

$$1a) GCF(27, 12) = 3$$

$$GCF(a^3, a) = a$$

$$GCF(b^4, b^6) = b^4$$

$$GCF(c, c^4) = c$$

$$\begin{aligned} & 3ab^4c [(27a^3b^4c \div 3ab^4c) + (12a^6b^6c^4 \div 3ab^4c)] \\ &= 3ab^4c (9a^2 + 4b^2c^2) \end{aligned}$$

$$b) \sqrt{9a^2} = 3a$$

$$\sqrt{25} = 5$$

$$(3a - 5)(3a + 5)$$

$$c) P = -896$$

$$S = -4$$

$$-4 \div 2 = -2$$

$$(-2)^2 = 4$$

$$4 - -896 = 900$$

$$\sqrt{900} = 30$$

$$-2 - 30 = -32$$

$$-2 + 30 = 28$$

$$\frac{64x^2 - 32x + 28x - 14}{\downarrow \quad \downarrow} \qquad \qquad \qquad \leftarrow GCF$$
$$32x(2x-1) + 14(2x-1)$$

$$= (32x+14)(2x-1)$$

$$= 2(16x+7)(2x-1)$$

$$d) P = -14$$

$$S = -5$$

$$-5 \div 2 = -2.5$$

$$(-2.5)^2 = 6.25$$

$$6.25 - 14 = 20.25$$

$$\sqrt{20.25} = 4.5$$

$$-2.5 - 4.5 = -7$$

$$-2.5 + 4.5 = 2$$

$$\frac{x^2 - 7x + 2x - 14}{\downarrow \quad \downarrow} \leftarrow GCF$$

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

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

$$e) P = 90$$

$$S = 19$$

$$19 \div 2 = 9.5$$

$$(9.5)^2 = 90.25$$

$$90.25 - 90 = 0.25$$

$$\sqrt{0.25} = 0.5$$

$$9.5 - 0.5 = 9$$

$$9.5 + 0.5 = 10$$

$$\frac{6b^2 + 9b + 10b + 15}{\downarrow \quad \downarrow}$$

$$3b(2b+3) + 5(2b+3) = (3b+5)(2b+3)$$

$$f) \sqrt{a} = 3$$

$$\frac{18a^2 - 3a - 3b - 77b^2}{(6a + 11b)(3a - 7b)}$$

$$g) \sqrt{x^4} = x^2$$
$$\sqrt{y^4} = y^2$$

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

$$\sqrt{x^2} = x$$
$$\sqrt{y^2} = y$$

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

$$h) P = 4$$
$$S = -S$$

$$-S \div 2 = -2.5$$

$$(-2.5)^2 = 6.25$$

$$6.25 - -5 = 11.25$$

$$\sqrt{11.25} = 3.5$$

$$-2.5 - 3.5 = -4$$
$$-2.5 + 3.5 = 1$$

$$\frac{x^4 - 1x^2}{x^2(x^2 - 1)} - 4(x^2 - 1)$$

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

$$i) \frac{\sqrt{100x^2}}{\sqrt{49}} = 10x$$

invert

$$\frac{1}{-100x^2 + 49}$$

$$= (10x+7)(10x-7)$$

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

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

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

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

$$k) P = 100$$

$$S = -29$$

$$-29 \div 2 = -14.5$$

$$(-14.5)^2 = 210.25$$

$$210.25 - 100 = 110.25$$

$$\sqrt{110.25} = 10.5$$

$$-14.5 + 10.5 = -4$$

$$-14.5 - 10.5 = -25$$

$$x^4 - 4x^2 - 25x^2 + 100$$

$$\sqrt{x^4} = x^2$$

