ASSET 2

Elementary Algebra Review

1)

A. Natural or Counting numbers:

$\langle 1,2,3,4,5,6\ldots\rangle$

B. Integers:

$\langle \ldots -3,-2,-1,0,1,2,3\ldots\rangle$

C. Irrational Numbers:

$\langle \Pi, \sqrt{2}\rangle$

D. Whole Numbers:

$\langle 0,1,2,3,4\ldots\rangle$

E. Rational Numbers:

$\langle \ldots -3,-2,-1,0,1/2,1,2,3\ldots\rangle$

F. Real numbers:

$\langle \ldots -3,-1\frac{1}{5},0,\frac{2}{3},\sqrt{2},\Pi\rangle$

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2)

A. -5^2

The exponent tells how many times 5 is multiplied to itself.

$= -(5*5)$
$= -(25)$
$= -25$

-25

B. $(5 \times 10^{-12})(7 \times 10^{10})$

Multiply the numbers and add the exponents.
The decimal must always be placed after the first number.
When the decimal moves the exponent changes.

$= 35 \times 10^{-2}$
$= 3.5 \times 10^{-1}$

3.5×10^{-1}

C. $(5 \times 10^{-2})+(7 \times 10^{2})$

One can only add when the exponents are the same.
Convert the lowest exponent to match the highest exponent by moving the decimal over the sum of the two exponents.

$= .0005 \quad (2+2=4)$
$= .0005 \times 10^2 + 7 \times 10^2$
$= 7.0005 \times 10^2$

7×10^2 or 700.05

D. $-6(3^2-4)\div 5i(2)$

Follow the order of operations.

$=-6(9-4)\div 5i(2)$
$=-6(5)\div 10i$
$=\frac{-30}{10i}$

Because i represents $\sqrt{-1}$, the denominator must be rationalized.

$=\frac{-30}{10i}\left(\frac{i}{i}\right)=\frac{-30i}{10i^2}$

When i is squared it becomes -1.

$=\frac{-30i}{-10}$
$=\frac{-30i \div -10}{-10 \div -10}$
$= 3i$

Next reduce the fraction.

$3i$

E. $2(7-4)+8$

Follow the order of operations.

$=2(3)+8$
$=6+8$
$= 14$

14

F. $7 + [8(2-3^2) - 5]$ Follow the order of operations.

$=7 + [8(2-9) - 5]$
$=7 + [8(-7) - 5]$
$=7 + (-56 - 5)$
$=7 +(-61)$
$= - 54$

-54

G. $2x^2 - 7x + 2$; solve when $x = -3$ Substitute x with -3 and solve.

$=2(-3)^2 - 7(-3) + 2$
$=2(9) + 21 + 2$
$=18 + 23$
$=41$

41

H. $5b^2-2b+1$
solve when $b = -3$ Substitute b with – 3 and solve.

$5(-3)^2-2(-3)+1$
$=5(9)+6+1$
$=45+7$
$=52$

52

I. $3x^2y+2xy-5y$
Solve when $x = -2$; $y = 3$; Substitute and solve.

$=3(-2)^2(3)+2(3)(-2)-5(3)$
$=3(4)(3)+6(-2)-15$
$=3(12)-12-15$
$=36-12-15$
$=9$

9

J. $12-\frac{2x}{y}+\frac{y}{x}$ Substitute and solve

Solve when: $X = -2$; $y = 3$

$12-\frac{2(-2)}{3}+\frac{3}{-2}$

$=\frac{12}{1}-\frac{(-4)}{3}+\frac{3}{-2}$

$=$

$\left(\frac{6}{6}\right)\frac{12}{1}-\left(\frac{6}{6}\right)\frac{(-4)}{3}-\left(\frac{6}{6}\right)\frac{3}{2}$ Find a common denominator.

$=\frac{72}{6}+\frac{8}{6}-\frac{9}{6}$

$=\frac{71}{6}$

$\frac{71}{6}$

3)

A. $7x^{-3}$ Move the x with the negative exponent into the denominator and change the sign.

$=\frac{7}{x^3}$

$\frac{7}{x^3}$

B. $(3x^3)(7x^5)$

$(3x^3)(7x^5)$
$=21x^8$ Multiply the numbers and then add the numbers.
$x^n * x^m = x^{n+m}$
$x^2 * x^3 = x^5$

$21x^8$

C. $(5x^2)(3x^{-7})$

$=(5x^2)(3x^{-7})$ See the previous two problems.
$=15x^{-5}$

$=\frac{15}{x^5}$

$\frac{15}{x^5}$

D. $(12x^3)(4x^{-3})$

See the previous problems for instructions.

