World 2-1 Adding and Subtracting Polynomials

Evaluate Polynomials by Substitution

1) Evaluate the rule y = 4x + 1 for the following values of x: Show work in space provided

a) x = 0 y=1 b) x = 1 _____ c) x = 5 _____ d) x = -2 _____

y = 4x + 1
y = 4(0) + 1
y= 1

2) Evaluate the rule $y = 2x^2 + 3x - 8$ for the following values of x:

a) x = 0 _____ b) x = 3 _____ c) x = 0.5 _____ d) x = -2 _____

3) Evaluate the rule $n = 4m^2 + 6m - 7$ for the following values of m:

a) m = 1 _____ b) m = -2 _____

c) m = 0 _____ d) m = ¼ _____

4) Lancelot shoots an arrow up in the air to the top of his castle's tower. He is initially standing on a platform. The rule $y = -3.1t^2 + 17.4t + 4.2$ gives the height of the arrow, in metres, at a given time t, in seconds, since Lancelot fired the arrow.

a) How tall is the platform? _____

b) The arrow reaches its highest point at 1.5 seconds after it was thrown. What is the maximum height? _____

Adding and Subtracting Polynomials

1) For each group, circle the two monomials that do not belong in the set of "like terms".

a) $2a,\ 4a,\ 3,\ -7a,\ 10a^2$

b) $17x,\ 2xy,\ -4x,\ 5x^2,\ x$

c) $8b,\ 4ab,\ -ab,\ 10ab,\ 6ab^2$

d) $8p^2q,\ 2p^2q^2,\ -8p^2q,\ p^2q,\ 3p^2q^3$

e) $5xyz,\ 7yz,\ -11y^2z,\ 12yz,\ -2yz$

f) $4x^3y^4,\ x^3y^4,\ 3x^4y^4,\ -2x^3y^4,\ 7x^4y^3$

2) Simplify by gathering like terms:

a) $x + 2x$ = _____

b) $7a - 2a$ = _____

c) $5m^2 + 10m^2 - 7m^2$ = _____

d) $8p^2q^4 + 6p^2q^4 - 10p^2q^4$ = _____

e) $4a^2 + 3a - 6a^2$ = _____

f) $4xy - 4x^2y + 3xy - 8xy^2 + 3x^2y$ = _____

3) Simplify:

a) $(4a + 7) + (3a + 10)$

b) $(8a + 6) + (11a + 5)$

c) $(10x^2 + 3x - 4) + (5x^2 - 6x + 7)$

d) $(4x^2 + 6x - 1) + (x^2 - 3x + 4)$

e) $(3b^2 + 2b) - (12b^2 + 2)$

f) $(9b^2 + 4b) - (5b^2 + 5)$

g) $(x - 4) - (2x - 5)$

h) $(3x - 4) - (7x - 9)$

4) Group like terms to simplify these expressions

a) $(3m^4 + 7m) – (8m^4 – 3m) + (2m^4 + 6m)$

b) $(4m^4 + 3m) – (1m^4 – 5m) + (2m^4 + 7m)$

c) $(-9n^2 + n + 8) – (2n^2 + 4x – 10)$

d) $(-5n^2 + 4n + 5) – (3n^2 + 5x – 13)$

e) $z^2 – (3z^2 + 15z + 12) + (-4z^2 + 7z – 6)$

f) $3z^2 – (6z^2 + 7z + 25) + (-2z^2 + 3z – 25)$

g) $(1.4v^2 + 0.2v – 2.1) + (0.8v^2 – 1.6v + 0.5)$

h) $(3.8v^2 + 4.2v – 3.5) + (4.3v^2 – 2.8v + .5)$

5) Marie Antoinette is 5 years older than her brother Robert. Let x represent Robert's age. Write an algebraic expression that represents the sum of their ages.

6) A square has a side length of 3x + 2 metres

a) What is the simplified expression for the perimeter?

b) What is the area, if x = 4 metres

7) An archer, a barrel maker and candle maker collected sea shells by the water. The candle maker collected twice as many as the archer. The barrel maker collected ten less than the candle maker. Together they collected 240 sea shells.

a) Use x as the variable, and express the sum of the sea shells as an algebraic equation.

b) How many sea shells did the barrel maker collect?

