

Factor the following:

A)  $x^2 + 6x - 40$

$(x+10)(x-4)$

B)  $x^2 - 625$

$(x+25)(x-25)$

C)  $x^2 - 23x + 126$

$(x-9)(x-14)$

D)  $5x^2 - 45$

$5(x^2-9)$

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

$3(x-2x-5)$

E)  $14x^2y^8 + 6xy^3 - 42x^4y$

$2xy(7xy^7 + 3y^2 - 21x^3)$

SOLVE BY SQUARE ROOTS

A)  $x^2 = 100$

$x = \pm 10$

C)  $(x-3)^2 = \sqrt{81}$

$x-3 = \pm 9$

$x-3=9$     $x-3=9$   
 $+3$     $+3$     $+3$     $+3$

$x = 12$     $x = -6$

B)  $3x^2 + 25 = 10$

$3x^2 = -15$

$x^2 = -5$

$x = \pm \sqrt{-5}$

D)  $4(x-6)^2 = 32$

$(x-6)^2 = \sqrt{8}$

$x-6 = \pm 2\sqrt{2}$

$x = 6 \pm 2\sqrt{2}$

SOLVE BY FACTORING

Solve the following.

A)  $x^2 + 2x - 48 = 0$

$(x+8)(x-6) = 0$

$x+8=0$     $x-6=0$

$x = -8$     $x = 6$

C)  $x^2 - 10x + 21 = 0$

$(x-3)(x-7) = 0$

$x-3=0$     $x-7=0$

$x = 3$     $x = 7$

SOLVE BY COMPLETING THE SQUARE

Solve

A)  $x^2 + 6x + 3 = 0$

$x^2 + 6x = -3$

$(\frac{6}{2})^2 = (3)^2 = 9$

$x^2 + 6x + 9 = -3 + 9$

$(x+3)^2 = 6$

$x = -3 \pm \sqrt{6}$

B)  $x^2 + 7x = 10$

$(\frac{7}{2})^2 = (3.5)^2 = 12.25$

$x^2 + 7x + 12.25 = 10 + 12.25$

$(x+3.5)^2 = 22.25$

$x+3.5 = \pm \sqrt{22.25}$

$x = -3.5 \pm \sqrt{22.25}$

$(\frac{6}{2})^2 = (3)^2 = 9$

$x^2 + 6x + 9 = 2 + 9$

$(x+3)^2 = 11$

$x+3 = \pm \sqrt{11}$

$x = -3 \pm \sqrt{11}$

# QUADRATIC FORMULA

Solve  $a=1$   $b=5$   $c=1$

A)  $x^2 + 5x + 1 = 0$

B)  $3x^2 + 4x = 6$

$a=3$   $b=4$   $c=-6$

$x = \frac{-4 \pm \sqrt{(4)^2 - 4(3)(-6)}}{2(3)}$

$x = \frac{-5 \pm \sqrt{(5)^2 - 4(1)(1)}}{2(1)}$

$x = \frac{-5 \pm \sqrt{21}}{2}$

C)  $6x^2 + 2x - 4 = 0$

$x = \frac{-2 \pm \sqrt{22}}{3}$

$a=6$   $b=2$   $c=-4$   
 $x = \frac{-2 \pm \sqrt{(2)^2 - 4(6)(-4)}}{2(6)}$

DISCRIMINANT  $x = \frac{2}{3}$   $x = -1$

Find the discriminant of the quadratic equation and complete the table. Do NOT solve the equation.

Equation	Discriminant	Describe the solutions including how many, real, rational, irrational, or imaginary
$x^2 + 2x + 8 = 0$	-28	2 Imaginary
$x^2 + 6x + 1 = 0$	32	2 Real (Irrational)
$4x^2 + 2x - 6 = 0$	100	2 Real (Rational)
$2x^2 - 2x + 5 = 0$	-36	2 Imaginary

# Complex Numbers

A. Find the product:  $(3+6i)(4-7i)$  B. Which is the value of  $i^{18}$ ?

$12 - 21i + 24i - 42i^2$

$\frac{18}{4} = 4.5 \rightarrow i^2$

$54 + 3i$

$-1$

C. What is the conjugate of  $-3-5i$ ?

$-3+5i$

D. Simplify:  $(6-7i)^2$

$36 - 42i - 42i + 49i^2$   
 $-13 - 84i$

Simplify.

Write the following in complex form:

$\frac{2+5i}{6-8i} \cdot \frac{6+8i}{6+8i}$

E.  $\frac{2+5i}{6-8i}$

$6+8i$

F.  $2 + \sqrt{-144}$

$2 + 12i$

G.  $-8 - \sqrt{-54}$

$-8 - 3i\sqrt{6}$

$(2+5i)(6+8i)$   
 $12 + 16i + 30i + 40i^2$   
 $-28 + 46i$

$\frac{120}{100} = \frac{-14+23i}{50}$

Write the expression as a complex number in standard form:

H.  $(-6+i) - (-23-20i)$

$-6+i + 23 + 20i$   
 $17 + 21i$

I.  $10 - (21+7i) - 27i$

$10 - 21 - 7i - 27i$   
 $-11 - 34i$