Chapter 8. Polynomials

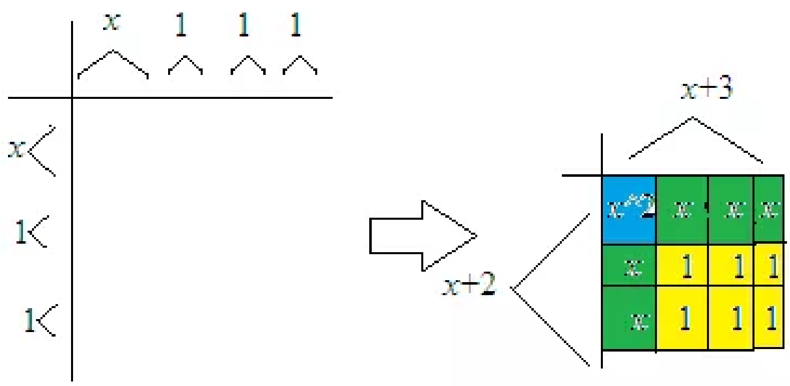
Ex. 8.6

Answer 1AA.

Find the product of $(x+2)(x+3)$ using algebra tiles.

The rectangle will have a width of $x+2$ and a length of $x+3$. Use algebra tiles to mark off the dimensions on a product mat and then complete the rectangle with algebra tiles.

Therefore



Now the above rectangle consists of 1 blue x^2 tile, 5 green *x* tiles and 6 yellow 1 tiles. So, the area of the rectangle is x^2+5x+6

Therefore $(x+2)(x+3)=x^2+5x+6$

Hence the product of $(x+2)(x+3)$ using algebra tiles is $\boxed{x^2+5x+6}$

Answer 1CU.

To multiply 2*x* with $(4x^2+3x-5)$, firstly use the distributive property $a(b+c+d)=ab+ac+ad$, therefore

$$2x(4x^2+3x-5)=2x\cdot(4x^2)+2x\cdot(3x)-2x\cdot(5)$$

So, in the first step of the statement $2x(4x^2+3x-5)=2x\cdot(4x^2)+2x\cdot(3x)-2x\cdot(5)$, distributive property is used.

Now to solve $2x\cdot(4x^2)+2x\cdot(3x)-2x\cdot(5)$, multiply coefficients and exponents separately and using product of powers property that is $a^m \times a^n = a^{m+n}$, therefore

$$\begin{aligned} 2x(4x^2+3x-5) &= 2x\cdot(4x^2)+2x\cdot(3x)-2x\cdot(5) \\ &= 2\times4\cdot x^{1+2}+2\times3\cdot x^{1+1}-2\times5\cdot x \\ &= 8x^{1+2}+6x^{1+1}-10x \end{aligned}$$

So, in this step $2x(4x^2+3x-5)=8x^{1+2}+6x^{1+1}-10x$, product of powers property is used.

Hence on multiplying $2x(4x^2+3x-5)$, $\boxed{\text{distributive property}}$ is used in first step

$2x(4x^2+3x-5)=2x\cdot(4x^2)+2x\cdot(3x)-2x\cdot(5)$ and in the next step

$2x(4x^2+3x-5)=8x^{1+2}+6x^{1+1}-10x$, $\boxed{\text{product of powers property}}$ is used.

Answer 1PQ.

The degree of the polynomial is the value of the greatest exponent of any expression (except the constant) in the polynomial.

The given expression is $5x^4$.

4 is the highest exponent of the above expression so it is the degree of the polynomial $5x^4$

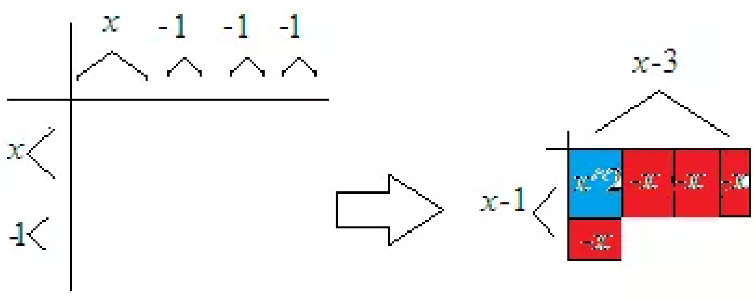
Hence the degree of the polynomial $5x^4$ is $\boxed{4}$

Answer 2AA.

Find the product of $(x-1)(x-3)$ using algebra tiles.

