Daily Math Week 23 (2013-2014)

Mon. February 3, 2014
Tues. February 4, 2014
Wed. February 5, 2014
Thurs. February 6, 2014
Fri. February 7, 2014

Solve for *x*:

$$(6x + 9) - (2x - 5) = 38$$

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Monday, February 3, 2014

Solve for *x*:

$$(6x + 9) - (2x - 5) = 38$$

Answer:

$$(6x + 9) - (2x - 5) = 38$$
$$6x + 9 - 2x + 5 = 38$$
$$4x + 14 = 38$$
$$4x + 14 - 14 = 38 - 14$$
$$4x = 24$$
$$4x \div 4 = 24 \div 4$$
$$x = 6$$

Expand: $8m^2(3m^5 - 2m^4)$

Monday, February 3, 2014

Expand:

$$8m^2(3m^5 - 2m^4)$$

Answer: $8m^2(3m^5 - 2m^4)$

$$\mathbf{24m^7 - 16m^6}$$

Find the greatest common factor:

$$5a^2 + 2a$$

Find the greatest common factor:

$$5a^2 + 2a$$

Answer: $5a^2 = 5 \cdot a \cdot a$

$$2a = 2 \cdot a$$

GCF = a

Expand and simplify:

$$(x + 2)(x + 2)$$

Expand and simplify:

$$(x + 2)(x + 2)$$

Answer: $(x\ +\ 2)(x\ +\ 2)$

$$x(x + 2) + 2(x + 2)$$

$$x^2 + 2x + 2x + 4$$

$$\boldsymbol{x^2 + 4x + 4}$$

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Monday, February 3, 2014   **5th**

Find two integers whose product is -20 and whose sum is -1.

Monday, February 3, 2014   5th

Find two integers whose product is -20 and whose sum is -1.

Answer:

Factor 1	Factor 2	Sum
1	-20	1 + -20 = -19
2	-10	2 + -10 = -8
4	**-5**	**4 + -5 = -1**
5	-4	5 + -4 = 1
10	-2	10 + -2 = 8
20	-1	20 + -1 = 19

If $x = 60$, $y = 5$, and $z = 2$, then $\sqrt{\dfrac{x}{2zy}} = ?$

If $x = 60$, $y = 5$, and $z = 2$, then $\sqrt{\dfrac{x}{2zy}} = ?$

Answer: $\sqrt{\dfrac{x}{2zy}}$

$$\sqrt{\dfrac{60}{2(2)(5)}} = \sqrt{\dfrac{60}{20}} = \sqrt{3}$$

Find the polynomial for the perimeter of a triangle whose sides are $(x^2 + 3x + 2)$, $(2x^2 - 5x - 3)$, and $(x^2 + 8x + 15)$.

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Find the polynomial for the perimeter of a triangle whose sides are (x^2 + 3x + 2), (2x^2 − 5x − 3), and (x^2 + 8x + 15).

Answer:

Perimeter = Sum of the sides

$$(x^2 + 3x + 2) + (2x^2 - 5x - 3) + (x^2 + 8x + 15)$$
$$(x^2 + 2x^2 + x^2) + (3x - 5x + 8x) + (2 - 3 + 15)$$
$$\mathbf{4x^2 + 6x + 14}$$

Expand:

$$7x^2y(3x^2y + 2xy^2 + x^3)$$

Expand:

$$7x^2 y(3x^2 y + 2xy^2 + x^3)$$

Answer:

$$7x^2 y(3x^2 y + 2xy^2 + x^3)$$

$$\mathbf{21x^4 y^2 + 14x^3 y^3 + 7x^5 y}$$

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Find the greatest common factor:
$$5x^2y + xy + 7xy^2$$

Find the greatest common factor:
$$5x^2y \ + \ xy \ + \ 7xy^2$$

Answer:

$$5x^2y = 5 \cdot x \cdot x \cdot y$$

$$xy = x \cdot y$$

$$7xy^2 = 7 \cdot x \cdot y \cdot y$$

GCF = xy

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Expand and simplify:

$$(y - 3)(y - 3)$$

Expand and simplify:
$$(y - 3)(y - 3)$$

Answer: $(y - 3)(y - 3)$
$$y(y - 3) - 3(y - 3)$$
$$y^2 - 3y - 3y + 9$$
$$\textcolor{red}{\boldsymbol{y^2 - 6y + 9}}$$

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Find two integers whose product is -24 and whose sum is 5.

Find two integers whose product is -24 and whose sum is 5.

