

Name: \_\_\_\_\_

Date: November 10<sup>th</sup>

Knowledge <u>14</u>	Application <u>4/6</u>	TIPS <u>6/8</u>	Communication <u>3/3</u>
<u>16</u>			

- Show full solutions for full marks. Leave answers in exact form unless a degree of accuracy is given.
- Communication mark will be based on proper form and use of symbols.

## (KNOWLEDGE)

## 1. Simplify.

$$\begin{aligned}
 \text{a) } (2x^2 - 3x - 5) - (2x^2 + 4x - 7) \\
 &= 2x^2 - 3x - 5 - 2x^2 - 4x + 7 \\
 &= 2x^2 - 2x^2 - 3x - 4x - 5 + 7 \\
 &= -7x + 2 \quad \checkmark
 \end{aligned}$$

$$\begin{aligned}
 \text{b) } \frac{24x^7y^5}{8x^4y^2} \\
 &= 3x^3y^3 \quad \checkmark
 \end{aligned}$$

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## 2. Expand and simplify.

$$\begin{aligned}
 \text{a) } (3x+1)(2x-1) \\
 &= (3x)(2x) + (3x)(-1) + (1)(2x) + (1)(-1) \\
 &= 6x^2 - 3x + 2x - 1 \\
 &= 6x^2 - x - 1 \quad \checkmark
 \end{aligned}$$

$$\text{b) } -2(5-2x)(3x+4)$$

$$\begin{aligned}
 &= (-10 + 4x)(3x + 4) \\
 &= (-10)(3x) + (-10)(4) + (4x)(3x) + (4x)(4) \\
 &= -30x - 40 + 12x^2 + 16x \\
 &= 12x^2 - 14x - 40 \quad \checkmark
 \end{aligned}$$

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## 3. Factor, if possible.

$$\text{a) } 25b^2 + 10b$$

$$= 5b(5b+2) \quad \checkmark$$

$$\text{c) } 3m(n-3) + 5(n-3)$$

$$\begin{aligned}
 &= (3m-9) + (5n-15) \\
 &= 3m - 9 + 5n - 15 \\
 &= 3m + 5n - 24
 \end{aligned}$$

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$$\text{d) } x^2 - 9x + 20$$

$$\begin{aligned}
 &= (-5) + (-4) = -9 \\
 &= (-5)(-4) = 20 \\
 &= x^2 - 5x - 4x + 20 \\
 &= x(x-5) - 4(x-5) \\
 &= (x-5)(x-4) \quad \checkmark
 \end{aligned}$$

$$\text{e) } (x+3)^2 - y^2$$

$$\begin{aligned}
 &= (x+3-y)(x+3+y) \\
 &= (x+3)(x+3) \\
 &= (x+3)^2 \quad \checkmark
 \end{aligned}$$

$$f) 18x^4 + 33x^3 - 30x^2$$

$$= 3x^2(6x^2 + 11x - 10)$$

$$= (-4) + (15) = 11$$

$$(-4)(15) = -60$$

$$= 3x^2(6x^2 - 4x + 15x - 10)$$

$$= 3x^2[2x(3x-2) + 5(3x-2)]$$

$$= 3x^2(2x+5)(3x-2)$$

$$g) 2x^2 - 2xy + 2x - 2y$$

$$= 2x^2 + 2x - 2xy - 2y$$

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

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

$$\downarrow$$

$$2(x-y)$$

$$- f) 49x^2 - 14xy + y^2$$

$$= (7x-y)^2$$

$$h) 16m^4 - 81$$

$$= (4m^2-9)(4m^2+9)$$

$$= (2m-3)(2m+3)(4m^2+9)$$

$$i) -4y^2 + 1 + 9x^2 - 6x$$

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

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

$$=$$

$$j) \frac{c^4}{4} - \frac{d^4}{81}$$

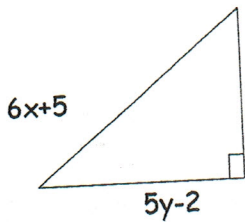
$$= \left( \frac{c^2}{2} - \frac{d^2}{9} \right) \left( \frac{c^2}{2} + \frac{d^2}{9} \right)$$

$$\left( \frac{c^2}{2} - \frac{d^2}{3} \right) \left( \frac{c^2}{2} + \frac{d^2}{3} \right) \left( \frac{c^2}{2} + \frac{d^2}{9} \right)$$

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(APPLICATION)

7.a) Find the area of the triangle.



$$A_{\triangle} = \frac{B \times h}{2}$$

$$= \frac{(5y-2)(4x+3)}{2}$$

$$= \frac{(5y)(4x) + (5y)(3) + (-2)(4x) + (-2)(3)}{2}$$

$$= \frac{20xy + 15y - 8x - 6}{2}$$

$$= 10xy + 7.5y - 4x - 3$$

b) The area of the rectangle is given.

i) Find the expression for the length and width.

$$= (-3)(-1) = -7$$

$$(-7)(1) = -30$$

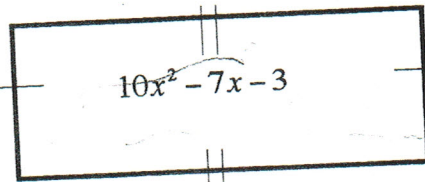
$$= 10x^2 - 10x - 3x - 3$$

$$= 10x(x-1) - 3(x+1)$$

$$= (10x-3)(x+1)$$

$$(10x-3)(x+1)$$

The length is  $10x-3$  & the width is  $x+1$ .



ii) If  $x$  represents 50m, what are the length and width in metres?

$$\text{Let } x = 50$$

$$= 10 \times 50 - 3$$

$$= 10(50) - 3$$

$$= 500 - 3$$

$$= 497$$

503

The length is 497 meters

$$10(50) - 3$$

$$x+1$$

$$= (50) + 1$$

$$= 51$$

49

The width is 51 meters.

49m by 51m.

8. Create a polynomial that has four terms with different numerical coefficients and a greatest common factor of  $3xy$ . (2/2)

$$3xy + 9xy^2 + 12x^2y^3 + 21x^3y$$

9. List all integer values of  $k$  such that the trinomial can be factored over the integers. (2/4)

$$3x^2 + kx + 5$$

$$= (1) + (5) = x$$

$$(1)(5) = 5$$

$$\begin{pmatrix} 1 & 5 \\ 3 & 5 \\ 5 & 3 \end{pmatrix}$$

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

$$(1)(-5) = -5$$

$$1 + 15 = 16$$

$$(-1) + (-15) = -16$$

$$(-1)(-15) = 15$$

$$(-3)(-5) = 15$$

$\therefore$  The values of  $k$  could be 16 and -16.

also 8, -8

10. Determine the value(s) of  $k$  such that the following trinomial is a perfect square. (2/2)

$$kx^2 - 24xy + 9y^2$$

$$2ab = 24xy$$

$$(2)(3) = 24xy$$

$$24xy = 24xy$$

$= \sqrt{16}$   
 $= 4$   
 $\therefore$  If the value of  $k$  was 16 the trinomial would be a perfect square because  $2ab = 24xy$ .