World 2-2 The Distributive Property: Multiplying Polynomials

1) Use the distributive property to multiply the following polynomials.

a) $5(x + 3)$ = _ _____

b) $3x(2x + 4)$ = _____

c) $8(4a + 3)$ = _____

d) $m^2(4m^3 + 2m)$ = _____

e) $-2n(m + 2n)$ = _____

f) $-6ab(a^2 – 5b^3)$ = _____

g) $(3xy – 5x + 3y)x^2y^3$

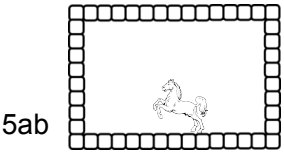
h) $½x^2(6x^3 – 8x^2 + 4x)$

i) $3m(2n + 4) – 2n(3m – 2)$

j) $5a^2(a + b^2) + 2b^2(3a – a^2)$

2) Consider the following stone wall to contain a horse:

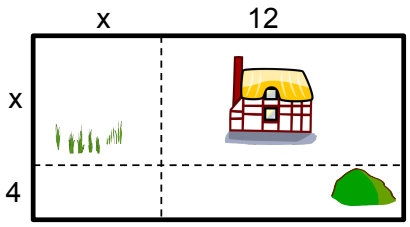
a) What is the simplified expression for the perimeter?



b) What is the simplified expression for the area?

3) Consider the rectangular property on the right:

a) Find the simplified algebraic expression for the perimeter of the property.



b) Find the simplified algebraic expression for the total area.

c) If x = 2m, what is the numerical value of the area, in m^2?

Multiplying Binomials using FOIL

1) Expand and Simplify

a) $(x + 1)(x + 3)$

$=x^2 + 3x + x + 3$
$=x^2 + 4x + 3$

b) $(y – 3)(y + 2)$

c) $(2a – 1)(a – 4)$

d) $(2p + 7)(3p – 4)$

e) $(2m – 1)^2$

f) $(3q – 1)(3q + 1)$

g) $(6t + 2u)(t – 5u)$

h) $(\frac{2}{3}x + 6)(12x – 3)$

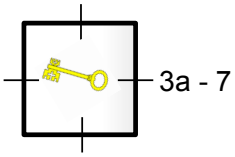
i) $(1.6n + 4)(0.5n – 8)$

j) $(3x + 2)(2x – 3) – (x + 4)^2$

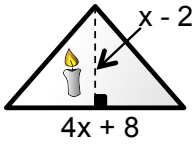
2) Find the simplified algebraic expression for the area contained within the boarder.

a)

b)



c)

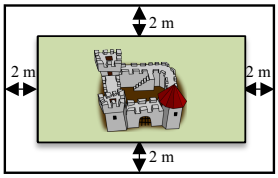


World 2-3 Polynomial Word Problems – Add, Subtract and Multiply

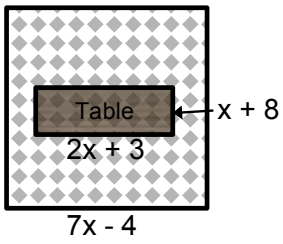
1. A rectangular field used for jousting has a length of 8x – 4 and a width of x + 3. The queen wants to increase the length by 4 metres, and the width by 6 metres. What is the area of the enlarged field? (Hint: draw a diagram!)

2. The length of a castle's land is 2 times greater than its width. A moat surrounds the castle and has a width of the moat is 2 m.

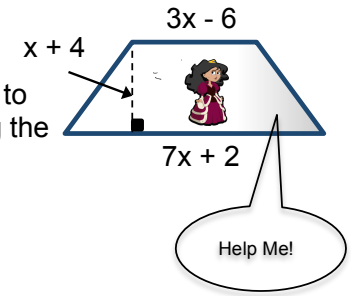
   What is the algebraic expression for the area of the **moat**?



3. The court jester has to tile the royal square dinning room. What algebraic expression represents the area that is not covered by the dinning table?



4. A princess is trapped in a trapezoid shaped cell. The only way to save her is to determine the algebraic expression representing the area of her cell.