Answer:

Factor 1	Factor 2	Sum
1	-24	1 + -24 = -23
2	-12	2 + -12 = -10
3	-8	3 + -8 = -5
4	-6	4 + -6 = -2
6	-4	6 + -4 = 2
8	**-3**	**8 + -3 = 5**
12	-2	12 + -2 = -10
24	-1	24 + -1 = 23

Tuesday, February 4, 2014 **5ᵗʰ**

If $x = 125$, $y = 5$, and $z = 2$, then
$$z(\sqrt{x} + \sqrt{y}) = ?$$

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If x = 125, y = 5, and z = 2, then

$$z(\sqrt{x} + \sqrt{y}) = ?$$

Answer: $\textcolor{red}{2}(\sqrt{\textcolor{red}{125}} + \sqrt{\textcolor{red}{5}})$

$$2(\sqrt{25}\sqrt{5} + \sqrt{5})$$

$$2(5\sqrt{5} + \sqrt{5})$$

$$2(6\sqrt{5}) = \mathbf{12\sqrt{5}}$$

Find the value of *m* if the perimeter of the trapezoid is 67.

4*m*

2*m* + 1

2*m*

5m + 1

Find the value of *m* if the perimeter of the trapezoid is 67.

$4m$

$2m + 1$ $2m$
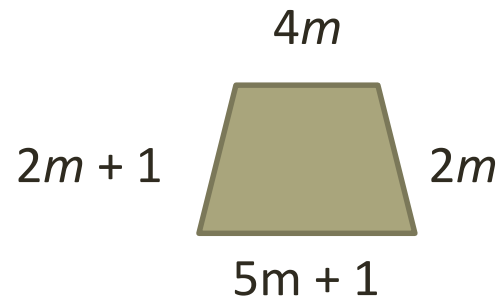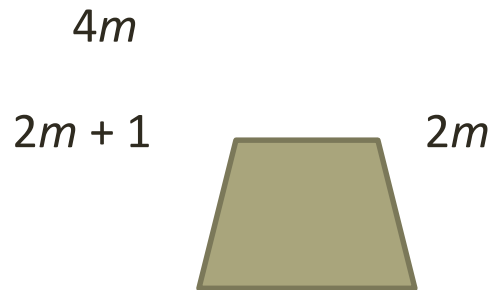
Answer:

$$4m + 2m + (5m + 1) + (2m + 1) = 67$$
$$13m + 2 = 67$$
$$13m + 2 - 2 = 67 - 2$$
$$13m = 65$$
$$13m \div 13 = 65 \div 13$$
$$\boldsymbol{m = 5}$$

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Expand:

$$30a(2a + b - 3c)$$

Expand:

$$30a(2a + b - 3c)$$

Answer: $30a(2a + b - 3c)$

$$\textcolor{red}{\mathbf{60a + 30b - 90c}}$$

Factor:

$$x^2 y^2 \;+\; x^3 y$$

Factor:

$$x^2y^2 + x^3y$$

Answer: $x^2y^2 = x \cdot x \cdot y \cdot y$

$$x^3y = x \cdot x \cdot x \cdot y$$

$$x \cdot x \cdot y(y + x)$$

$$x^2y(y + x)$$

Expand and simplify: $(m + 8)^2$

Expand and simplify: $(m + 8)^2$

Answer: $(m + 8)^2 = (m + 8)(m + 8)$

$$m(m + 8) + 8(m + 8)$$

$$m^2 + 8m + 8m + 64$$

$$\textcolor{red}{\boldsymbol{m^2 + 16m + 64}}$$

Wednesday, February 5, 2014 **3rd**

Find two integers whose product is -60 and whose sum is -11.

Find two integers whose product is -60 and whose sum is -11.

Answer:

Factor 1	Factor 2	Sum
1	-60	1 + -60 = -59
2	-30	2 + -30 = -28
3	-20	3 + -20 = -17
4	**-15**	**4 + -15 = -11**
5	-12	5 + -12 = -7
6	-10	6 + -10 = -4
10	-6	10 + -6 = 4
12	-5	12 + -5 = 7
15	-4	15 + -4 = 11
20	-3	20 + -3 = -17
30	-2	30 + -2 =-28
60	-1	60 + -1 = -59

$3\sqrt{5}$ is between which two integers?

$3\sqrt{5}$ is between which two integers?