$(12x^3)(4x^{-3})$
$=48x^0$
$=48(1)$
$=48$

$x^0 = 1$

48

E. $\frac{35x^5}{10x^2}$

Divide the numbers and subtract the exponents. The sum of the exponents must always be a positive number.

$\frac{35x^5}{10x^2}$
$=\frac{5 \div 35x^5}{5 \div 10x^2}$
$=\frac{7x^5}{2x^2}$
$=\frac{7x^5 * x^{-2}}{2}$
$=\frac{7x^3}{2}$

$\frac{x^n}{x^m} = x^{n-m}$

$\frac{x^2}{x^3} = \frac{1}{x^{3-2}} = \frac{1}{x}$

$\frac{7x^3}{2}$

F. $\frac{12xy^{-2}}{8x^{-3}y^3}$

See the previous problem for instruction.

$\frac{12xy^{-2}}{8x^{-3}y^3}$
$=\frac{4 \div 12xy^{-2}}{4 \div 8x^{-3}y^3}$
$=\frac{3xy^{-2}}{2x^{-3}y^3}$
$=\frac{3x * x^3}{2y^3y^2}$
$=\frac{3x^4}{2y^5}$

$\frac{3x^4}{2y^5}$

G. $\left(\frac{3x^3y^2}{6x^2y}\right)^3$

Solve as shown previously.

$\left(\frac{3x^3y^2}{6x^2y}\right)^3$

Take care to follow the order of operations.

$=\left(\frac{3 \div 3x^3x^{-2}y^2y^{-1}}{6 \div 3}\right)^3$
$=\left(\frac{1x^1y^1}{2}\right)^3$

The exponent must be applied to each term.

$=\left(\frac{1^{1*3}x^{1*3}y^{1*3}}{2^{1*3}}\right) = \frac{1^3x^3y^3}{2^3}$

$(x^m)^n = x^{mn}$

$(x^2)^3 = x^6$

$=\frac{x^3y^3}{8}$

$\frac{x^3y^3}{8}$

H. $(5)^{-3}$

See previous problem for instruction.

$(5)^{-3}$
$=(5)^{-3} = 5^{1*-3}$
$=5^{-3} = \frac{1}{5^3}$

$\frac{1}{5^3}$

4)

A. $(8x-2)+(7-3x)$

Combine like terms.

$(8x-2)+(7-3x)$
$=$ $+8x-2$
$-3x+7$
$5x+5$
$=5x+5$
$=5(x+1)$

Next, factor what each term has in common.

5x+5 or 5(x+1)

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

Combine like terms and remember to follow the order of operations.

$(4-5x)-(3-2x)$
$(4-5x)+(-3+2x)$
$=\begin{array}{l}+(4-5x)\\+(-3+2x)\\\hline 1-3x\end{array}$

Multiply or distribute the -1 through (3-2x).

$\boxed{-3x+1}$

C. $\begin{array}{l}(3x^2-5+2x)\\-[(7x^2+5)-(4x^2-5x)]\end{array}$

Follow the order of operations.

$-[(7x^2+5)-(4x^2-5x)]$
$=-[(7x^2+5)-4x^2+5x]$
$=-[7x^2-4x^2+5x+5]$
$=-[3x^2+5x+5]$
$=-3x^2-5x-5$

Simplify the second set first.

Once the second set is simplified combine it with the first set.

$=$
$(3x^2-5+2x)+(-3x^2-5x-5)$
$=\begin{array}{l}+(+3x^2+2x-5)\\+(-3x^2-5x-5)\\\hline -3x-10\end{array}$

Combine these two terms

$\boxed{-3x-10}$

D. $\begin{array}{l}+3x^2-2x+7\\-(x^2-5x+4)\\\hline\end{array}$

Distribute the $-5x^2$.

