

Math (F&P) 10

Polynomial Review

Name: _____

Key

Learning Goal	Beginning	Developing	Proficient	Sophisticated
I will be able to find LCM/GCF using prime factorization				
I will be able to show the multiplication of polynomials				
I will be able to show the factoring of polynomials				

Learning Goal #1: I will be able to determine the prime factors of a number

1. Write the prime factorization of 35 700

$$\begin{array}{r}
 5 \overline{) 35700} \\
 \underline{5} \\
 5 \overline{) 7140} \\
 \underline{5} \\
 2 \overline{) 1428} \\
 \underline{2} \\
 2 \overline{) 714} \\
 \underline{2} \\
 3 \overline{) 357} \\
 \underline{3} \\
 7 \overline{) 119} \\
 \underline{7} \\
 17
 \end{array}
 = 2^3 \cdot 3 \cdot 5^2 \cdot 7 \cdot 17$$

2. Write the prime factorization of 5463

$$\begin{array}{r}
 3 \overline{) 5463} \\
 \underline{3} \\
 1821 \\
 3 \overline{) 1821} \\
 \underline{3} \\
 607
 \end{array}
 = 3^2 \cdot 607$$

3. Write the prime factorization of 325

$$\begin{array}{r}
 5 \overline{) 325} \\
 \underline{5} \\
 65 \\
 5 \overline{) 65} \\
 \underline{5} \\
 13
 \end{array}
 = 5^2 \cdot 13$$

4. Write the prime factorization of 348

$$\begin{array}{r}
 2 \overline{) 348} \\
 \underline{2} \\
 174 \\
 2 \overline{) 174} \\
 \underline{2} \\
 87 \\
 3 \overline{) 87} \\
 \underline{3} \\
 29
 \end{array}
 = 2^2 \cdot 3 \cdot 29$$

5. What is the LCM of 14 and 30?

$$\begin{array}{r}
 2 \overline{) 14} \\
 \underline{2} \\
 7 \\
 3 \overline{) 30} \\
 \underline{3} \\
 10 \\
 2 \overline{) 10} \\
 \underline{2} \\
 5
 \end{array}$$

$$\begin{array}{r}
 14 \quad (2) \quad (7) \\
 30 \quad (2) \quad (3) \quad (5)
 \end{array}$$

$$LCM_{(14,30)} = 2 \cdot 3 \cdot 5 \cdot 7 = 210$$

6. What is the LCM of 58 and 124?

$$\begin{array}{r}
 2 \overline{) 58} \\
 \underline{2} \\
 29 \\
 2 \overline{) 124} \\
 \underline{2} \\
 62 \\
 2 \overline{) 62} \\
 \underline{2} \\
 31
 \end{array}$$

$$\begin{array}{r}
 58 \quad (2) \quad (29) \\
 124 \quad (2) \quad (2) \quad (31)
 \end{array}$$

$$LCM_{(58,124)} = 2^2 \cdot 29 \cdot 31 = 3596$$

7. What is the LCM of 125 and 175?

$$\begin{array}{r}
 5 \overline{) 125} \\
 \underline{5} \\
 25 \\
 5 \overline{) 25} \\
 \underline{5} \\
 5 \\
 5 \overline{) 175} \\
 \underline{5} \\
 35 \\
 5 \overline{) 35} \\
 \underline{5} \\
 7
 \end{array}$$

$$\begin{array}{r}
 125 \quad (5) \quad (5) \quad (5) \\
 175 \quad (5) \quad (5) \quad (7)
 \end{array}$$

$$LCM_{(125,175)} = 5^3 \cdot 7 = 875$$

8. What is the LCM of 40, 60, and 100?

$$\begin{array}{r} 2 \overline{)40} \\ 2 \overline{)20} \\ 2 \overline{)10} \\ 5 \end{array} \quad \begin{array}{r} 2 \overline{)60} \\ 3 \overline{)30} \\ 2 \overline{)15} \\ 5 \end{array} \quad \begin{array}{r} 2 \overline{)100} \\ 5 \overline{)50} \\ 2 \overline{)25} \\ 5 \end{array}$$

$$\begin{array}{r} 40 \quad 2 \cdot 2 \cdot 2 \cdot 5 \\ 60 \quad 2 \cdot 2 \cdot 3 \cdot 5 \\ 100 \quad 2 \cdot 2 \cdot 5 \cdot 5 \end{array}$$