The rectangle will have a width of $x-1$ and a length of $x-3$. Use algebra tiles to mark off the dimensions on a product mat and then complete the rectangle with algebra tiles.

Therefore

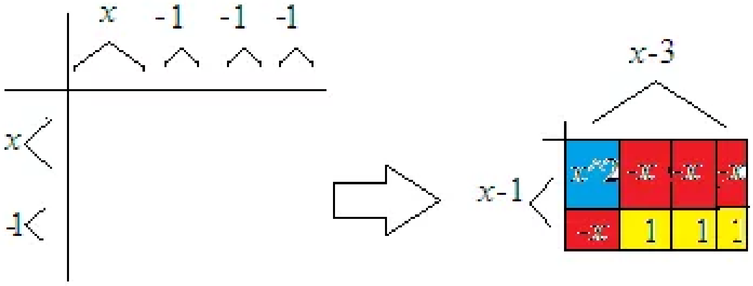


Now determine whether to use 4 yellow 1 tiles or 4 red -1 tiles to complete the rectangle.

Remember that the numbers at the top and side give the dimensions of the tile needed. The area of each tile is the product of -1 and -1 or 1.

In the above rectangle -1 is multiplied by -1 which is equal to 1 so this is represented by a yellow 1 tile. Therefore fill in the space with 3 yellow 1 tiles to complete the rectangle.

Therefore



Now the above rectangle consists of 1 blue x^2 tile, 4 red $-x$ tiles and 3 yellow 1 tiles. So, the area of the rectangle is x^2-4x+3

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

Hence the product of $(x-1)(x-3)$ using algebra tiles is $\boxed{x^2-4x+3}$

Answer 2PQ.

The degree of the polynomial is the value of the greatest exponent of any expression (except the constant) in the polynomial if the polynomial is in one variable.

If the polynomial is in the multiple variables then add the exponents of the variables and the degree of the polynomial is the largest exponent or the sum of exponent.

Now the expression is $-9n^3p^4$.

There are two different variables in the above expression so add the exponents that means $3+4=7$

Therefore the polynomial $-9n^3p^4$ has degree 7.

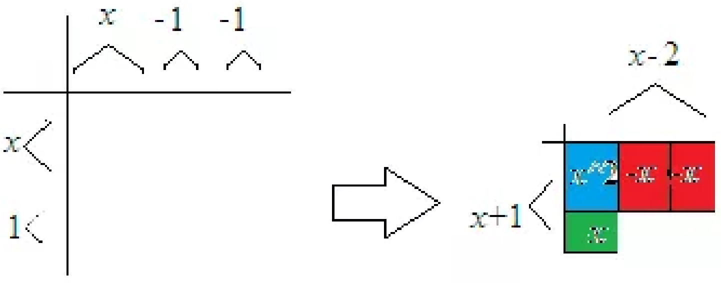
Hence the degree of the polynomial $-9n^3p^4$ is $\boxed{7}$

Answer 3AA.

Find the product of $(x+1)(x-2)$ using algebra tiles.

The rectangle will have a width of $x+1$ and a length of $x-2$. Use algebra tiles to mark off the dimensions on a product mat and then complete the rectangle with algebra tiles.

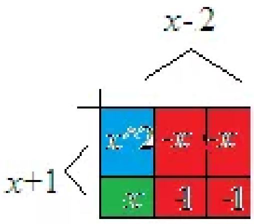
Therefore



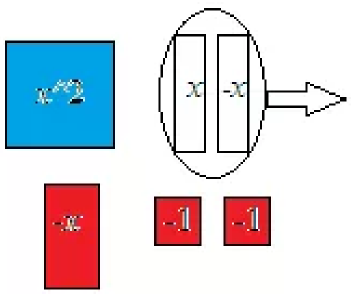
Now determine whether to use 4 yellow 1 tiles or 4 red -1 tiles to complete the rectangle.

Remember that the numbers at the top and side give the dimensions of the tile needed. The area of each tile is the product of -1 and -1 or 1.

In the above rectangle 1 is multiplied by -1 which is equal to -1 so this is represented by a red -1 tile. Therefore fill in the space with 2 red -1 tiles to complete the rectangle



Rearrange the tiles to simplify the polynomial you have formed. A zero pair is formed by one positive and one negative *x* tile.