$+3x^2-2x+7$
$-x^2+5x-4$
$2x^2+3x+3$

$\boxed{2x^2+3x+3}$

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

$-5x(3x^2-5x+2)$
$=-15x^3+25x^2-10x$

$\boxed{-15x^3+25x^2-10x}$

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

FOIL to solve. Multiple the **F**irst two terms; the Outside terms; the Inside terms; Last terms. Combine like terms

$(3x-2)(5x+7)$
$=15x^2+21x-10x-14$

$=15x^2+11x-14$

$\boxed{15x^2+11x-14}$

G.

$(2xy-3x^2)(5xy-x^3+4y^2)$

$(2xy-3x^2)(5xy-x^3+4y^2)$

Multiply the first term to every term in the second set.

$2xy(5xy-x^3+4y^2)$
$=10x^2y^2-2x^4y+8xy^3$

Then multiply the second term by every term in the second set.

$-3x^2(5xy-x^3+4y^2)$
$=-15x^3y+3x^5-12x^2y^2$

Combine like terms between the two answers. The $10x^2y^2$ & $-12x^2y^2$ are like terms.

$+10x^2y^2-2x^4y+8xy^3$
$-15x^3y+3x^5-12x^2y^2$
$=$

$\boxed{3x^5-2x^4y-15x^3y-2x^2y^2+8xy^3}$

H.

$\dfrac{16x^3y^2-10x^2y^2+12xy^3}{2xy^2}$

The denominator is the same for each term.

$=$

$\dfrac{16x^3y^2}{2xy^2}-\dfrac{10x^2y^2}{2xy^2}+\dfrac{12xy^3}{2xy^2}$

Re-write the problem as three fractions and reduce.

$=$

$\frac{16\div 2x^3x^{-1}y^2y^{-2}}{2\div 2}-\frac{10\div 2x^2x^{-1}y^{-2}y^2}{2\div 2}+\frac{12\div 2xx^{-1}y^3y^{-2}}{2\div 2}$

$=8x^2-5x+6$

$\boxed{8x^2-5x+6\,y}$

I. $5x-2\overline{)20x^2+7x-6}$

Divide the terms like this

$$=5x-2\overline{)\begin{array}{r}4x+3\\ 20x^2+7x-6\\ -(20x^2-8x)\\ \hline 15x-6\\ -(15x-6)\\ \hline \end{array}}$$

$4x+3$

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5)

A. $25x^2-15x+35x^3$

First, one must factor out the Greatest Common Factor (5x).

$25x^2-15x+35x^3$
$=5x(5x-3+7x^2)$
$=5x(7x^2+5x-3)$

Re-write the problem in general form (Ax^2+Bx+C) and factor the trinomial if possible.

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

B. $25x^2-16$

$25x^2-16$
$=(5x-4)(5x+4)$

This binomial is a difference of squares.
$a^2-b^2=(a-b)(a+b)$

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

C. x^2+9

This binomial is a sum of squares.

Prime

This term is prime.

D. $xy-y+x-1$

When asked to factor a polynomial that exceeds three terms, you must group the terms. First one must factor out the GCF.

$xy-y+x-1$
$=y(x-1)+1(x-1)$
$=(y+1)(x-1)$

$(y+1)(x-1)$

E. $12x^2+5x-2$

$12x^2+5x-2$
$=12x^2-3x+8x-21$

-24: 24, 12, 8, 6 (2, 3, 4)

$=(12x^2-3x)(8x-2)$
$=3x(4x-1)+2(4x-1)$
$=(3x+2)(4x-1)$

To factor a trinomial, multiply the coefficient of the first term (12) to the constant (-2). Next find the factors of -24 that add/subtract to +5. A +8 and -3 add to form +5.
Factor out the GCF.

$(3x+2)(4x-1)$

F. $4x^2y-12xy+9y$

$4x^2y-12xy+9y$
$=y(4x^2-12x+9)$
$=y(2x-3)^2$

First factor out the GCF.

The trinomial is a perfect square trinomial.
$x^2+2xy+y^2$
$=(x+y)^2$
$x^2-2xy+y^2$
$=(x-y)^2$

$y(2x-3)^2$

G.
$12x^3y^2+5x^2y-3xy^2$

$12x^3y^2+5x^2y-3xy^2$
$=xy(12x^2y+5x-3y)$

Factor out the GCF.

$xy(12x^2y+5x-3y)$

H. $4x^2-12x+9$

See problem 5f.

