

EXERCISES FOR APPENDIX: BASIC FACTORING TECHNIQUES

Question 1 In Exercises ?? - ??, factor completely over the integers. Check your answer by multiplication.

Problem 1.1 $2x - 10x^2$

$$2x(1 - 5x)$$

Problem 1.2 $12t^5 - 8t^3 = 4t^3(3t^2 - 2)$

Problem 1.3 $16xy^2 - 12x^2y$

$$4xy(4y - 3x)$$

Problem 1.4 $5(m + 3)^2 - 4(m + 3)^3$

$$(m + 3)^2(-4m - 7) = -(m + 3)^2(4m + 7)$$

Problem 1.5 $(2x - 1)(x + 3) - 4(2x - 1) = (2x - 1)(x - 1)$

Problem 1.6 $t^2(t - 5) + t - 5$

$$(t - 5)(t^2 + 1)$$

Problem 1.7 $w^2 - 121 = (w - 11)(w + 11)$

Problem 1.8 $49 - 4t^2$

$$(7 - 2t)(7 + 2t) = -(2t - 7)(2t + 7)$$

Problem 1.9 $81t^4 - 16$

$$(3t - 2)(3t + 2)(9t^2 + 4)$$

Problem 1.10 $9z^2 - 64y^4 = (3z - 8y^2)(3z + 8y^2)$

Problem 1.11 $(y + 3)^2 - 4y^2$

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

Problem 1.12 $(x + h)^3 - (x + h)$

$$(x + h)(x + h - 1)(x + h + 1)$$

Problem 1.13 $y^2 - 24y + 144 = (y - 12)^2$

Problem 1.14 $25t^2 + 10t + 1$

$$(5t + 1)^2$$

Problem 1.15 $12x^3 - 36x^2 + 27x$

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

Problem 1.16 $m^4 + 10m^2 + 25 = (m^2 + 5)^2$

Problem 1.17 $27 - 8x^3$

$$(3 - 2x)(9 + 6x + 4x^2) = -(2x - 3)(4x^2 + 6x + 9)$$

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Problem 1.18 $t^6 + t^3$

$$t^3(t+1)(t^2-t+1)$$

Problem 1.19 $x^2 - 5x - 14 = (x - 7)(x + 2)$

Problem 1.20 $y^2 - 12y + 27$

$$(y - 9)(y - 3)$$

Problem 1.21 $3t^2 + 16t + 5 = (3t + 1)(t + 5)$

Problem 1.22 $6x^2 - 23x + 20$

$$(2x - 5)(3x - 4)$$

Problem 1.23 $35 + 2m - m^2$

$$(7 - m)(5 + m) = -(m - 7)(m + 5)$$

Problem 1.24 $7w - 2w^2 - 3$

$$(-2w + 1)(w - 3) = -(2w - 1)(w - 3)$$

Problem 1.25 $3m^3 + 9m^2 - 12m = 3m(m - 1)(m + 4)$

Problem 1.26 $x^4 + x^2 - 20$

$$(x - 2)(x + 2)(x^2 + 5)$$

Problem 1.27 $4(t^2 - 1)^2 + 3(t^2 - 1) - 10$

$$(2t - 3)(2t + 3)(t^2 + 1)$$

Problem 1.28 $x^3 - 5x^2 - 9x + 45 = (x - 3)(x + 3)(x - 5)$

Problem 1.29 $3t^2 + t - 3 - t^3$

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

Problem 1.30 $y^4 + 5y^2 + 9$

Hint: $y^4 + 5y^2 + 9 = (y^4 + 6y^2 + 9) - y^2$

$$(y^2 - y + 3)(y^2 + y + 3)$$

Question 2 In Exercises ?? - ??, find all rational number solutions. Check your answers.

Problem 2.1 $(7x + 3)(x - 5) = 0$

$$x = -\frac{3}{7} \text{ or } x = 5$$

Problem 2.2 $(2t - 1)^2(t + 4) = 0$

$$t = -4 \text{ (smaller solution)}$$

$$t = \frac{1}{2} \text{ (larger solution)}$$

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Problem 2.3 $(y^2 + 4)(3y^2 + y - 10) = 0$

$$y = \frac{5}{3} \text{ or } y = -2$$

Problem 2.4 $4t = t^2$

$$t = 0 \text{ (smaller solution)}$$

$$t = 4 \text{ (larger solution)}$$

Problem 2.5 $y + 3 = 2y^2$

$$y = -1 \text{ or } y = \frac{3}{2}$$

Problem 2.6 $26x = 8x^2 + 21$

$$x = \frac{3}{2} \text{ (smaller solution)}$$

$$x = \frac{7}{4} \text{ (larger solution)}$$

Problem 2.7 $16x^4 = 9x^2$

$$x = 0 \text{ or } x = \pm \frac{3}{4}$$

Problem 2.8 $w(6w + 11) = 10$

$$w = -\frac{5}{2} \text{ (smaller solution)}$$

$$w = \frac{2}{3} \text{ (larger solution)}$$

Problem 2.9 $2w^2 + 5w + 2 = -3(2w + 1)$

$$w = -5 \text{ or } w = -\frac{1}{2}$$

Problem 2.10 $x^2(x - 3) = 16(x - 3)$

$$x = 3 \text{ or } x = \pm 4$$

Problem 2.11 $(2t + 1)^3 = (2t + 1)$

$$t = -1, t = -\frac{1}{2}, \text{ or } t = 0$$

Problem 2.12 $a^4 + 4 = 6 - a^2$

$$a = \pm 1$$

Problem 2.13 $\frac{8t^2}{3} = 2t + 3$

$$t = -\frac{3}{4} \text{ (smaller solution)}$$

$$t = \frac{3}{2} \text{ (larger solution)}$$

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Problem 2.14 $\frac{x^3 + x}{2} = \frac{x^2 + 1}{3}$

$$x = \frac{2}{3}$$

Problem 2.15 $\frac{y^4}{3} - y^2 = \frac{3}{2}(y^2 + 3)$

$$y = \pm 3$$

Problem 3 With help from your classmates, factor $4x^4 + 8x^2 + 9$.

Problem 4 With help from your classmates, find an equation which has 3 , $-\frac{1}{2}$, and 117 as solutions.