LCM(40, 60, 100) = $2^3 \cdot 3 \cdot 5^2$
= 600

9. What is the GCF of 483 and 575?

$$\begin{array}{r} 3 \overline{)483} \\ 7 \overline{)161} \\ 7 \overline{)23} \\ 5 \overline{)4} \end{array}$$

$$\begin{array}{r} 5 \overline{)575} \\ 5 \overline{)115} \\ 23 \end{array}$$

$$\begin{array}{r} 483 \quad 3 \cdot 3 \cdot 3 \cdot 7 \cdot 7 \\ 575 \quad 5 \cdot 5 \cdot 23 \end{array}$$

* NO GCF

10. What is the GCF of 663 and 910?

$$\begin{array}{r} 3 \overline{)663} \\ 13 \overline{)221} \\ 17 \end{array}$$

$$\begin{array}{r} 2 \overline{)910} \\ 5 \overline{)455} \\ 13 \overline{)91} \\ 7 \end{array}$$

$$\begin{array}{r} 663 \quad 3 \cdot 13 \cdot 17 \\ 910 \quad 2 \cdot 5 \cdot 7 \cdot 13 \end{array}$$

GCF(663, 910) = 13

11. What is the GCF of 66, 495, and 2541?

$$\begin{array}{r} 3 \overline{)66} \\ 2 \overline{)22} \\ 11 \end{array}$$

$$\begin{array}{r} 5 \overline{)495} \\ 3 \overline{)99} \\ 3 \overline{)33} \\ 11 \end{array}$$

$$\begin{array}{r} 7 \overline{)2541} \\ 3 \overline{)363} \\ 11 \overline{)121} \\ 11 \end{array}$$

$$\begin{array}{r} 66 \quad 2 \cdot 3 \cdot 11 \\ 495 \quad 3 \cdot 3 \cdot 5 \cdot 11 \\ 2541 \quad 3 \cdot 7 \cdot 11 \cdot 11 \end{array}$$

GCF(66, 495, 2541) = 33

Learning Goal #2: I will be able to show the multiplication of polynomials

1. Multiply the below polynomials. Be sure to show ALL YOUR WORK!

a. $5x(9x^3y^2 - 11y^4 + 3)$

$$45x^4y^2 - 55xy^4 + 15x$$

b. $(y - 8)(2y^2 - 3y + 14)$

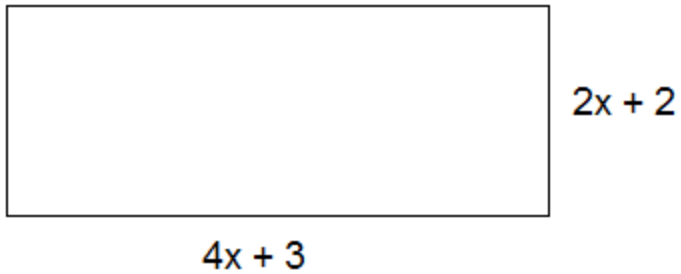
$$\begin{array}{r} 2y^3 - 3y^2 + 14y - 16y^2 + 24y - 112 \\ 2y^3 - 19y^2 + 38y - 112 \end{array}$$

c. $4(a - 5)(a^3 + 2ab - 2) - (c + 12)$

$$\begin{array}{r} (4a - 20)(a^3 + 2ab - 2) - c - 12 \\ 4a^4 + 8a^2b - 8a - 20a^3 - 40ab + 40 - c - 12 \\ 4a^4 - 20a^3 + 8a^2b - 40ab - 8a - c + 28 \end{array}$$

2. Calculate the area of the below shape:

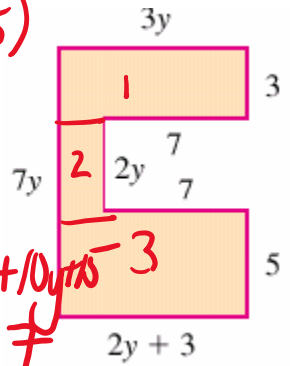
$$\begin{aligned} \text{Area} &= l \times w \\ &= (4x+3)(2x+2) \\ &= 8x^2 + 8x + 6x + 6 \\ &= 8x^2 + 14x + 6 \end{aligned}$$



