

1/13/11

Tuesday

course website:

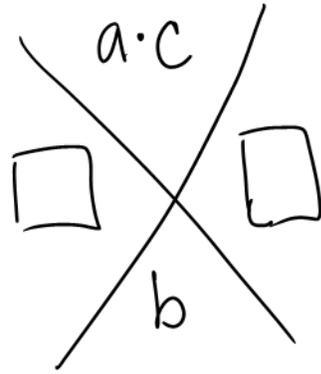
www.swccd.edu/~sgracey

• Intro

• Review factoring

• lecture 7.1-7.2

$$ax^2 + bx + c$$



$$(2x + 5)(3x - 1)$$

$$2x(3x - 1) + 5(3x - 1)$$

$$6x^2 - 2x + 15x - 5$$

$$6x^2 + 13x - 5$$

↳ difference

↳ product of opposing signs

$$(x + 3)(5x + 4)$$

$$5x^2 + 4x + 15x + 12$$

$$5x^2 + 19x + 12$$

↳ sum

↳ product of 2 positives

$$(x - 1)(10x - 9)$$

$$10x^2 - 9x - 10x + 9$$

$$10x^2 - 19x + 9$$

↳ sum

↳ product of 2 negatives

$$2 \overline{)40}$$

$$2 \overline{)20}$$

$$2 \overline{)10}$$

$$5 \overline{)5}$$

1

Find the greatest common factor, GCF, of the expressions.

1) 15, 21, 27

$$\boxed{3}$$

$$15 = 3 \cdot 5$$

$$21 = 3 \cdot 7$$

$$27 = 3^3$$

1) $\boxed{3}$

2) x^7, x^4

$$x^7 = x^4 \cdot x^3$$

$$x^4 = x^4$$

2) $\boxed{x^4}$

3) $21m^3, 189m^8, 441m^4$

3) $\boxed{21m^3}$

4) $15(a - b)$ and $14(a - b)$

4) $\boxed{(a-b)}$

Find the missing factor.

5) $-4x^7y^3 = xy \cdot ?$

5) $\boxed{-4x^6y^2}$

Factor the GCF from the polynomial.

6) $8x - 32$

$$8(x - 4)$$

6) $8(x - 4)$

7) $7x^4 - 42x^2$

7) $7x^2(x^2 - 6)$

8) $24x^3y + 15xy^4$

8) $3xy(8x^2 + 5y^3)$

9) $\frac{1}{5}x + \frac{2}{5}$

9) $\frac{1}{5}(x + 2)$

10) $9x^6 + 18x^4 + 12x^2 - 27$

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

10) _____

11) $s(t^2 - 15) + 5(t^2 - 15)$

11) $(t^2 - 15)(s + 5)$

12) $(5w + 3)(w + 2) + (w + 1)(w + 2)$

$$(w + 2)[(5w + 3) + (w + 1)]$$
$$(w + 2)(6w + 4)$$
$$2(w + 2)(3w + 2)$$

12) $2(w + 2)(3w + 2)$

Factor by grouping.

13) $3x + 33 + xy + 11y$

13) _____

$$3(x+11) + y(x+11)$$

$$(x+11)(3+y)$$

14) $2y - 8 + xy - 4x$

14) _____

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

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

15) $x^3 + 2x^2 + x + 2$

15) _____

$$x^2(x+2) + 1(x+2)$$

$$(x+2)(x^2+1)$$

16) $14y^6 - y^5 - 14y + 1$

16) _____

$$y^5(14y-1) - 1(14y-1)$$

$$(14y-1)(y^5-1)$$

17) $(x-10)(x-5) + (x-10)$

17) _____

$$(x-10)[(x-5) + 1]$$

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

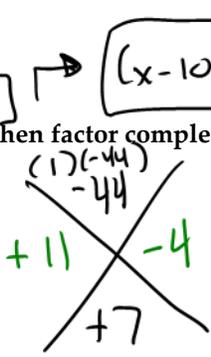
Write the trinomial in standard form and then factor completely. If the trinomial cannot be factored, say it is prime.

