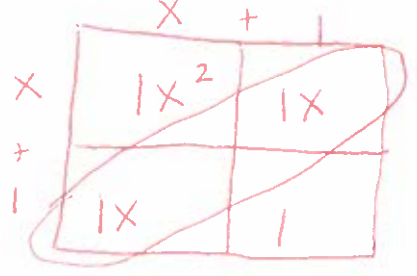
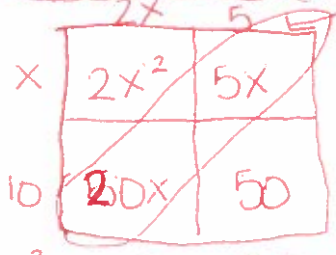
Ex. 4



A shaded = A whole - A middle

$$A_{\text{whole}} = (x+10)(2x+5)$$

$$A_{\text{middle}} = (x+1)(x+1)$$



$$2x^2 + 25x + 50$$

$$- 1x^2 + 2x + 1$$

$$\boxed{1x^2 + 23x + 44}$$

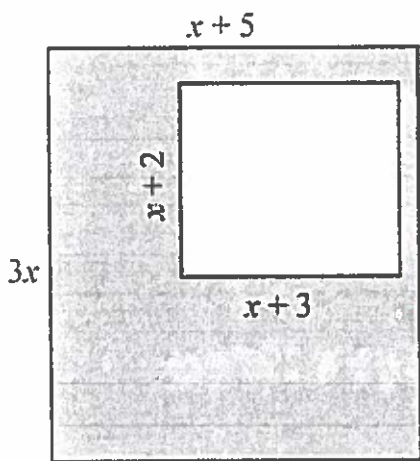
Subtract

$$2x^2 + 25x + 50$$

$$1x^2 + 2x + 1$$

You Try 6

A rectangular field has a patch of dirt at the top right where nothing grows, as shown in the figure. What is the area of the space where crops do grow in the field?



$A_{\text{whole}} = (3x)(x+5)$

$3x^2 + 15x$

~~$x^2 + 5x + 6$~~
 $2x^2 + 10x - 6$

$A_{\text{middle}} = (x+2)(x+3)$
 $x^2 + 3x + 2x + 6$
 $x^2 + 5x + 6$

$3x^2 + 15x + 0$
 $-(x^2 + 5x + 6)$

$A_{\text{shaded}} \rightarrow 2x^2 + 10x - 6$

What is the area of a circle with radius...

Ex. 7 $r = 3x - 4$

$A = \pi r^2$

$A = \pi(3x-4)^2$ multiply by FOIL

$A = \pi(3x-4)(3x-4)$

	$3x$	-4	
$3x$	$9x^2$	$-12x$	$A = \pi(9x^2 - 24x + 16)$
-4	$-12x$	16	

You Try 8 $r = 2x + 5$

$A = \pi r^2$

$A = \pi(2x+5)^2$

$A = \pi(2x+5)(2x+5)$

	$2x$	5
$2x$	$4x^2$	$10x$
5	$10x$	25

$A = 4x^2 + 20x + 25$

What is the radius of a circle with area...

Ex. 9 $A = \pi(x^2 + 14x + 49)$

$A = \pi(x+7)(x+7)$

$\pi(x+7)^2$

$r = x + 7$

You Try 10 $A = \pi(x^2 - 20x + 100)$