Math 10

Lesson 2–4 Answers

Lesson Questions

Question 1

If possible, factor each trinomial.

a) $x^2 + 2x - 8$

2 factors of –8 that add up to 2

$4 - 2 = -8$

$4 - 2 = 2$

$x^2 + 2x - 8$

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

b) $a^2 + 7a - 18$

2 factors of –18 that add up to 7

$-2(9) = -18$

$-2 + 9 = 7$

$a^2 + 7a - 18$

$= (a + 9)(a - 2)$

c) $-30 + 7m + m^2$

2 factors of –30 that add up to 7

$-3(10) = -30$

$-3 + 10 = 7$

$-30 + 7m + m^2$

$= (-3 + m)(10 + m)$

$= (m - 3)(m + 10)$

Question 2

If possible, factor each binomial.

a) $x^2 - 9$

$x^2 - 9$

$= x^2 - (3)^2$

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

b) $16a^2 - 25c^2$

$16a^2 - 25c^2$

$= (4a)^2 - (5c)^2$

$= (4a + 5c)(4a - 5c)$

c) $7g^3h^2 - 28g^5$

first factor out GCF

$7g^3h^2 - 28g^5$

$= 7g^3 (h^2 - 4g^2)$

$= 7g^3 (h^2 - (2g)^2)$

$= 7g^3 (h + 2g)(h - 2g)$

Question 3

Show why it is not possible to factor $m^2 + 16$.

If it were possible, the only possible factors would be 4 and 4 or 4 and –4 or –4 and –4

When we multiply the possible factors we get different results:

$(x + 4)(x + 4)$

$= x^2 + 4x + 4x + 16$

$= x^2 + 8x + 16$

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

$= x^2 - 16$

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

$= x^2 - 4x - 4x + 16$

$= x^2 - 8x + 16$

Question 4

If possible, factor each trinomial.

a) $x^2 + 6x + 9$

9 is a perfect square

$3^2 = 9$ and $3 + 3 = 6$

$\therefore x^2 + 6x + 9$

$= (x + 3)(x + 3)$

$= (x + 3)^2$

b) $2a^2 - 44a + 242$

first, factor out GCF

$2(a^2 - 22a + 121)$

121 is a perfect square

$(-11)^2 = 121$ and $-11 + -11 = -22$

$\therefore 2(a^2 - 22a + 121)$

$= 2(a - 11)(a - 11)$

$= 2(a - 11)^2$

c) $h^2 - 12h - 36$

This trinomial is not factorable for integers. There are no factors of a –36 that add up to –12.

Assignment

1. a) $(x + 2)(x – 2)$ b) $(2x + 3)(2x – 3)$
   c) $(x + 4)(x + 4)$ d) $(x – 3)(x – 3)$

2. a) $x^2 – 64$ b) $4x^2 – 25$
   c) $9a^2 – 4b^2$ d) $3t^2 – 75$

3. a) $x^2 + 6x + 9$ b) $25a^2 – 30ab + 9b^2$
   c) $4h^2 + 12h + 9$ d) $5x^2 – 20xy + 20y^2$

4. a) $(x + 4)(x – 4)$ b) $(b + 11)(b – 11)$
   c) not factorable d) $(3a + 4b)(3a – 4b)$
   e) $(6c + 7d)(6c – 7d)$ f) not factorable
   g) not factorable h) $(10 + 3t)(10 – 3t)$

5. a) $(x + 6)(x + 6)$ b) $(x + 5)(x + 5)$
   c) not factorable d) $(m – 13)(m – 13)$
   e) $(4k – 1)(4k – 1)$ f) $(7 – m)(7 – m)$
   g) not factorable h) $(6a + 7)(6a + 7)$

6. a) $5(t^2 – 20)$ b) $10xy(x + 3)(x – 3)$
   c) $4(x^2 – 12x + 9)$ d) $2x(3x + 2)(3x + 2)$
   e) $(x^2 + 4)(x + 2)(x – 2)$ f) $(x + 3)^2 (x – 3)^2$

7. a) $–16b$ is not a perfect square term.
   b) There are no pairs of integers that have a product of $–12$ and a sum of $–7$.
   c) The trinomial is not of the form $(ax)^2 – 2abx + b^2$.
   d) $49t^2 + 100$ is not a difference of squares.

8. a) 280 b) 460 c) 600 d) –600

9. a) $\pi(r + 4)^2 – \pi r^2$
   b) $8\pi(r + 2)$
   c) 201.1 cm^2

10. a) Never true. $(–b)^2 \neq –b^2$
    b) Sometimes true. It is true if $a = 0$ or $b = 0$.
    c) Sometimes true. When $b = 0$,
    $a^2 – 0^2 = a^2 – 2a(0) + 0^2$
    $a^2 = a^2$
    d) Always true. $(a + b)^2 = a^2 + 2ab + b^2$.

11. Rahim is correct; $4(4x^2 + y^2)$ cannot be factored further.