DAY 1 - Review Exponent Laws

Multiply.

5) $2n^4 \cdot 5n^4$

6) $6r \cdot 5r^2$

7) $2n^4 \cdot 6n^4$

8) $6k^2 \cdot k$

9) $5b^2 \cdot 8b$

10) $4x^2 \cdot 3x$

Divide.

5) $\dfrac{3r^3}{2r}$

6) $\dfrac{7k^2}{4k^3}$

7) $\dfrac{10p^4}{6p}$

8) $\dfrac{3b}{10b^3}$

9) $\dfrac{8m^3}{10m^3}$

10) $\dfrac{7n^3}{2n^5}$

Power of Power.

1) $\left(3a^2\right)^3$

2) $\left(2n^4\right)^4$

3) $\left(3x^4\right)^4$

4) $\left(6b^2\right)^2$

5) $\left(7y^4\right)^2$

6) $\left(3ab^4\right)^4$

Simplify

1.   **a)** $4 + 4r - z + 3r + 5z - 2$ **b)** $7y - 3 + 2y$

     c) $2 + 3r - 5 + r$ **d)** $3x + 3y - 2x + 4$

Expand and simplify

2.
    a) $3(x+2)$

    b) $2(q+3)+11q$

    c) $8(4-p)-3(p+5)$

    d) $5(k-1)+3(2k-2)$

    e) $-2(e-7)-4(-3e+5)$

    f) $4(3k+7)-2(2-4k)$

Evaluate each expression for $x=2$ and $y=-1$.

3.
    a) $4x+3y$

    b) $-7y$

    c) $2x+3y$

    d) $2xy+3yx-y$

    e) $xy-xy+2x-2y+3xy$

    f) $\dfrac{3x+y}{5}+\dfrac{2x+y}{2}$

DAY 2 - Multiplying Polynomials

Expand and simplify

1.   **a)** $(2x + 1)(3x + 7)$ **b)** $(3x - 4)(3x + 5)$ **c)** $(5x + 3)(x - 2)$

2.   **a)** $(2x + 1)^2$ **b)** $(4x - 1)^2$ **c)** $(3x + 2)^2$

Expand and simplify the expression

3. $(2x - 3)(3x - 2)$ 4. $(5x - 2)^2$

5. $(x + 3)(x + 7) - (x + 5)^2$

6.   A two-lane bridge has width $x + 3$ and length $4x + 5$.
   a) Sketch a rectangle with these dimensions.
   b) Find a quadratic expression that represents the area of
      the bridge.

7.   A tennis club is redesigning
      its court area. They want
      to add several new courts
   and some benches for
      waiting players.

   $4x + 3$

   $5x - 2$

   a) Write a quadratic expression to represent the total court area.
   b) The club plans to place a fence around the court area.
      Write an expression for the perimeter of the court area to
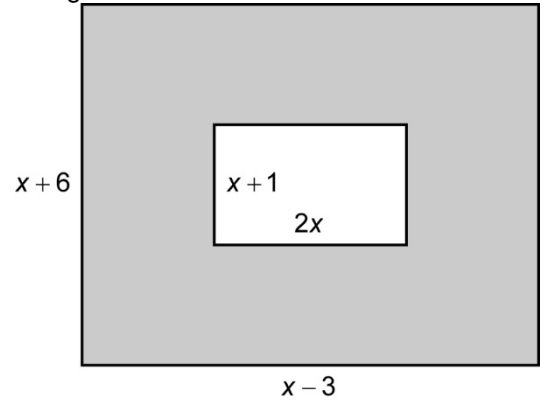   determine how much fencing will be required.
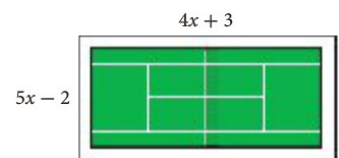
Write and simplify an expression to represent the area of each shaded region.
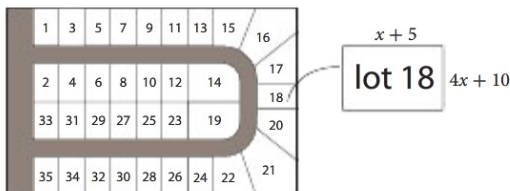
8.

$2x$

$2x + 2$

$2x$

$3x + 1$

9.