18) $7x - 44 + x^2$

18) _____

$$x^2 + 7x - 44$$

$$x^2 + 11x - 4x - 44$$



$$x(x+11) - 4(x+11)$$

$$(x+11)(x-4)$$

19) $54 - 15x + x^2$
 $x^2 - 15x + 54$

$(x-6)(x-9)$

19) _____

Factor the trinomial completely. If the trinomial cannot be factored, say it is prime.

20) $x^2 - 7x + 12$

$(x-3)(x-4)$

20) _____

21) $x^2 - x - 40$

(PRIME)

21) _____

22) $m^2 + mn - 12n^2$

$(m+4n)(m-3n)$

22) _____

23) $5x^2 + 5x - 100$

$5(x^2 + x - 20) \rightarrow 5(x+5)(x-4)$

23) _____

24) $-x^2 - 3x + 70$

$-(x^2 + 3x - 70) \rightarrow -(x+10)(x-7)$

24) _____

25) $x^3 + 6x^2 - 16x$

25) _____

26) $9x^2 - 30x + 3x^3$

26) _____

27) $2x^3y^3 - 4x^3y^2 - 16x^3y$

27) _____

Solve the problem.

28) A ball is thrown directly upward from the top of a building that is 160 feet high. The height of the ball after t seconds is given by the trinomial $(-16t^2 + 48t + 160)$ feet. Write this polynomial in factored form.

28) _____

Factor the polynomial completely using the trial and error method.

29) $7x^2 + 13x - 24$

29) _____

30) $9y^2 - 24y + 16$

30) _____

31) $15x^3 - 2x^2 - 8x$

31) _____

32) $8y^2 + 36y - 20$

32) _____

33) $8x^3y + 20x^2y + 12xy$

33) _____

Solve the problem.

34) A rectangle has an area described by the polynomial $(28x^2 + 29x + 6)$ square inches. Find the length and width of the rectangle.

34) _____

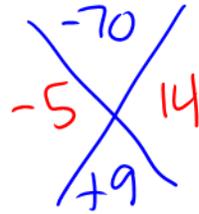
Factor the polynomial completely using the grouping method.

35) $7x^2 + 9x - 10$

$$7x^2 - 5x + 14x - 10$$

$$x(7x - 5) + 2(7x - 5)$$

$$(7x - 5)(x + 2)$$



$$\begin{array}{r} 2 \overline{) 70} \\ 5 \overline{) 35} \\ 7 \overline{) 7} \\ 1 \end{array}$$

35) _____

36) $21 + 72x^2 - 87x$

36) _____

37) $8y^2 + 36y - 20$

37) _____

38) $16x + 16x^2 + 3x^3$

38) _____

39) $6x^3 - 22x^2 + 20x$

39) _____

Factor completely. If the polynomial is prime, state so.

40) $x^2 + 20x + 100$

40) _____

41) $x^2 - 4x + 4$

41) _____

42) $x^2 - \frac{2}{11}x + \frac{1}{121}$

42) _____

$$\frac{1}{121} (121x^2 - 11 \cdot 2x + 1)$$

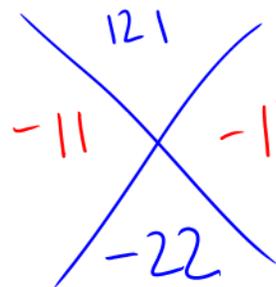
$$\frac{1}{121} (121x^2 - 22x + 1)$$

$$\frac{1}{121} (121x^2 - 11x - 11x + 1)$$

$$\frac{1}{121} [11x(11x-1) - 1(11x-1)]$$

$$\frac{1}{121} (11x-1)(11x-1)$$

$$\boxed{\frac{1}{121} (11x-1)^2}$$



43) $x^2 + 8x + 16$

43) _____

$$\begin{array}{l}
 x^2 = x \cdot x \\
 16 = 4 \cdot 4 \\
 8x = 2 \cdot x \cdot 4 \quad \checkmark
 \end{array}
 \Rightarrow
 \boxed{(x+4)^2}$$