3. Calculate the area of the below shape:

$$\begin{aligned} \text{Shape 1} &= (3)(3y) = 9y \\ \text{Shape 2} &= (7y-3-5)(2y+3-7) \\ &= (7y-8)(2y-4) \\ &= 14y^2 - 28y - 16y + 32 \\ &= 14y^2 - 44y + 32 \end{aligned}$$

$$\begin{aligned} \text{Shape 3} &= (2y+3)(5) \\ &= 10y + 15 \end{aligned}$$

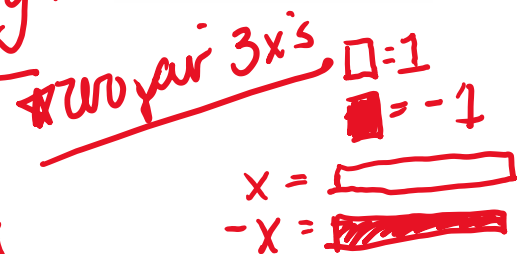


$$\begin{aligned} \text{Area}_{\text{TOTAL}} &= \\ &= 9y + 14y^2 - 44y + 32 + 10y + 15 \\ &= 14y^2 - 25y + 47 \end{aligned}$$

4. Draw algebra tiles to show the below multiplication:

a. $(x+3)(x-10)$

✓ factors
 $x^2 - 7x - 30$



b. $(3m+7)(m^2-3m+6)$

$$\begin{aligned} &3m^3 - 9m^2 + 18m + 7m^2 - 21m - 42 \\ &3m^3 - 2m^2 - 3m - 42 \end{aligned}$$

5. Multiply (use DISTRIBUTIVE PROPERTY)

a. $(x+5)(x-12)$

$$x^2 - 12x + 5x - 60 = x^2 - 7x - 60$$

b. $(2y+2)(4y-1)$

$$8y^2 - 2y + 8y - 2 = 8y^2 + 6y - 2$$

c. $(5-y)(3-y)$

$$15 - 5y - 3y + y^2 = y^2 - 8y + 15$$

d. $(4+p)^2 = (4+p)(4+p) = 16 + 4p + 4p + p^2 = 16 + 8p + p^2$

Learning Goal #3: I will be able to show the factoring of polynomials

1. Which of the following trinomials can be represented by a rectangle? Explain HOW you would prove this.

a. $4c^2 + 33c + 8$ $\xrightarrow{32}$ $4c^2 + 32c + 1c + 8$
 $4c(c+8) + 1(c+8) = (4c+1)(c+8)$

b. $4c^2 + 21c + 3$ $\xrightarrow{12}$ $4c^2 + 12c + 9c + 3$
 $4c(c+3) + 3(c+1)$

c. $4c^2 + 13c + 8$ $\xrightarrow{32}$ $4c^2 + 12c + c + 8$
 $4c(c+3) + 1(c+8)$

d. $4c^2 + 4c + 15$ $\xrightarrow{60}$ $4c^2 + 12c + 3c + 15$
 $4c(c+3) + 3(c+5)$

2. Factor: $24b^2 + 50b - 14$

$2(12b^2 + 25b - 7)$
 $\xrightarrow{84}$

$2[12b^2 + 21b + 4b - 7]$
 $2[3b(4b+7) + 1(4b-7)]$
can't factor

3. Factor: $4 - 9z - 13z^2$

$-1(13z^2 + 9z - 4)$

$\rightarrow -1(13z^2 + 13z - 4z - 4)$
 $-1[13z(z+1) - 4(z+1)]$
 $-1(13z-4)(z+1)$

4. Factor: $8m^2 - 34mn + 33n^2$

$\xrightarrow{264}$
 $(4m-11n)(2m-3n)$

$8m^2 - 12mn - 22mn + 33n^2$
 $4m(2m-3n) - 11n(2m-3n)$
 $(4m-11n)(2m-3n)$

5. $4x^2 - 25$

$(2x+5)(2x-5)$

6. $16xm^2n^3 - 12m^3 - 16m + 4m^3$

$\xrightarrow{16xm^2n^3}$ $16xm^2n^3 - 8m^2 - 16m \rightarrow 8m(2xm^2n^3 - m - 2)$

7. $x^2 - x - 20$

$(x+4)(x-5)$