$x + 6$

$x + 1$

$2x$

$x - 3$
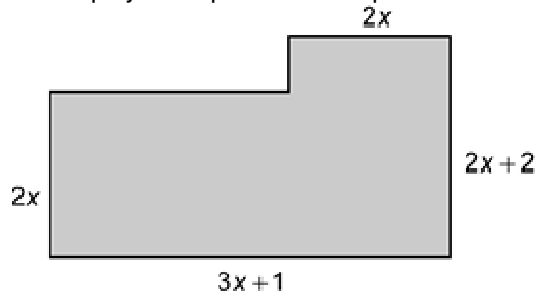
10. A builder is developing a site for a new subdivision with extra-long lots. Dmitri plans to buy lot 18.
   a) Find an expression to represent the area of lot 18.
   b) If $x = 35$ ft, find the actual area of lot 18.
   c) According to city by-laws, houses are only permitted to occupy 40% of their lots. What is the maximum area that Dmitri's house can occupy? Check with your local by-law department to see if the 40% rule applies in your area.

1	3	5	7	9	11	13	15	16
2	4	6	8	10	12	14		17
33	31	29	27	25	23	19		18
								20
35	34	32	30	28	26	24	22	21

$x + 5$

lot 18 $4x + 10$

11. A public skateboard park is $x + 3$ units wide and $2x - 6$ units long.
   a) Write a quadratic expression to represent the area of the skateboard park.
   b) If $x = 11$ m, calculate the actual area of the skateboard park in square metres.
   c) If concrete resurfacing costs $4.99/m^2, calculate the cost of resurfacing the skateboard park.

DAY 3 - Common Factoring - GCF

Find the greatest common factor then record the expression in factored form

1. $3x + 6y$ 2. $17ac - 34ad$ 3. $-24xy + 16x^2y^2$

4. $27x^3y^3 + 18x^2y^2 + 9xy$ 5. $-6n^2p^2 + 12np^2 + 36n^3p^3$ 6. $33c^4d^3e^2 - 11c^2de$

7. $3x + 15$ 8. $4x^2 + 8x$ 9. $5x^2 - 10x$
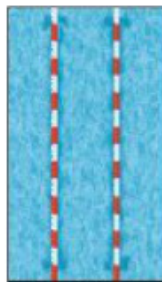
10. $-10x^2 + 20x - 30$ 11. $-9x^2 - 3x + 9$ 12. $4x^2 - 6x + 8$

13.   A swimming pool has the area shown.
   a) Factor completely the expression representing the area to determine the length and the width of the swimming pool.
   b) Find the actual measures of its sides if $x = 2$ m.
   c) Find the perimeter of the pool.

$A = x^2 + 5x$

14.   Find the dimensions of each rectangle.
   a)

$A = 21x^2 + 3x$

   b)

$A = 2x^2 + 18x$

15. Lilly wants to laminate some posters. Suppose the area of one poster is represented by $4x^2 + 6x$, where x is measured in metres.
    a) Factor the expression.
    b) What are the dimensions of the poster?

16. The area of a tennis court is represented by $60x^2 + 75x$. What are the dimensions of the tennis court?

17. Two neighbouring lawns, the areas of which are represented by the binomials $2x^2 + 7x$ and $2x^2 + 9x$, are combined to form one large mowing contract. The shape of the combined lawns is rectangular.

    a) Find an expression to represent the area of the combined lawns.
    b) Factor the expression in part a) to determine the dimensions of the combined lawns.
    c) What are the actual dimensions of the combined lawns if $x = 13$ m?

18. BONUS Write an expression in factored form for the area of the shaded region.

5xy

x + 2

2x
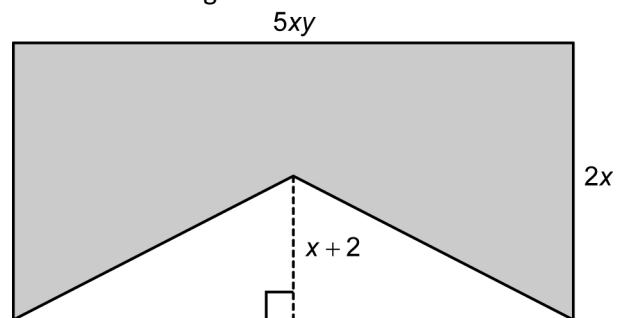
DAY 4 - Simple Trinomial Factoring – Sum & Product