Now there are 1 blue x^2 tile, 1 red $-x$ tiles and 2 red -1 tiles. So, the area of the rectangle is x^2-x-2

Therefore $(x+1)(x-2)=x^2-x-2$

Hence the product of $(x+1)(x-2)$ using algebra tiles is $\boxed{x^2-x-2}$

Answer 3CU.

Let us take a monomial 2*x* and a trinomial $\left(4x^2+3x-5\right)$

Now multiply the above trinomial $4x^2+3x-5$ with the monomial 2*x*.

To multiply 2*x* with $4x^2+3x-5$, firstly use the distributive property $a(b+c+d)=ab+ac+ad$, therefore

$$2x\left(4x^2+3x-5\right)=2x\cdot\left(4x^2\right)+2x\cdot(3x)-2x\cdot(5)$$

Now to solve $2x\cdot\left(4x^2\right)+2x\cdot(3x)-2x\cdot(5)$, multiply coefficients and exponents separately and using product of powers property that is $a^m\times a^n=a^{m+n}$, therefore

$$\begin{aligned}2x\left(4x^2+3x-5\right)&=2x\cdot\left(4x^2\right)+2x\cdot(3x)-2x\cdot(5)\\&=2\times4\cdot x^1\times x^2+2\times3\cdot x^1\times x^1-2\times5\cdot x\\&=2\times4\cdot x^{1+2}+2\times3\cdot x^{1+1}-2\times5\cdot x\quad\{\text{product of power rule}\}\\&=8x^3+6x^2-10x\end{aligned}$$

Hence on multiplying a trinomial $4x^2+3x-5$ with the monomial 2*x*, you will get

$\boxed{8x^3+6x^2-10x}$

Answer 3PQ.

The degree of the polynomial is the value of the greatest exponent of any expression (except the constant) in the polynomial if the polynomial is in one variable.

If the polynomial is in the multiple variables then add the exponents of the variables and the degree of the polynomial is the largest exponent or the sum of exponent.

Now the expression is $7a^2-2ab^2$.

There are two different variables in the above expression so add the exponents 1 and 2 of the variables that means $1+2=3$

3 is the sum of the exponents therefore the polynomial $7a^2-2ab^2$ has degree 3.

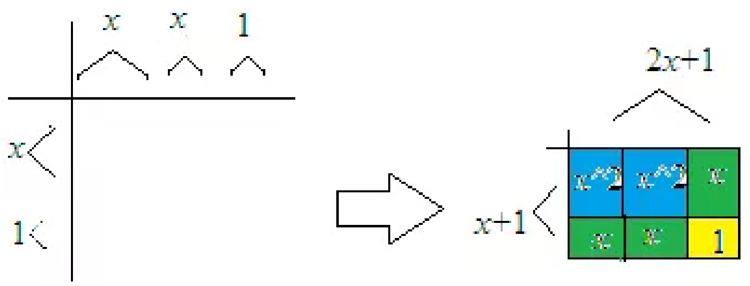
Hence the degree of the polynomial $7a^2-2ab^2$ is $\boxed{3}$

Answer 4AA.

Find the product of $(x+1)(2x+1)$ using algebra tiles.

The rectangle will have a width of $x+1$ and a length of $2x+1$. Use algebra tiles to mark off the dimensions on a product mat and then complete the rectangle with algebra tiles.

Therefore



Now the above rectangle consists of 2 blue x^2 tile, 3 green *x* tile and 1 yellow 1 tiles. So, the area of the rectangle is $2x^2+3x+1$

Therefore $(x+1)(2x+1)=2x^2+3x+1$

Hence the product of $(x+1)(2x+1)$ using algebra tiles is $\boxed{2x^2+3x+1}$

Answer 4CU.

Find the product $-3y(5y+2)$

To multiply $-3y$ with $5y+2$, firstly use the distributive property $a(b+c)=ab+ac$, therefore

$$-3y(5y+2)=-3y\cdot(5y)-3y\cdot(2)$$

Now to solve $-3y\cdot(5y)-3y\cdot(2)$, multiply coefficients and exponents separately and use product of powers property that is $a^m\times a^n=a^{m+n}$, therefore

$$\begin{aligned}-3y(5y+2)&=-3y\cdot(5y)-3y\cdot(2)\\&=-3\times5\cdot y^1\times y^1-3\times2\cdot y\\&=-15\cdot y^{1+1}-6\cdot y \qquad \{\text{product of power rule}\}\\&=-15y^2-6y\end{aligned}$$

Hence the product of $-3y(5y+2)$ is $\boxed{-15y^2-6y}$

Answer 4PQ.