Answer: $3\sqrt{5} = \sqrt{9}\sqrt{5} = \sqrt{45}$

$$\sqrt{36} < \sqrt{45} < \sqrt{49}$$

$$\mathbf{6 < \sqrt{45} < 7}$$

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Simplify:

$$\frac{12x^5y^7z^3}{15x^7y^3z^3}$$

Simplify:

$$\frac{12x^5 y^7 z^3}{15x^7 y^3 z^3}$$

Answer: $\frac{12x^5 y^7 z^3}{15x^7 y^3 z^3}$

$$\frac{12y^4}{15x^2} = \frac{3 \cdot 4 \cdot y^4}{3 \cdot 5 \cdot x^2} = \frac{4y^4}{5x^2}$$

Expand:

$$6x^2(7x^2 - 5x - 6)$$

Expand:

$$6x^2(7x^2 - 5x - 6)$$

Answer: $6x^2(7x^2 - 5x - 6)$

$$\color{red}{42x^4 - 30x^3 - 36x^2}$$

Factor:

$$5a^5 + 3a^4 + 6a^3$$

Factor:

$$5a^5 + 3a^4 + 6a^3$$

Answer: $5a^5 = 5 \cdot a \cdot a \cdot a \cdot a \cdot a$

$$3a^4 = 3 \cdot a \cdot a \cdot a \cdot a$$

$$6a^3 = 3 \cdot 2 \cdot a \cdot a \cdot a$$

$$a \cdot a \cdot a(5 \cdot a \cdot a + 3 \cdot a + 3 \cdot 2)$$

$$\boldsymbol{a^3(5a^2 + 3a + 6)}$$

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Expand and simplify:

$$(n-5)^2$$

Expand and simplify:

$$(n - 5)2$$

Answer: $(n - 5)^2 = (n - 5)(n - 5)$

$$n(n - 5) - 5(n - 5)$$

$$n^2 - 5n - 5n + 25$$

$$\boldsymbol{n^2 - 10n + 25}$$

Find two integers whose product is -180 and whose sum is 11.

Thursday, February 6, 2014   **2nd**

Find two integers whose product is -180 and whose sum is 11.

Answer:

Factor 1	Factor 2	Sum	Factor 1	Factor 2	Sum
1	-180	1 + -180 = -179	15	-12	15 + -12 = 3
2	-90	2 + -90 = -88	18	-10	18 + -10 = 8
3	-60	3 + -60 = -57	**20**	**-9**	**20 + -9 = 11**
4	-45	4 + -45 = -41	30	-6	30 + -6 = 24
5	-36	5 + -36 = -31	36	-5	36 + -5 = 31
6	-30	6 + -30 = -24	45	-4	45 + -4 = 41
9	-20	9 + -20 = -11	60	-3	60 + -3 = 57
10	-18	10 + -18 = -8	90	-2	90 + -2 =88
12	-15	12 + -15 = -3	180	-1	180 + -1 = 179

Evaluate $3x^2 - 2x + 10$, if $x = \dfrac{2}{3}$

Thursday, February 6, 2014 **3rd**

Evaluate $3x^2 - 2x + 10$, if $x = \dfrac{2}{3}$

Answer: $3x^2 - 2x + 10$

$$3\left(\frac{2}{3}\right)^2 - 2\left(\frac{2}{3}\right) + 10$$

$$3\left(\frac{4}{9}\right) - 2\left(\frac{2}{3}\right) + 10$$

$$\frac{12}{9} - \frac{4}{3} + 10$$

$$\frac{12}{9} - \frac{12}{9} + 10 = \mathbf{\color{red}{10}}$$

Find the greatest common factor:

$$-14x^3y^3 + 8x^5y + 20x^5$$

Find the greatest common factor:
$$-14x^3y^3 \ + \ 8x^5y \ + \ 20x^5$$

Answer:

$-14x^3y^3 = -1 \cdot 2 \cdot 7 \cdot x \cdot x \cdot x \cdot y \cdot y \cdot y$

$8x^5y = 2 \cdot 2 \cdot 2 \cdot x \cdot x \cdot x \cdot x \cdot x \cdot y$

$20x^5 = 2 \cdot 2 \cdot 5 \cdot x \cdot x \cdot x \cdot x \cdot x$

GCF = $2x^3$

Expand and simplify:
$$(x + 10)(x - 10)$$

Expand and simplify:
$$(x + 10)(x - 10)$$

Answer:
$$x(x - 10) + 10(x - 10)$$
$$x^2 - 10x + 10x - 100$$
$$\textcolor{red}{\boldsymbol{x^2 - 100}}$$

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Find two integers that multiply to -16 and add to 0.