1.   Factor each trinomial. Check your answers
     by expanding.
     a) $x^2 + 12x + 36$ **b)** $x^2 - 12x + 27$ **c)** $x^2 + 7x - 30$ **d)** $x^2 - 16x - 36$

2.   For each rectangle, find the binomials that represent the length
     and the width.

a) $A = x^2 + 4x + 4$ **b)** $A = x^2 - 4x - 5$ **c)** $A = x^2 + 9x - 22$ **d)** $A = x^2 - 9x + 20$

Factor, if possible.

3. $x^2 + 8x + 12$ 4. $c^2 - 3c - 18$ 5. $d^2 + 10d + 21$

6. $d^2 - 12d + 35$ 7. $x^2 + x + 1$ 8. $c^2 - 11c + 30$

9. $y^2 + 15y + 56$ 10. $x^2 - x - 72$ 11. $x^2 - 9x$

Factor completely

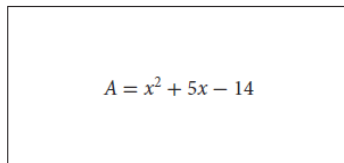12. $3x^2 + 21x + 30$ 13. $-x^2 + 4x - 3$ 14. $4x^2 - 12x - 72$ 15. $2x^2 + 4x + 2$

16. The area of an Olympic-sized pool is modelled by the quadratic
equation $A = x^2 + 9x + 8$.
a) Find expressions for the dimensions of the pool.
b) Suppose the length of the pool is 33 m. Find the area of
the pool.

17. The area of Rheena's original garden is represented by the
trinomial $x^2 + 12x + 36$.
a) Factor the trinomial to find the length and width of her original
garden.
b) What is the shape of Rheena's garden? How do you know?
c) Calculate the actual dimensions if $x = 1$ m.

18. The perimeter of a rectangle is 32 cm. Its area is shown in the
diagram. Find the actual dimensions of the rectangle.

$A = x^2 + 5x - 14$

19. The perimeter of a rectangular sandbox is 30 m. The
area is represented by $x^2 + 7x - 8$. Find the actual
dimensions of the sandbox.

DAY 5 - Binomial Factoring – Difference of Squares

1. Which expressions are differences of squares? Provide reasons for your decision.

   a) $x^2 - 9$ **b)** $49 + x^2$ **c)** $100 - 36x^2$

2. Factor $2x^2 - 18$. Is it a difference of squares? Why or why not? Is it possible to factor this binomial? Explain your answer.

3. Factor the ones that can be factored in #1. Then check your answers by expanding.

Factor completely

4. $x^2 - 81$

5. $x^2 - 121$

6. $x^2 - 144$

7. $400 - x^2$

8. $25 - x^2$

9. $49 - x^2$

10. $100 - x^2$
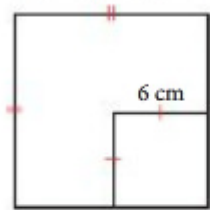
11. $225 - x^2$

12. $16x^2 - 121$

13. $8x^2 - 18$

14. $48x^2 - 27$

15. $5x^2 - 45y^2$

16.

A square has area x^2 square centimetres. At one corner, a smaller square with sides 6 cm long has been removed.

6 cm

a) Write the binomial to represent the difference between the two areas.

b) Factor the binomial to find expressions for the dimensions of a rectangle with area equal to the remaining area of the large square.

c) Find the actual dimensions of this rectangle if $x = 10$ cm.

17.

The area of the top of a classroom art table shown is represented by the expression $100 - x^2$.

a) If the length is represented by $10 + x$, find the expression to represent its width.

b) Find the actual dimensions if $x = 4$ ft.

c) Calculate the area.