$(2x-3)^2$

I. $3x^2-9x-yx+3y$

Group and factor.

$3x^2-9x-yx+3y$
$=3x(x-3)-y(x-3)$
$=(3x-y)(x-3)$

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

J. $x^3 - 5x^2 + 4x$

$x^3 - 5x^2 + 4x$
$= x(x^2 - 5x + 4)$ Factor out the GCF.
$= x(x-4)(x-1)$

$\boxed{x(x-4)(x-1)}$

K. $4x^2 - 16$

$4x^2 - 16$
$= (2x-4)(2x+4)$ This is a difference of squares.

$\boxed{(2x-4)(2x+4)}$

C. $\dfrac{3x^2 - 7x + 2}{6x^2 - 5x + 1}$

$\dfrac{3x^2 - 7x + 2}{6x^2 - 5x + 1}$
$= \dfrac{(3x-1)(x-2)}{(3x-1)(2x-1)}$
$= \dfrac{\cancel{(3x-1)}(x-2)}{\cancel{(3x-1)}(2x-1)}$ First factor each polynomial and reduce.
$= \dfrac{(x-2)}{(2x-1)}$

$\boxed{\dfrac{(x-2)}{(2x-1)}}$

6)

A. $\dfrac{14x^2}{8x}$

$\dfrac{14x^2}{8x}$ Reduce the fraction.
$= \dfrac{14 \div 2x^2 * x^{-1}}{8 \div 2}$
$= \dfrac{7x}{4}$

$\boxed{\dfrac{7x}{4}}$

B. $\dfrac{(x-2)(3-x)}{(x-3)(x+5)}$

$\dfrac{(x-2)(3-x)}{(x-3)(x+5)}$ Reduce the fraction.
$= \dfrac{(x-2)(x-3)(-1)}{(x-3)(x+5)}$ Multiply the numerator by -1 to change the +3-x to x-3.
$= \dfrac{(-x+2)\cancel{(x-3)}}{\cancel{(x-3)}(x+5)}$
$= \dfrac{(-x+2)}{(x+5)}$

$\boxed{\dfrac{(-x+2)}{(x+5)}}$

7)

A. $\dfrac{6x^2}{5x} * \dfrac{15x}{2x^2}$

$=$
$\dfrac{6 \div 2x^2x^{-2}}{5 \div 5} * \dfrac{15 \div 5x * x^{-1}}{2 \div 2}$ Cross reduce and multiply.
$= \dfrac{3x^0}{1} * \dfrac{3x^0}{1}$
$= \dfrac{3}{1} * \dfrac{3}{1}$
$= 3*3$
$= 9$

$\boxed{9}$

B. $\dfrac{3x}{8} + \dfrac{7x}{8}$ Add the denominators, and reduce the fraction.

$\dfrac{3x}{8} + \dfrac{7x}{8}$
$= \dfrac{3x+7x}{8} = \dfrac{10x}{8}$
$= \dfrac{10 \div 2x}{8 \div 2} = \dfrac{5x}{4}$

$\boxed{\dfrac{5x}{4}}$

C. $\dfrac{x+2}{x-3}-\dfrac{x+3}{x^2-7x+12}$

$=\dfrac{x+2}{x-3}-\dfrac{x+3}{(x-4)(x-3)}$

$=$

$\dfrac{(x-4)}{(x-4)}*\dfrac{x+2}{x-3}-\dfrac{x+3}{(x-4)(x-3)}$ Factor each term. Chose a common denominator and subtract.

$=\dfrac{(x^2-2x-8)-(x+3)}{(x-4)(x-3)}$

$=\dfrac{x^2-2x-8-x-3}{(x-4)(x-3)}$

$=\dfrac{x^2-3x-11}{(x-4)(x-3)}$

$\boxed{\dfrac{x^2-3x-11}{(x-4)(x-3)}}$

D.

$\dfrac{3x^2-13x-10}{2x^2-16x+30}\div\dfrac{3x^2+5x+2}{x^3-2x^2-3x}$

$\dfrac{3x^2-13x-10}{2x^2-16x+30}\div\dfrac{3x^2+5x+2}{x^3-2x^2-3x}$

$=$

$\dfrac{(3x+2)(x-5)}{(2x-6)(x-5)}\div\dfrac{(3x+2)(x+1)}{x(x-3)(x+1)}$ Factor each term and divide.