World 2-4 Dividing and Factoring Polynomials using the GCF

1) State the GCF (Greatest Common Factor for each polynomial

a) $16x + 20$: _____ b) $15a - 12a^2$: _____ c) $18ab + 27a + 9a^2b$: _____

d) $4a^2 + 12a + 8a^3$: _____ e) $24m + 16mn$: _____ e) $30x^3y^4 - 24x^2y^3 - 18xy^2$: _____

2) Divide

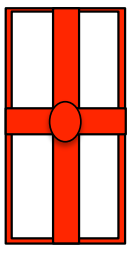
a) $\frac{5a+10b}{5}$ = _____	b) $\frac{3w^2-27w^4}{3w^2}$ = _____
c) $\frac{4x^2-14x}{2x}$ = _____	d) $\frac{5a^2-10ab}{5a}$ = _____
e) $\frac{16m^4-8m^3}{-8m^3}$ = _____	f) $\frac{24k^2-15k+27k^3}{3k}$ = _____
g) $\frac{a^2-2ab+a^3}{-a}$ = _____	h) $\frac{15v^2t-10t^2v^3+5v^2}{-5v^2}$ = _____

3) Re-write as a product of factors by factoring out the GCF.

a) $a^2 + ab$ = a(a+b)	b) $14k^2 - 6k$ = _____
c) $25m^3 - 15m^2$ = _____	d) $32m^2 + 16m$ = _____
e) $48a^2b - 20ab^2$ = _____	f) $18a^3b^2 + 6a^4b + 24a^2b^3$ = _____

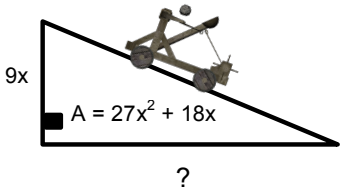
4) The area of a small blue rectangular shield is $30x^2 - 18x$. Find its length if its width is $6x$.

5) The area of a rectangle is $24a^2 + 8a$. If its width is $8a$, what is the perimeter of the shield?

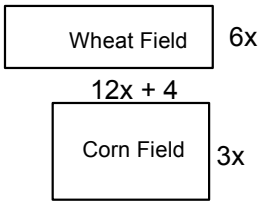


$A = 24a^2 + 8a$

6) A ramp has a height of 9x and an area of $27x^2 + 18x$. Determine the length of the ramp.



7) The areas of a corn field and a wheat field are the same. What is the perimeter of the wheat field?



ADDITIONAL PRACTICE Rough work to be completed on a separate sheet of paper

1) Simplify:

a) $(6x^2+4) + (3x^2+5) =$ _____

b) $(2y^2+3y+1) + (4y^2+2y+1) =$ _____

c) $(2a+7) + (4a+2b+7) =$ _____

d) $(2a^2-4ab+4b^2) + (4a^2-2ab) =$ _____

e) $(5a-4b+8c) – (3a+2b-c) =$ _____

f) $(3y+8) – (y+2) =$ _____

g) $(4a^2-3ab+5b) – (4a^2+3ab+6b) =$ _____

h) $(5z^3-3z+1) – (3z^3+5z-7) =$ _____

2) Expand and Simplify:

a) $7(m – 5) =$ _____

b) $-3(4p – 6r – 2) =$ _____

c) $4x^2y(2xy – 3xy^2) =$ _____

d) $2x(3y + 2) – (y^2 – 2y+10) =$ _____

e) $(2x – 3)(x + 5) =$ _____

f) $(2a – 3b)^2 =$ _____

f) $(6n – 4)(3n – 9) =$ _____

h) $(4x + y)(2x – 5y) =$ _____

3) Simplify:

a) $\frac{12x+32y}{4} =$ _____

b) $\frac{8x^2-36x^3}{4x} =$ _____

c) $\frac{16y^2-8y}{2y} =$ _____

d) $\frac{30m^2-20mn}{10n} =$ _____

4) Write as a product of factors

a) $8a^2 + 4a =$ _____

b) $24x^3y^2 + 36xy^4 =$ _____

c) $14xy^5 + 28x^3y^3 + 49x^2y^2$

d) $15a^5b^2c^3 + 45a^7bc^4 + 30a^7b^5c^2$

World 2-5 Rational and Irrational Numbers

Table 1: Complete the table with $\in$ or $\notin$

	N	Z	Q	Q*	R
5/6					
1					
π					
$\sqrt{5}$					
22/7					
1.25					

a) Write either rational (Q) or irrational (Q*) next to each number below:

a. 0 ____ b. -10 ____ c. π ____ d. 2/9 ____

e. 0.6 _____ f. $\sqrt{72}$ ____ g. 0.3 ____ i. $\sqrt{3}$ _____

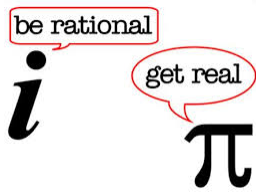
j. $\sqrt{2} \bullet \sqrt{2}$ ____

b) List all the number sets that belong to:

a. 4/9 b) $\sqrt{25}$ c) 4

d) -8 e) $\sqrt{5}$ f) -1/3

c) Write a rational and an irrational number between 2 and 2.5



Practice Test #1
Exponents and Polynomials

Name: _____ Date: _____

Teacher Comments

PART A: Multiple Choice *write the correct letter in the space provided (2 marks each)*

_____ 1] Which of the following expressions is the simplified version of $\frac{x^7y^4}{x^2\ y^8}$

a) x^5y^4 b) $\frac{x^5}{y^2}$ c) $\frac{x^5}{y^4}$ d) $x^{2.5}y^2$

_____ 2] Which of the following is FALSE?

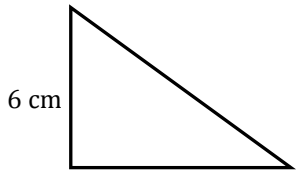
a) $a^4 \times a^3 = a^7$ b) $a^8 = a^6 + a^2$ c) $a^{3-3} = 1$ d) $b^{-3} = \frac{b^7}{b^{10}}$

_____ 3] Which expression is equivalent to $(2x - 3)(x+4)$?

a) $2x^2 + 11x - 12$ b) $x^2 + 7x - 7$ c) $7x - 7$ d) $2x^2 + 5x - 12$

_____ 4] What is the length of the missing side?

a) 10 cm b) *14 cm* c) 5.3 cm d) 3.7



PART B: SHORT ANSWER *only correct answers will be awarded points (4 marks each)*

1] Express the following using scientific notation. Round to 1 decimal place.

a) The moon is 380 000 km from Earth _____

b) A red blood cell is 0.0000083 m wide _____

c) Light travels 2 592 000 000 m/s _____

d) An antibody is 0.000 000 000 012 m long _____

2] Simplify the following

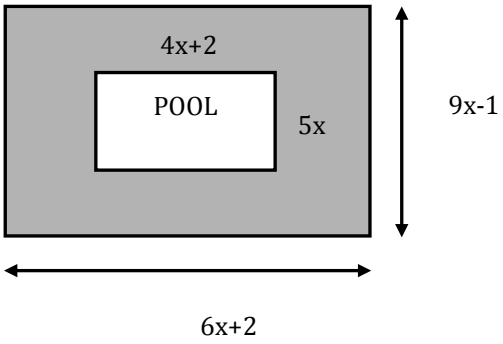
a) $y^4 y^9$ *b)* $(x^3)^5$ *c)* $\frac{3x^2 + 9x^2 - 24x}{3x}$ *d)* $\frac{(4x^2y^4)^2}{(2xy)^4}$

3] Rewrite these polynomials as a product of factors.

a) $8x^2 + 4x$ *b)* $6ab^2 + 12a^2b^2 - 24a^3b^3$

PART C: LONG ANSWER *Show all of your work. Include a final statement. (30 marks)*

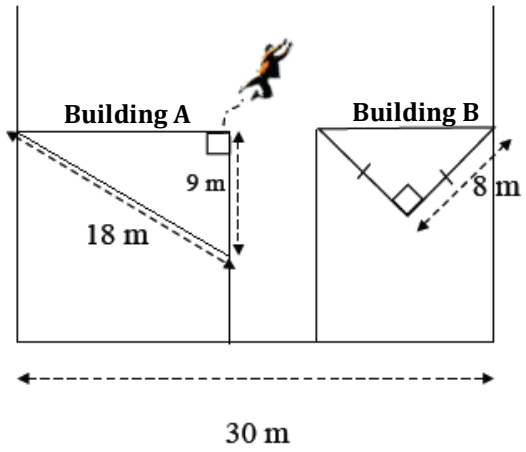
1] a) Determine the expression for the area of the concrete around this pool.



b) If x=2 m determine the total area of the concrete.