$10 + x$

$A = 100 - x^2$
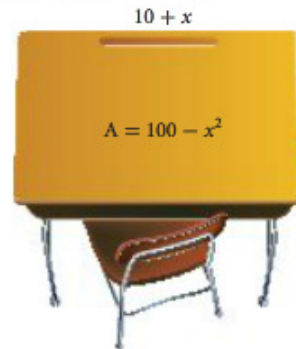
18. Expand

a. $-2(3a + 5)(a - 2)$

b. $2b(b-1)^2$

19. Factor - mix of types

a. $y^2 + 15y + 56$

b. $36x^2 - y^2$

c. $17ac - 34ad$

d. $3g^2 + 6g + 9$

DAY 6 - Mix Practice

1. Review how to expand and simplify.

a. $(y-3)(y+5)$ b. $(x-3y)^2$ c. $(10y+6)(3y+7)-(y+2)(y-4)$

2. Factor.

a. $2x^2+4x$ b. x^2+6x+9 c. $5x^2+3x$ d. $3xy-7xz$

e. $x^2-4x-12$ f. $9x^2-16$ g. $x^2+12x+35$ h. $49x^2-100$

i. $10x^2+20y^2$ j. $x^2-4x-45$ k. $1-225y^2$ l. $x^2+9x+14$
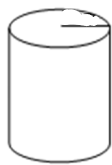
3. Factor completely
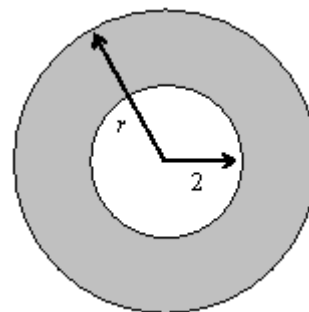
a. $4x^2-28x+40$ b. $28a^5-7a^3$ c. $2y^2-12y+18$ d. $16x^2-64y^2$

4. Factor the expression for the surface area
BONUS
$SA = 2\pi r^2 + 2\pi rh$

5. Write an expression, in factored form, for the area
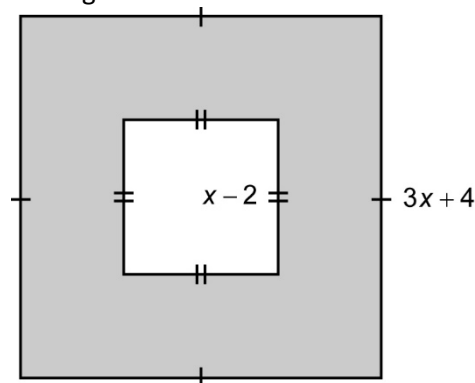BONUS of the figure shown below.

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pg. 8 # 18, 19
on TEST!
like

6. The area of a television screen is represented by
$x^2 + 3x - 18$. The perimeter is 294 cm. Find the
actual dimensions of the TV.

7. Find an algebraic expression for the area of the
shaded region.

$x - 2$ $3x + 4$

a) Write it in expanded form
b) Write it in factored form.

Practice TEST

1. The expanded form of $(4x - 5)(3x + 1)$ is:

2. The expanded form of $(3x - 5)^2$ is:

3. The dimensions of a rectangular rooftop are $4x + 7$ by $3x + 2$. The area of the rooftop is:

4. $12x^2 + 6x + 21$ when factored completely is:

5. Which expression is NOT a difference of squares.

   A $4x^2 - 9$ **B** $36 - x^2$

   C $9x^2 - 49$ **D** $x^2 - 8$

6. The dimensions of a rectangle with an area of $x^2 - 6x - 7$ are:

7. The factored form of $9x^2 - 49$ is:

8. Expand and simplify.

   a) $(x - 4)^2$ **b)** $(2x - 9)(3x + 2)$

9. Factor each polynomial completely. (common factor fist)

   a) $2x^2 + 16x - 18$ **b)** $3x^2 + 18x - 27$

   c) $4x^2 + 12x - 40$ **d)** $15x^2 - 25x + 35$

10. Determine the dimensions of each rectangle, given the area.

   a) $36x^2 - 12x$ **b)** $27x^2 + 81x$

11. Factor each difference of squares.

a) $x^2 - 196$ b) $25 - 4x^2$

Extended Response

12. The perimeter of a school yard is 50 m. The area is represented by $x^2 + 3x - 18$. Find the actual dimensions of the school yard

13. Tim wants to carpet his bedroom floor. The floor is $(2x + 3)$ by $(3x + 1)$.

a) Write an expanded quadratic expression that represents the area of the floor.

b) If $x = 1$ m, what is the area to be carpeted?

c) The carpet costs $10/m^2. How much will it cost Tim to carpet his floor?

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