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Thursday, February 6, 2014   6th

Find two integers that multiply to -16 and add to 0.

Answer:

Factor 1	Factor 2	Sum
1	-16	1 + -16 = -15
2	-8	2 + -8 = -6
4	-4	4 + -4 = 0
8	-2	8 + -2 = 6
16	-1	16 + -1 = 15

Solve for d:

$$3(3d + 5) - 4(2d - 3) = 11$$

Solve for *d*:

$$3(3d + 5) - 4(2d - 3) = 11$$

Answer:

$$3(3d + 5) - 4(2d - 3) = 11$$

$$9d + 15 - 8d + 12 = 11$$

$$d + 27 = 11$$

$$d + 27 - 27 = 11 - 27$$

$$\boldsymbol{d = -16}$$

Write an expression for the area of a rectangle whose length is n^3 and whose width is $2n^2$.

Write an expression for the area of a rectangle whose length is n^3 and whose width is $2n^2$.

Answer: Area = length x width

$$\text{Area} = n^3 \cdot 2n^2 = \color{red}{\boldsymbol{2n^5}}$$

Expand and simplify:
$$6x^2(x - 7) - 3x(x + 9)$$

Expand and simplify:
$$6x^2(x-7) - 3x(x+9)$$

Answer: $6x^2(x-7) - 3x(x+9)$

$$6x^3 - 42x^2 - 3x^2 - 27x$$

$$\mathbf{6x^3 - 45x^2 - 27x}$$

Find the greatest common factor:
$$30u^3v^6 + 21u^2v^2 + 3u^2v$$

Find the greatest common factor:
$$30u^3v^6 + 21u^2v^2 + 3u^2v$$

Answer:

$30u^3v^6 = 2 \cdot \textcolor{red}{3} \cdot 5 \cdot \textcolor{red}{u} \cdot \textcolor{red}{u} \cdot u \cdot \textcolor{red}{v} \cdot v \cdot v \cdot v \cdot v \cdot v$

$21u^2v^2 = \textcolor{red}{3} \cdot 7 \cdot \textcolor{red}{u} \cdot \textcolor{red}{u} \cdot \textcolor{red}{v} \cdot v$

$3u^2v = \textcolor{red}{3} \cdot \textcolor{red}{u} \cdot \textcolor{red}{u} \cdot \textcolor{red}{v}$

GCF = $\textcolor{red}{\mathbf{3u^2v}}$

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Friday, February 7, 2014   **4th**

Expand and simplify: $(a + 1)(a - 1)$

Expand and simplify: $(a + 1)(a - 1)$

Answer: $(a + 1)(a - 1)$

$$a(a - 1) + 1(a - 1)$$

$$a^2 - a + a - 1$$

$$\textcolor{red}{\boldsymbol{a^2 - 1}}$$

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Friday, February 7, 2014   5th

Find two integers that multiply to -49 and add to 0.

Find two integers that multiply to -49 and add to 0.

Answer:

Factor 1	Factor 2	Sum
1	-49	1 + -49 = -48
7	**-7**	**7 + -7 = 0**
49	-1	49 + -1 = 48

Arrange the following values in order from **least to greatest** if $x = -2$:

$$\frac{9}{x} \qquad \sqrt{-4x} \qquad x + 9 \qquad \frac{9x}{3}$$

Arrange the following values in order from **least to greatest** if x = -2:

$$\frac{9}{x} \qquad \sqrt{-4x} \qquad x + 9 \qquad \frac{9x}{3}$$

Answer:

$$\frac{9}{-2} = -4.5$$

$$\sqrt{-4(-2)} = \sqrt{8} \approx 2.82$$

$$(-2) + 9 = 7$$

$$\frac{9(-2)}{3} = -6$$

$$-6 < -4.5 < 2.82 < 7$$

$$\frac{9x}{3} < \frac{9}{x} < \sqrt{-4x} < x + 9$$

Simplify:

$$\frac{\left(x^2 y^{-4}\right)^{-1}}{x^3 y^{-4} \cdot y^3}$$

Simplify:

$$\frac{(x^2 y^{-4})^{-1}}{x^3 y^{-4} \cdot y^3}$$

Answer: $\dfrac{(x^2 y^{-4})^{-1}}{x^3 y^{-4} \cdot y^3} = \dfrac{x^{-2} y^4}{x^3 y^{-1}}$

$\dfrac{y^4 y}{x^3 x^2} = \dfrac{y^5}{x^5}$ **or** $\left(\dfrac{y}{x}\right)^5$