

Pre-Calc CLASS Work Practice 10.5 - 10.6

$$1a.) \frac{x-3}{(x+2)(x+1)^2} = \frac{A}{x+2} + \frac{B}{x+1} + \frac{C}{(x+1)^2}$$

- clear the fractions by multiplying each side of the equ. by the factored form of the denominator in the original expression.

$$(x+2)(x+1)^2 \left[\frac{x-3}{(x+2)(x+1)^2} \right] = \left[\frac{A}{x+2} + \frac{B}{x+1} + \frac{C}{(x+1)^2} \right] (x+2)(x+1)^2$$

$$x-3 = A(x+1)^2 + B(x+2)(x+1) + C(x+2)$$

$$x-3 = Ax^2 + 2Ax + A + Bx^2 + 3Bx + 2B + Cx + 2C$$

$$x-3 = x^2(A+B) + x(2A+3B+C) + (A+2B+2C)$$

$$0 = A+B \quad \rightarrow \quad A = -B \quad \rightarrow \quad \text{sub into 2nd + 3rd equations}$$

$$1 = 2A + 3B + C$$

$$1 = 2(-B) + 3B + C \quad \rightarrow \quad 1 = B + C$$

$$-3 = A + 2B + 2C$$

$$-3 = (-B) + 2B + 2C \quad \rightarrow \quad -3 = B + 2C$$

$$4 = -C$$

$$0 = A + (5)$$

$$1 = B + (-4)$$

$$\boxed{C = -4}$$

$$\boxed{-5 = A}$$

$$\boxed{5 = B}$$

$$\left\{ \frac{x-3}{(x+2)(x+1)^2} = \frac{-5}{x+2} + \frac{5}{x+1} + \frac{-4}{(x+1)^2} \right\}$$

<over>

$$1b.) \frac{x^2 - 11x - 18}{x^3 + 3x^2 + 3x} = \frac{x^2 - 11x - 18}{x(x^2 + 3x + 3)} = \frac{A}{x} + \frac{Bx + C}{x^2 + 3x + 3}$$

- Clear the fractions by mult each side by $x(x^2 + 3x + 3)$

$$x(x^2 + 3x + 3) \left[\frac{x^2 - 11x - 18}{x(x^2 + 3x + 3)} \right] = \left[\frac{A}{x} + \frac{Bx + C}{x^2 + 3x + 3} \right] x(x^2 + 3x + 3)$$

$$x^2 - 11x - 18 = A(x^2 + 3x + 3) + (Bx + C)(x)$$

$$x^2 - 11x - 18 = Ax^2 + 3Ax + 3A + Bx^2 + Cx$$

$$x^2 - 11x - 18 = x^2(A + B) + x(3A + C) + (3A)$$

$$1 = A + B$$

$$-11 = 3(-6) + C \rightarrow -11 + 18 = C$$

$$-11 = 3A + C$$

$$\boxed{7 = C}$$

$$-18 = 3A$$

$$\rightarrow \boxed{A = -6}$$

$$1 = (-6) + B$$

$$\rightarrow \boxed{7 = B}$$

$$\frac{x^2 - 11x - 18}{x^3 + 3x^2 + 3x} = \frac{-6}{x} + \frac{7x + 7}{x^2 + 3x + 3}$$

$$2a.) x^2 - 4y^2 = 16$$

$$2y - x = 2$$

$2y - 2 = x \rightarrow$ sub in for x in the 1st eqn and solve for y

$$(2y - 2)^2 - 4y^2 = 16 \rightarrow 4y^2 - 8y + 4 - 4y^2 = 16$$

$$-8y = 16 - 4 \rightarrow \frac{-8y}{-8} = \frac{12}{-8} \quad \boxed{y = \frac{-3}{2}}$$

$$2\left(\frac{-3}{2}\right) - x = 2$$

$$-3 - x = 2 \rightarrow -3 - 2 = x \rightarrow \boxed{-5 = x}$$

$$2b.) \quad x^3 - 2x^2 + y^2 + 3y - 4 = 0$$

$$x - 2 + \frac{y^2}{x} - y = 0$$

mult 2nd equ by $(-x^2)$ AND ADD to 1st equ

$$x^3 - 2x^2 + y^2 + 3y - 4 = 0$$

$$+ \quad -x^3 + 2x^2 - y^2 + y + 0 = 0$$

$$4y - 4 = 0 \rightarrow 4y = 4 \rightarrow \boxed{y = 1}$$

plug $y = 1$ into 1st equ & solve for x

$$x^3 - 2x^2 + (1)^2 + 3(1) - 4 = 0$$

$$x^3 - 2x^2 = 0 \rightarrow x^2(x - 2) = 0 \rightarrow \boxed{x = 0}; \boxed{x = 2}$$

* can't be $x = 0$ b/c 2nd equ

would be undefined if you plugged zero in for x

$$\boxed{\text{Solution: } (2, 1)}$$

$$3.) \quad x^3 + y^2 = 4$$

$$x^2 y = 4 \rightarrow y = \frac{4}{x^2} \quad (\text{plug into 1st equ})$$

$$x^3 + \left(\frac{4}{x^2}\right)^2 = 4$$

$$x^3 + \frac{16}{x^4} - 4 = 0 \quad (\text{plug into } y, \text{ into your calc, graph, + use 2nd trace} \rightarrow$$

$$\boxed{x = -1.27}$$

Zero)

$$y = \frac{4}{(-1.27)^2}$$

$$\boxed{y = 2.48}$$