$$\sqrt{4x^2} = 2x$$

$$\sqrt{25x^2} = 5x$$

$$\sqrt{100} = 10$$

$$\sqrt{x^2} = x$$

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

$$1) P = 576$$
$$S = 48$$

$$48 \div 2 = 24$$

$$24^2 = 576$$

$$576 - 576 = 0$$

$$\text{GCF}(18, 48, 32) = 2$$
$$2(3x+4)^2$$

$$m) P = 3360$$
$$S = -164$$

$$-164 \div 2 = -82$$

$$-82^2 = 6724$$

$$6724 - 3360 = 3364$$

$$\sqrt{3364} = 58$$

$$-82 + 58 = -24$$

$$-82 - 58 = -140$$

$$\frac{40m^2 - 24m - 140m + 84}{8m(5m-3) - 28m(5m-3)}$$

$$= (8m-28)(5m-3)$$
$$= 4(2m-7)(5m-3)$$

$$n) 7((7y^2 \div 7) - (252 \div 7)) \\ = 7(y^2 - 36)$$

$$\frac{\sqrt{y^2}}{\sqrt{36}} = \frac{y}{6}$$

$$7(y+6)(y-6)$$

$$o) (2n^3 - 20n^2 + 42n)a$$

$$P = 184$$

$$S = 20$$

$$20 \div 2 = 10$$

$$10^2 = 100$$

$$100 - 84 = 16$$

$$\sqrt{16} = 4$$

$$10 + 4 = 14$$

$$(10 - 4) = 6$$

$$(2n^2 - 14n)(n-3) \\ = 2n(n-7)(n-3)$$

$$2a) \frac{(x+1)(x+2)}{(x-3)(x-2)} \times \frac{(x-4)(x-3)}{x(x+1)}$$

$$= \frac{(x+1)(x+2)(x-4)(x-3)}{(x-3)(x-2)x(x+1)}$$

$$= \frac{(x+2)(x-4)}{(x-2)(x)} \quad x \neq 3, 2, 0, -1$$

$$2b) \frac{(x^2+4)(x+2)(x-2)}{(x-2)^2} \times \frac{(2+x)(2-x)}{(x)(x^2+4)} \times \frac{(x^2+4)}{(x-2)}$$

$$= \frac{(x^2+4)(x+2)(x-2)(2+x)(2-x)(x^2+4)}{(x-2)(x-2)(x)(x^2+4)(x-2)}$$

$$= \frac{(x+2)(2+x)(x^2+4)}{(x-2)(x)(x-2)}$$

$$= \frac{(x+2)(2+x)(x^2+4)}{x(x-2)^2}$$

c)

$$4) (8a^6 - 16b^6)(a^2 - b^2)$$

$$(9a^6 + b^4)(9a^6 - 4b^4)(a+b)(a-b)$$

$$(9a^6 + 4b^4)(3a^3 + 2b^2)(3a^3 - 2b^2)(a+b)(a-b)$$

$$5a) a^2 - \frac{6a}{15} - \frac{21}{15} = 0$$

$$a^2 - \frac{6a}{15} = \frac{21}{15}$$

$$a^2 - \frac{6a}{15} + \frac{9}{100} = \frac{21}{15} + \frac{9}{100}$$

$$\left(a - \frac{6}{30}\right)^2 = \frac{189}{100}$$

$$a - \frac{6}{30} = \frac{3\sqrt{21}}{10}$$

$$\frac{6}{30} \pm \frac{3\sqrt{21}}{10}$$

$$\frac{2+3\sqrt{21}}{10} \quad OR \quad \frac{-2+3\sqrt{21}}{10}$$

$$b) b = -1 + \sqrt{22} \quad OR \quad -1 - \sqrt{22}$$

$$c) c = \frac{5+3\sqrt{7}}{4} \quad OR \quad \frac{5-3\sqrt{7}}{4}$$

$$6a) ?$$

$$b) y = \frac{5+\sqrt{7}}{6} \quad OR \quad \frac{5-\sqrt{7}}{6}$$

$$c) n = \frac{7+3\sqrt{10}}{6} \quad OR \quad \frac{7-3\sqrt{10}}{6}$$

Didn't have time to
show work

7) to simplify it, you can divide both sides by x^2

$$ax^2 + bx + c = 0$$

$$a + \frac{bx}{x} + \frac{c}{x^2} = 0$$

rewrite:

$$a = -\frac{b}{x} - \frac{c}{x^2}$$