$=$

$\dfrac{\cancel{(3x+2)}\cancel{(x-5)}}{(2x-6)\cancel{(x-5)}}*\dfrac{x(x-3)\cancel{(x+1)}}{\cancel{(3x+2)}\cancel{(x+1)}}$

$=\dfrac{x(x-3)}{2x-6}=\dfrac{x\cancel{(x-3)}}{2\cancel{(x-3)}}$ Cross reduce and multiply.

$\boxed{\dfrac{x}{2}}$

E. $\dfrac{35x}{6y}-\dfrac{2x}{9y}$ Find a common denominator (18y).

$=\dfrac{3*35x}{3*6y}-\dfrac{2x*2}{9y*2}$

$=\dfrac{105x}{18y}-\dfrac{4x}{18y}=\dfrac{105x-4x}{18y}$

$=\boxed{\dfrac{101x}{18y}}$

8)

A. $\sqrt{9}$

3	9
3	3
	1

Break nine into factors and group these primes into pairs. For every pair take one number out.

$=\sqrt{3*3*1}$

$=3\sqrt{1}=3$

$\boxed{3}$

B. $\sqrt{12}$ See previous problem for instructions.

3	12
2	4
2	2
	1

$=\sqrt{3*2*2*1}$

$=2\sqrt{3}$

$\boxed{2\sqrt{3}}$

C. $\sqrt{160}$ See previous problem for instructions.

4	160
4	40
2	10
5	5
	1

$=\sqrt{4*4*2*5}$

$=4\sqrt{2*5}=4\sqrt{10}$

$\boxed{4\sqrt{10}}$

D. $\sqrt{18x^3y^5}$ See question 8a.

$=\sqrt{2*9xxxyyyyy}$

$=3xy^2\sqrt{2xy}$

$\boxed{3xy^2\sqrt{2xy}}$

9)

A. $\left(5\sqrt{2}\right)\left(-3\sqrt{7}\right)$ If the roots on the radicals are the same, simply multiply.

$=-15\sqrt{14}$

$\boxed{-15\sqrt{14}}$

B. $\left(-2\sqrt{5}\right)\left(-3\sqrt{5}\right)$ See above.

$=6\sqrt{25}=6*5$

$=30$

$\boxed{30}$

C. $\sqrt{\frac{8}{2}}$

$=\frac{\sqrt{8}}{\sqrt{2}}=\frac{\sqrt{2*2*2}}{\sqrt{2}}=\frac{2\sqrt{2}}{\sqrt{2}}=2$

$=\frac{2\sqrt{2}}{\sqrt{2}}=2$

8	2
4	2
2	
1	

Multiply the two terms and take the square root.

$\boxed{2}$

D. $\sqrt{24xy^2}*\sqrt{15x^3y^3}$

$=\sqrt{24*15x^4y^5}$

$=\sqrt{2*2*2*3*3*5xxxxxyyyyy}$

$=2*3xxyy\sqrt{2*5x}$

$=6x^2y^2\sqrt{10x}$

Take the square root of the top and bottom.

$\boxed{6x^2y^2\sqrt{10x}}$

E. $\frac{\sqrt{8x^5yz}}{72xy^3}$

$=\frac{\sqrt{8x^5yz}}{72xy^3}=\frac{\sqrt{2*2*2xxxxxyz}}{2*2*2*3*3xyyy}$

$=\frac{2xx\sqrt{2xyz}}{2*36*x*y^3}=\frac{x\sqrt{2xyz}}{36y^3}$

$=\frac{x\sqrt{2xyz}}{36y^3}$

Take the square root of both the top and bottom.

Reduce the fraction.

F.
$(-2\sqrt{5}+\sqrt{2})(-2\sqrt{5}-\sqrt{2})$

To solve this, FOIL the terms.

$=4\sqrt{25}+\cancel{2\sqrt{10}}-\cancel{2\sqrt{10}}-\sqrt{4}$

$=4\sqrt{25}-\sqrt{4}=4*5-2$

$=20-2=18$

Combine like terms and solve.

