MAT 012   **Practice TEST 1**
Prof. Clayton   Will not be collected, but will help you prepare for the test.
****
You may want to use one of these: $A^3 + B^3 = (A+B)(A^2 - AB + B^2)$
$$A^3 - B^3 = (A-B)(A^2 + AB + B^2)$$
****

1. Simplify: $7a^3 + 12a - 8 - (6a^4 - a^3 + 8a - 10) = 7a^3 + 12a - 8 - 6a^4 + a^3 - 8a + 10$

$$= -6a^4 + 8a^3 + 4a + 2$$

2. Factor out the greatest common factor:

$$12x^9 - 60x^7 - 28x^6 + 4x^5 = 4x^5(3x^4 - 15x^2 - 7x + 1)$$

3. Factor: $2x^2 - 17x + 21$

$$= \frac{(2x - 14)(2x - 3)}{2} = \frac{2(x - 7)(2x - 3)}{2}$$

$$= (x - 7)(2x - 3)$$

$$\begin{array}{c} 42 \\ \nearrow \nwarrow \\ 21 \quad 2 \\ 42 \quad 1 \\ 7 \quad 6 \\ \boxed{14 \quad 3} \end{array}$$

4. Factor: $5x^3 + 40 = 5(x^3 + 8) = 5(x^3 + 2^3)$ use formula above

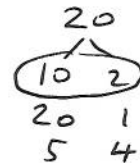$$A = x$$
$$B = 2$$

$$= 5(x + 2)(x^2 - x \cdot 2 + 2^2)$$

$$= 5(x + 2)(x^2 - 2x + 4)$$

5. Factor: $4x^4 - 8x^2 - 5$

$$= \frac{(4x^2 + 2)(4x^2 - 10)}{4}$$

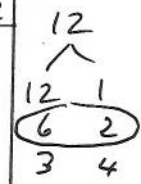$$= \frac{2(2x^2 + 1) \cdot 2(2x^2 - 5)}{4} = \frac{4(2x^2 + 1)(2x^2 - 5)}{4}$$

$$= (2x^2 + 1)(2x^2 - 5)$$

$$\begin{array}{c} 20 \\ \nearrow \nwarrow \\ \boxed{10 \quad 2} \\ 20 \quad 1 \\ 5 \quad 4 \end{array}$$

6. Solve: $3x^2 + 4x = 4$

$$\begin{array}{c} -4 \quad -4 \\ \hline 3x^2 + 4x - 4 = 0 \end{array}$$

$$\frac{(3x + 6)(3x - 2)}{3} = 0$$

$$\frac{3(x + 2)(3x - 2)}{3} = 0$$

$$(x + 2)(3x - 2) = 0$$

$x + 2 = 0$ or $3x - 2 = 0$

$\begin{array}{c} -2 \quad -2 \\ \hline x = -2 \end{array}$ or $\begin{array}{c} +2 \quad +2 \\ \hline \frac{3x}{3} = \frac{2}{3} \end{array}$

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

$$\begin{array}{c} 12 \\ \nearrow \nwarrow \\ 12 \quad 1 \\ \boxed{6 \quad 2} \\ 3 \quad 4 \end{array}$$

$$\boxed{x = -2 \quad \text{or} \quad x = \frac{2}{3}}$$