

M2 Topic 1 Test Review

① a) —

$$b) 4x^2 + 2x - 6 \quad \begin{array}{r|rr} -6 & 2x & 1 \\ +3, -2 & -1 & -3 \end{array}$$

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

$$\boxed{2(2x+1)(x-1)}$$

$$c) 3x^3 + 2x^2 - 12x - 8 \quad \begin{array}{r|rr} 3x & 2 \\ x^2 & 3x^3 & 2x^2 \\ -4 & -12x & -8 \end{array}$$

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

$$\boxed{(3x+2)(x+2)(x-2)}$$

$$d) 5a^6 - 25a^5 + 30a^4$$

$$5a^4(a^2 - 5a + 6)$$

$$\boxed{5a^4(a-6)(a+1)}$$

② Determine whether $x-8$ is a factor of $f(x) = 2x^3 - 15x^2 - 7x - 8$. Explain.

$$\begin{array}{r|rrrr} 8 & 2 & -15 & -7 & -8 \\ & \downarrow & 16 & 8 & 8 \\ \hline & 2 & 1 & 1 & 0 \end{array}$$

yes, because the remainder is 0.

④ Use division to find another factor

a) $f(x) = 70x^2 - 13x - 6$; $5x - 2$

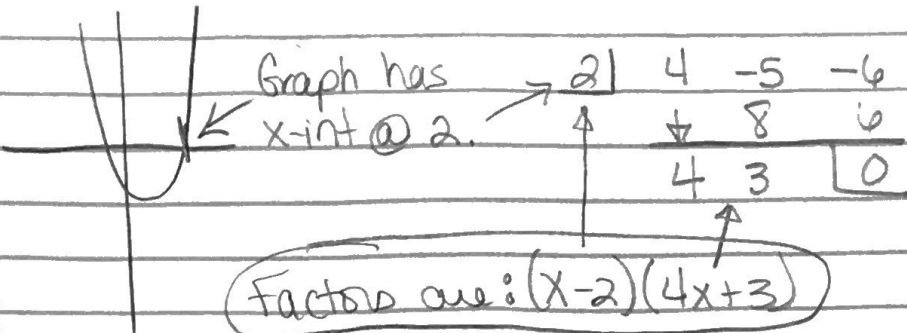
$$\begin{array}{r} 14x + 3 \\ 5x - 2 \overline{) 70x^2 - 13x - 6} \\ \underline{-70x^2 + 28x} \\ 15x - 6 \\ \underline{-15x + 6} \\ \end{array} \quad \boxed{14x+3}$$

b) $g(x) = 15x^2 + x - 6$; $3x + 2$

$$\begin{array}{r} 5x - 3 \\ 3x + 2 \overline{) 15x^2 + x - 6} \\ \underline{-15x^2 + 10x} \\ -9x - 6 \\ \underline{+9x + 6} \\ \end{array}$$

$$\boxed{5x-3}$$

5



6

a factor is given, use division to find another factor.

a) $2x^3 - 3x^2 - 24x + 45$; $x-3$

3	2	-3	-24	45
	↓	6	9	-45
	2	3	-15	0

$2x^2 + 3x - 15$

b) $x^3 - 6x^2 + 13x - 20$; $x-4$

4	1	-6	13	-20
	↓	4	-8	20
	1	-2	5	0

$x^2 - 2x + 5$

c) $6x^3 - 17x^2 + 32x - 30$; $2x-3$

2x-3	6x ³ - 17x ² + 32x - 30
	3x ² - 4x + 10
	-6x ³ + 9x ² ↓
	-8x ² + 32x ↓
	+8x ² + 12x ↓
	20x - 30 ↓
	-20x + 30
	0