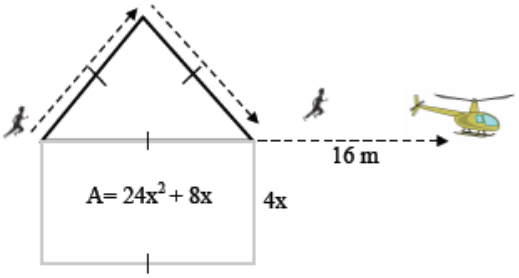
Uses mathematical reasoning							
		Observable indicators correspond to level					
Evaluation Criteria	LEVEL	A	B	C	D	E	
	Cr. 3	40	32	24	16	8	0
	Cr. 2	40	32	24	16	8	0
	Cr. 4 Cr. 5	20	16	12	8	4	0

2] Jackie Chan is doing a stunt at D'Arcy McGee High School for an upcoming movie. From experience we know Jackie can jump a maximum horizontal distance of 5 m. If Jackie jumps from building A to building B will he make it across the pit?



Uses mathematical reasoning							
		Observable indicators correspond to level					
Evaluation Criteria	LEVEL	A	B	C	D	E	
	Cr. 3	40	32	24	16	8	0
	Cr. 2	40	32	24	16	8	0
	Cr. 4 Cr. 5	20	16	12	8	4	0

3] Sly Stallone is performing a stunt for Expendables 3. His is running up and over an obstacle that happens to be an equilateral triangle and running into an awaiting chopper. The chopper has been instructed to lift off in 10 seconds!



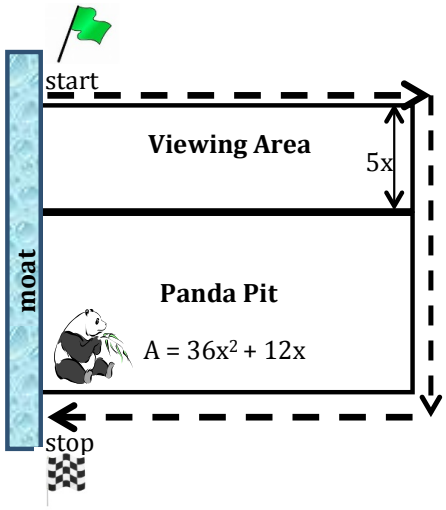
a) Determine the simplified algebraic expression for the distance Sly must travel to run over the obstacle and into the chopper.

b) If Sly runs at 5 m/s will he be able to make it to the chopper before it takes off? Assume x = 2 m.

Uses mathematical reasoning							
		Observable indicators correspond to level					
Evaluation Criteria	LEVEL	A	B	C	D	E	
	Cr. 3	40	32	24	16	8	0
	Cr. 2	40	32	24	16	8	0
	Cr. 4 Cr. 5	20	16	12	8	4	0

4] PANDA WATCH! Ron Burgundy is running late to a press conference at the zoo! Ron has to sprint all the way around the **Viewing Area** and around to the other side of the **Panda Pit.** Ron only has 35 seconds before the live coverage begins!

The **Panda Pit** and the **Viewing Area** are both rectangles and they share a common length. The length is the **greatest common factor** of the **Panda Pit.** The width of the **Viewing Area** is 5x.



a) What is the simplified algebraic expression for the total distance Ron has to run?

b) If x = 3m, and Ron runs at 4 m/s, will he make it to the press conference in time?

Uses mathematical reasoning							
		Observable indicators correspond to level					
Evaluation Criteria	LEVEL	A	B	C	D	E	
	Cr. 3	40	32	24	16	8	0
	Cr. 2	40	32	24	16	8	0
	Cr. 4 Cr. 5	20	16	12	8	4	0