

Quadratics Unit Review

Factor the following completely.

1) $x^2 - 10x + 24$

$$\begin{array}{r|l} 24 & -10 \\ \hline -6, -4 & -10 \end{array}$$

$$(x^2 - 6x) - 4x + 24$$

$$x(x-6) - 4(x-6)$$

$$\boxed{(x-4)(x-6)}$$

2) $2m^2 - 11m + 15$

$$\begin{array}{r|l} 30 & -11 \\ \hline -5, -6 & -11 \end{array}$$

$$(2m^2 - 5m) - 6m + 15$$

$$m(2m-5) - 3(2m-5)$$

$$\boxed{(m-3)(2m-5)}$$

3) $16x^2 - 25$

$$\begin{array}{r|l} -400 & 0 \\ \hline -20, 20 & 0 \end{array}$$

$$(16x^2 - 20x) + 20x - 25$$

$$4(4x-5) + 5(4x-5)$$

$$\boxed{(4x+5)(4x-5)}$$

Solve the following by factoring or the quadratic formula.

4) $r^2 - 11r + 18 = 0$

$$\begin{array}{r|l} 18 & -11 \\ \hline -9, -2 & -11 \end{array}$$

$$(r^2 - 9r) - 2r + 18$$

$$r(r-9) - 2(r-9)$$

$$(r-2)(r-9)$$

$$r-2=0 \quad r-9=0$$

$$\boxed{r=2} \quad \boxed{r=9}$$

5) $2x^2 + 5x = 7$

$$2x^2 + 5x - 7 = 0$$

$$\begin{array}{r|l} -14 & 5 \\ \hline 7, -2 & 5 \end{array}$$

$$(2x^2 + 7x) - 2x - 7$$

$$x(2x+7) - 1(2x+7)$$

$$(x-1)(2x+7)$$

$$\begin{array}{r|l} x-1=0 & 2x+7=0 \\ \hline x=1 & 2x=-7 \\ & x=-\frac{7}{2} \end{array}$$

6) $c^2 - 64 = 0$

$$c^2 = 64$$

$$c = \pm \sqrt{64}$$

$$\boxed{c = \pm 8}$$

$$= \frac{86 \pm 2\sqrt{1865}}{2}$$

$$= \frac{86}{2} \pm \frac{2\sqrt{1865}}{2}$$

$$\boxed{= 43 \pm \sqrt{1865}}$$

$$x^2 - 86x + 16 = 0$$

$$= \frac{86 \pm 2\sqrt{1865}}{2} \quad x = \frac{86 \pm \sqrt{7396 - 4(1)(-16)}}{2}$$

$$x = \frac{86 \pm \sqrt{7460}}{2} = \frac{86 \pm \sqrt{4 \cdot 1865}}{2}$$

Use the discriminant $b^2 - 4ac$ to tell me...

- The number of solutions for the function
- Are they real or imaginary?

8) $2x^2 + x + 28 = 0$
 $b^2 - 4ac = 1 - 4(2)(28)$

$= 1 - 224$
 $= -223 \rightarrow$ two solutions, imaginary

9) $2x^2 + 7x = -6$
 $2x^2 + 7x + 6 = 0$

$b^2 - 4ac = 49 - 4(2)(6)$
 $= 1 \rightarrow$ 2 solutions, real

10) $x^2 + 4x + 5 = 0$

$b^2 - 4ac = 16 - 4(1)(5)$
 $= 16 - 20$
 $= -4 \rightarrow$ two solutions, imaginary

11) $x^2 - 12x + 36 = 0$

$b^2 - 4ac = 144 - 4(1)(36)$
 $= 0 \rightarrow$ one solution, real

12) $3(x-4)^2 + 2 = 0$

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

$3(x^2 - 4x - 4x + 16) + 2 = 0$

$3(x^2 - 8x + 16) + 2 = 0$

$3x^2 - 24x + 48 + 2 = 0$

$3x^2 - 24x + 50 = 0$

$b^2 - 4ac = 576 - 4(3)(50)$
 $= 576 - 600$
 $= -24 \rightarrow$ two solutions, imaginary

13) $2(x-6)^2 - 1 = 4$

$2(x-6)(x-6) - 1 = 4$

$2(x^2 - 6x - 6x + 36) - 1 = 4$

$2(x^2 - 12x + 36) - 1 = 4$

$2x^2 - 24x + 72 - 1 = 4$

$2x^2 - 24x + 71 = 4$

$2x^2 - 24x + 67 = 0$

$b^2 - 4ac = 576 - 4(2)(67) = 40$

2 sol's, real

Simplify the following.

14) $2i(5-3i)$ $i^2 = -1$

$10i - 6i^2$

$10i + 6$

$6 + 10i$

standard form $a+bi$

15) $(4+3i) + (6-7i)$

$4+6+3i-7i$

$10 - 4i$

16) $(8-\sqrt{-1}) - (-3+\sqrt{-16})$

$8 - i + 3 - 4i$

$11 - 5i$

17) $(3+2i)(4+i)$

FOIL!

$12 + 3i + 8i + 2i^2$

$12 + 11i + 2i^2$

$12 + 11i - 2$

$10 + 11i$