$3x^2 - 4x + 10$

7) Use synth div. to find $f(6)$ $f(x) = 2x^4 - 15x^3 + 14x^2 + 27x - 30$

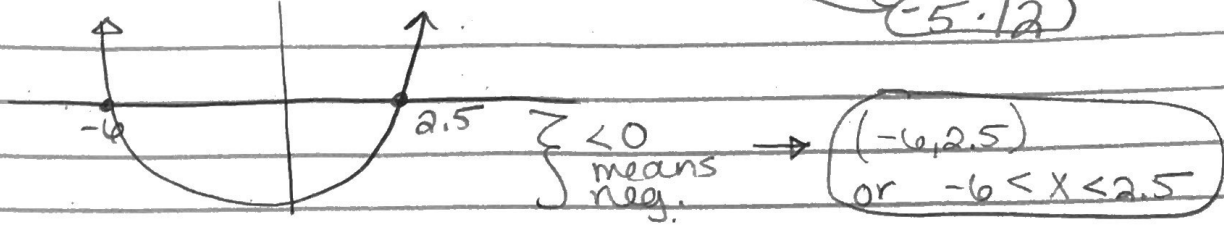
6	2	-15	14	27	-30
	↓	12	-18	-24	18
	2	-3	-4	3	-12

$f(6) = -12$

⑨ a) $2x^2 + 7x < 30$
 $-30 -30$
 $2x^2 + 7x - 30 < 0$
 $(2x-5)(x+6) < 0$
 $x = 5/2 \quad x = -6$

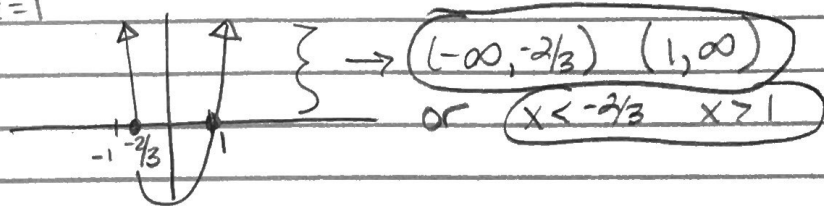
	$2x$	-5	
x	$2x^2$	$-5x$	
6	$12x$	-30	

$2 \cdot -30$
 -60
 $-15 \cdot 4$
 $-6 \cdot 10$
 $3 \cdot 20$
 $2 \cdot 30$
 $-5 \cdot 12$

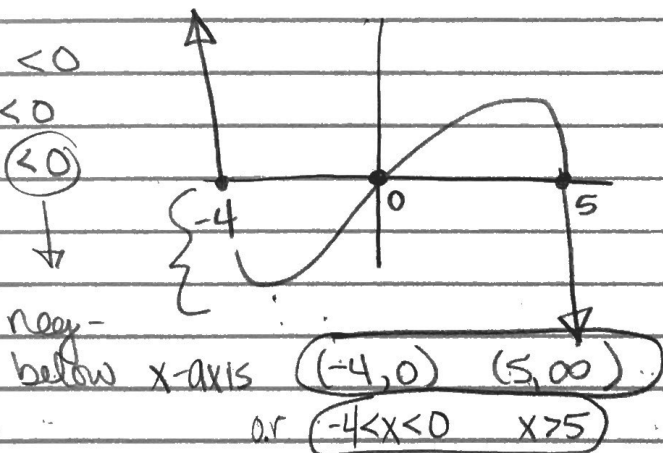


b) $3x^2 - x > 2$
 $3x^2 - x - 2 > 0$
 $(3x+2)(x-1) > 0$ pos-above x-axis
 $x = -2/3 \quad x = 1$

	$3x$	2
x	$3x^2$	$2x$
-1	$-3x$	-2



⑩ a) $-2x^3 + 2x^2 + 40x < 0$
 $-2x(x^2 - x - 20) < 0$
 $-2x(x-5)(x+4) < 0$
 $x = 0 \quad x = 5 \quad x = -4$



b) $x^4 - 13x^2 + 36 \leq 0$
 $(x^2 - 4)(x^2 - 9) \leq 0$
 $(x-2)(x+2)(x-3)(x+3) \leq 0$ neg. below x-axis