44) $p^2 - 25pq + 625q^2$

44) prime

$$\begin{array}{l}
 p^2 = p \cdot p \\
 625q^2 = 25q \cdot 25q \\
 25pq = 2 \cdot p \cdot 25q
 \end{array}$$

not unless you've been drinking!

45) $180x^2 - 60x + 5$

45) _____

46) $27x^2 - 36x^3 + 12x^4$

46) _____

47) $16 - w^2$

47) _____

no middle term, diff of squares

$$\boxed{(4-w)(4+w)}$$

48) $x^2 - \frac{1}{36}$

48) _____

$$49) 4x^2 - \frac{4}{25}$$

49) _____

$$50) x^8 - 256$$

50) _____

no middle term, diff of squares

$$a = x^4$$
$$256 = 16^2 \text{ so } b = 16$$

$$\begin{aligned} & \left. \begin{array}{l} x^8 - 256 \\ = (x^4 + 16)(x^4 - 16) \\ = (x^4 + 16)(x^2 - 4)(x^2 + 4) \\ = \boxed{(x^4 + 16)(x^2 + 4)(x + 2)(x - 2)} \end{array} \right\} \end{aligned}$$

51) _____

$$51) x^{10} - 64y^8$$

$$52) t^3 + 216$$

52) _____

no middle term, sum of cubes

$$\begin{aligned} a = t & \quad b = 6 \\ & \left. \begin{array}{l} t^3 + 216 \\ = (t + 6)((t)^2 - t \cdot 6 + (6)^2) \\ = \boxed{(t + 6)(t^2 - 6t + 36)} \end{array} \right\} \end{aligned}$$

$$53) 64 - t^3$$

53) _____

54) $125a^3 - 64b^3$

54) _____

$$= (5a)^3 - (4b)^3$$

$$= (5a - 4b) [(5a)^2 + (5a)(4b) + (4b)^2]$$

$$= \boxed{(5a - 4b)(25a^2 + 20ab + 16b^2)}$$

55) $x^6 + y^9$

55) _____

$$\begin{aligned} a &= x^2 \\ b &= y^3 \end{aligned} \quad \left. \begin{array}{l} \\ \end{array} \right\} \begin{aligned} &x^6 + y^9 \\ &= (x^2 + y^3) ((x^2)^2 - (x^2)(y^3) + (y^3)^2) \\ &= \boxed{(x^2 + y^3)(x^4 - x^2y^3 + y^6)} \end{aligned}$$

56) $24k^3m - 375m^4$

56) _____

57) $500x^3y^6 - 36x^6y^3$

57) _____

Factor completely. If a polynomial cannot be factored, say it is prime.