$\boxed{18}$

G. $\frac{\sqrt{15}}{\sqrt{3}}$

$\frac{\sqrt{15}}{\sqrt{3}}\left(\frac{\sqrt{3}}{\sqrt{3}}\right)=\frac{\sqrt{15*3}}{\sqrt{9}}$

$=\frac{\sqrt{3*3*5}}{3}=\frac{\cancel{3}\sqrt{5}}{\cancel{3}}=\sqrt{5}$

When a radical is in the denominator of a fraction it must be removed. Multiply the denominator by whatever it takes to create a perfect square. Example:
$\sqrt{2}*\sqrt{2}=\sqrt{4}=2$

$\boxed{\sqrt{5}}$

H. $\sqrt{3x}\sqrt{18x^3}$

$=\sqrt{3*2*3*3xxxx}=3x^2\sqrt{6}$

Multiply the two terms and take the square root.

$\boxed{3x^2\sqrt{6}}$

I. $\frac{\sqrt{18x^3}}{\sqrt{3x}}$

$\frac{\sqrt{18\div 3x^{-1}x^3}}{\sqrt{3\div 3}}=\frac{\sqrt{6x^2}}{\sqrt{1}}$

$=x\sqrt{6}$

Reduce the fraction and take the square root.

$\boxed{x\sqrt{6}}$

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10)

A. $\sqrt{\frac{2}{3}}$

$\frac{\sqrt{2}}{\sqrt{3}}\left(\frac{\sqrt{3}}{\sqrt{3}}\right)=\frac{\sqrt{6}}{\sqrt{9}}=\frac{\sqrt{6}}{3}$

Rationalize the denominator similar to the example of 9g.

$\boxed{\frac{\sqrt{6}}{3}}$

B. $\frac{6}{\sqrt{12}}$

$\frac{6}{\sqrt{12}}\left(\frac{\sqrt{12}}{\sqrt{12}}\right)=\frac{6\sqrt{12}}{\sqrt{144}}$

$\frac{6\sqrt{12}}{12}=\frac{6\div 6\sqrt{12}}{12\div 6}=\boxed{\frac{\sqrt{12}}{2}}$

See previous problem.

11)

A. $7+3x=-5$

Solve for x.

$+7+3x=-5$
$-7 \quad -7$
$3x=-12$
$=\frac{3x}{3}=\frac{-12}{3}$
$=x=-4$

-4

B. $3(x+1)=7(x-2)-3$

$3(x+1)=7(x-2)-3$
$=3x+3=7x-14-3$
$=3x+3=7x-17$
$-7x-3 \quad -7x-3$
$=-4x=-20$
$=\frac{-4x}{-4}=\frac{-20}{-4}$
$=x=5$

Follow the order of operations.

5

C. $2x^2-3=5x$

$2x^2-5x-3=0$
$=(2x+1)(x-3)=0$
$2x+1=0; x-3=0$
$=x=-\frac{1}{2}; x=3$

Set the problem equal to zero and factor.

$x=-\frac{1}{2}; x=3$

D. $\frac{6x}{8}-\frac{5}{1}=\frac{7x}{6}$

$=\frac{48}{1}\left(\frac{6x}{8}-\frac{5}{1}=\frac{7x}{6}\right)$
$=6(6x)-5(48)=7x(8)$
$=36x-240=56x$
$-36x \quad -36$
$-240=20x$
$\frac{-240}{20}=\frac{20x}{20}$
$=-12=x$

-12

Multiply both sides of the equations by the common denominator (24).

E. $\sqrt{x-2}+3=8$

$=\sqrt{x-2}+3=8$
$-3 \quad -3$
$\sqrt{x-2}=5$

$=\left(\sqrt{x-2}=5\right)^2$
$=x-2=25$
$+2 \quad +2$
$x=27$

Solve for x.

Square Both Sides

27

F. $2(3x+5)=10$

$=6x+10=10$
$-10 \quad -10$
$6x=0$
$\frac{6x}{6}=\frac{0}{6}$

$x=0$

G. $2x^2=6x$

$2x^2-6x=0$
$=2x(x-3)=0$
$2x=0; x-3=0$
$=x=0; x=3$

$x=0; x=3$

Set equal to zero and solve.

H. $(3x-1)(x-2)=8$

$(3x-1)(x-2)=8$
$3x^2-7x+2=8$
$-8 \quad -8$
$3x^2-7x-6=0$
$(3x+2)(x-3)=0$
$=3x+2=0; x-3=0$

$x=\frac{-2}{3}; x=3$

Foil, set equal to zero, and then factor.