58) $13x^2 + 12x^4$

58) _____

59) $3x^8 - 9x^6$

59) _____

$$60) x^2 + x - 12$$

60) _____

$$61) x^4 - 7x^2 - 30$$

61) _____

$$62) 5t^5 - 5t^4 - 60t^3$$

62) _____

$$63) 21 + 72x^2 - 83x$$

63) _____

$$64) 9x^2 - 8y^2 - 6xy$$

64) _____

$$65) 10y^2 + 45y - 25$$

65) _____

66) $-60x^3 + 112x^2 - 20x$

66) _____

67) $z^2 - 16$

67) _____

68) $108x^2y - 147y$

68) _____

69) $64m^2 - 9n^4$

69) _____

70) $x^3 - 729$

70) _____

71) $x^9 - 1$

71) _____

Answer Key

Testname: FACTORING REVIEW

- 1) 3
- 2) x^4
- 3) $21m^3$
- 4) $(a - b)$
- 5) $-4x^6y^2$
- 6) $8(x - 4)$
- 7) $7x^2(x^2 - 6)$
- 8) $3xy(8x^2 + 5y^3)$
- 9) $\frac{1}{5}(x + 2)$
- 10) $3(3x^6 + 6x^4 + 4x^2 - 9)$
- 11) $(t^2 - 15)(s + 5)$
- 12) $2(w + 2)(3w + 2)$
- 13) $(x + 11)(3 + y)$
- 14) $(y - 4)(2 + x)$
- 15) $(x^2 + 1)(x + 2)$
- 16) $(y^5 - 1)(14y - 1)$
- 17) $(x - 10)(x - 4)$
- 18) $(x + 11)(x - 4)$
- 19) $(x - 9)(x - 6)$
- 20) $(x - 4)(x - 3)$
- 21) prime
- 22) $(m + 4n)(m - 3n)$
- 23) $5(x - 4)(x + 5)$
- 24) $-(x + 10)(x - 7)$
- 25) $x(x - 2)(x + 8)$
- 26) $3x(x - 2)(x + 5)$
- 27) $2x^3y(y + 2)(y - 4)$
- 28) $-16(t + 2)(t - 5)$
- 29) $(x + 3)(7x - 8)$
- 30) $(3y - 4)(3y - 4)$
- 31) $x(3x + 2)(5x - 4)$
- 32) $4(2y - 1)(y + 5)$
- 33) $2xy(2x + 3)(2x + 2)$
- 34) $(7x + 2)$ inches and $(4x + 3)$ inches
- 35) $(x + 2)(7x - 5)$
- 36) $(8x - 7)(9x - 3)$
- 37) $4(2y - 1)(y + 5)$
- 38) $x(x + 4)(3x + 4)$
- 39) $2x(x - 2)(3x - 5)$
- 40) $(x + 10)^2$
- 41) $(x - 2)^2$
- 42) $\left(x - \frac{1}{11}\right)^2$
- 43) $(x + 4)^2$
- 44) prime
- 45) $5(6x - 1)^2$

Answer Key

Testname: FACTORING REVIEW

$$46) 3x^2(2x - 3)^2$$

$$47) (4 - w)(4 + w)$$

$$48) \left(x + \frac{1}{6}\right)\left(x - \frac{1}{6}\right)$$

$$49) \left(2x + \frac{2}{5}\right)\left(2x - \frac{2}{5}\right)$$

$$50) (x - 2)(x + 2)(x^2 + 4)(x^4 + 16)$$

$$51) (x^5 - 8y^4)(x^5 + 8y^4)$$

$$52) (t + 6)(t^2 - 6t + 36)$$

$$53) (4 - t)(16 + 4t + t^2)$$

$$54) (5a - 4b)(25a^2 + 20ab + 16b^2)$$

$$55) (x^2 + y^3)(x^4 - x^2y^3 + y^6)$$

$$56) 3m(2k - 5m)(4k^2 + 10km + 25m^2)$$

$$57) 4x^3y^3(125y^3 - 9x^3)$$

$$58) x^2(13 + 12x^2)$$

$$59) 3x^6(x^2 - 3)$$

$$60) (x - 3)(x + 4)$$

$$61) (x^2 - 10)(x^2 + 3)$$

$$62) 5t^3(t + 3)(t - 4)$$

$$63) (9x - 7)(8x - 3)$$

$$64) (3x + 2y)(3x - 4y)$$

$$65) 5(2y - 1)(y + 5)$$

$$66) -4x(5x - 1)(3x - 5)$$

$$67) (z + 4)(z - 4)$$

$$68) 3y(6x + 7)(6x - 7)$$

$$69) (8m - 3n^2)(8m + 3n^2)$$

$$70) (x - 9)(x^2 + 9x + 81)$$

$$71) (x^3 - 1)(x^6 + x^3 + 1)$$