I. $\frac{x}{x+3}-\frac{1}{x-3}=\frac{18}{x^2-9}$

Factor to find the common denominator. Multiply by the common denominator of $(x+3)(x-3)$.

$\frac{x}{x+3}-\frac{1}{x-3}=\frac{18}{(x+3)(x-3)}$

$=$

$\left(\frac{x-3}{x-3}\right)\frac{x}{x+3}-\frac{1}{x-3}\left(\frac{x+3}{x+3}\right)=\frac{18}{(x+3)(x-3)}$

$=$

$\frac{x^2-3x-x-3}{(x-3)(x+3)}=\frac{18}{(x+3)(x-3)}$

$=x^2-4x-3=18$

$=x^2-4x-21=0$

$=(x+3)(x-7)=0$

Set the equation to zero and factor the trinomial.

$=x+3=0;x-7=0$

$=x=-3;x=7$

Solve each for x

$x=-3;x=7$

J. $\sqrt{5-x}+7=12$

Original is incorrect. The "=2" should be a "=12."

$\sqrt{5-x}+7=12$

$=\sqrt{5-x}=5$

Isolate the radical and square both sides.

$=\left(\sqrt{5-x}\right)^2=(5)^2$

$=5-x=25$

$=-x=20$

$=x=-20$

Plug the answer back into the original equation to check.

X= - 20

12)

A. $5\geq 3x-1$

Solve for x.

$+5\geq 3x-1$

$+1 \quad +1$

$+6\geq 3x$

$=+\frac{6}{3}\geq\frac{3x}{3}$

$=2\geq x$

$2\geq x$

B. $5(2-x)>5x-20$

Solve for x

$5(2-x)>5x-20$

$=10-5x>5x-20$

$-10 \quad -5x \quad -5x \quad -10$

$-10x>-30$

$=-\frac{10}{-10}x>-\frac{30}{-10}$

$=x<3$

$x<3$

13)

Solve for n

A. $5n-4=6$

$5n-4=6$

$+4 \quad +4$

$5n=10$

$=\frac{5n}{5}=\frac{10}{5}$

$=n=2$

$n=2$

B. $2x=5+\frac{1x}{2}$

Solve for x

$2x=5+\frac{1x}{2}$

$=2(2x)=2\left(5+\frac{1x}{2}\right)$

$=4x=10+x$

$-x \quad -x$

$3x=10$

$=\frac{3x}{3}=\frac{10}{3}$

$=x=\frac{10}{3}$

$x=10/3$

C. $6z-5=2z-12$

Solve for z

$6z-5=2z-12$

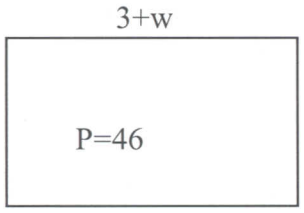
$-2z+5 \quad -2z+5$

$4z=-7$

$=\frac{4z}{4}=\frac{-7}{4}$

$z=\frac{-7}{4}$

D.



The formula for the perimeter of a square is: $P = 2l + 2w$.
Identify the given information.
W = width
$L = 3 + w$
$P = 46$
Plug these values into the formula and solve for the unknown variable.

$P = 2l + 2w$
$= 46 = 2(3 + w) + 2(w)$
$= 46 = 6 + 2w + 2w$
$-6 \quad -6$
$40 = +4w$
$= \frac{40}{4} = \frac{4}{4}w$
$= 10 = w$

$10 = w$

E.

$80(x) + 100(200 - x) = 17000$

200 bicycles
x = that cost \$80
200 - x = cost \$100
17000 = total cost

=
$80x - 100x + 20{,}000 = 17000$
$\quad - 20000 \quad - 20000$

$-20x = -3000$
$= \frac{-20}{-20}x = \frac{-3000}{-20}$
$= x = 150$
$= 200 - x =$
$200 - 150 = 50$

There are 150 bicycles that cost \$80; there are 50 that cost \$100.

X = cost

F. $x + 0.4x = 72.80$

$x + 0.4x = 72.80$
$= 1.4x = 72.80$
$= \frac{1.4x}{1.4} = \frac{72.80}{1.4}$
$= x = 52.00$

$x = 52.00$