The degree of the polynomial is the value of the greatest exponent of any expression (except the constant) in the polynomial if the polynomial is in one variable.

If the polynomial is in the multiple variables then add the exponents of the variables and the degree of the polynomial is the largest exponent or the sum of exponent.

Now the expression is $6-8x^2y^2+5y^3$.

There are two different variables in the above expression so add the exponents 2 and 2 of the variables that means $2+2=4$

4 is the sum of the exponents therefore the polynomial $6-8x^2y^2+5y^3$ has degree 4.

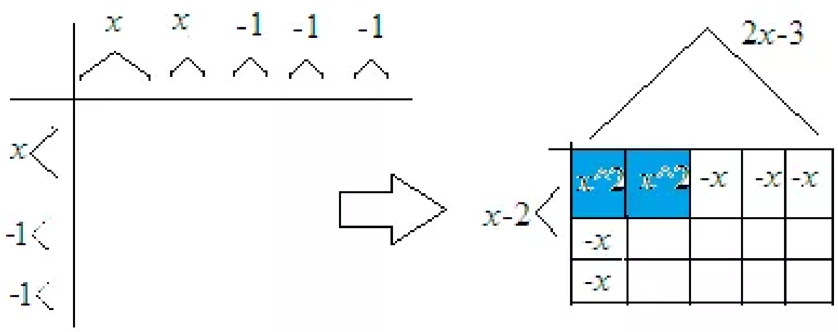
Hence the degree of the polynomial $6-8x^2y^2+5y^3$ is $\boxed{4}$

Answer 5AA.

Find the product of $(x-2)(2x-3)$ using algebra tiles.

The rectangle will have a width of $x-2$ and a length of $2x-3$. Use algebra tiles to mark off the dimensions on a product mat and then complete the rectangle with algebra tiles.

Therefore

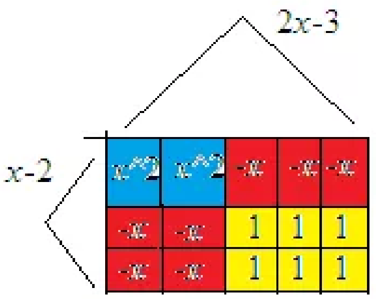


Now determine what color x tiles and what color 1 tiles to use to complete the rectangle. The area of each x tile is the product of x and -1. This is represented by a red $-x$ tile.

And the area of the 1 tile is represented by the product of -1 and 1 or -1. This is represented by a yellow 1 tile.

In the above rectangle -1 is multiplied by -1 which is equal to 1 so this is represented by a yellow 1 tile. So complete the rectangle with 7 red $-x$ tiles and 6 yellow 1 tiles.

Therefore



Now the above rectangle consists of 2 blue x^2 tile, 7 red $-x$ tiles and 6 yellow 1 tiles. So, the area of the rectangle is $2x^2-7x+6$

Therefore $(x-2)(2x-3)=2x^2-7x+6$

Hence the product of $(x-2)(2x-3)$ using algebra tiles is $\boxed{2x^2-7x+6}$

Answer 5CU.

Find the product $9b^2\left(2b^3-3b^2+b-8\right)$

To multiply $9b^2$ with $\left(2b^3-3b^2+b-8\right)$, firstly use the distributive property $a(b+c+d+e)=ab+ac+ad+ae$, therefore

$$9b^2\left(2b^3-3b^2+b-8\right)=9b^2\cdot\left(2b^3\right)-9b^2\cdot\left(3b^2\right)+9b^2\cdot(b)-9b^2\cdot(8)$$

Now to solve the above expression, multiply coefficients and exponents separately and use product of powers property that is $a^m\times a^n=a^{m+n}$, therefore

$$\begin{aligned}9b^2\left(2b^3-3b^2+b-8\right)&=9b^2\cdot\left(2b^3\right)-9b^2\cdot\left(3b^2\right)+9b^2\cdot(b)-9b^2\cdot(8)\\&=9\times2\cdot b^2\times b^3-9\times3\cdot b^2\times b^2+9\cdot b^2\times b-9\times8\cdot b^2\\&=18\cdot b^{2+3}-27\cdot b^{2+2}+9\cdot b^{2+1}-72\cdot b^2\\&=18b^5-27b^4+9b^3-72b^2\end{aligned}$$

Hence the product of $9b^2\left(2b^3-3b^2+b-8\right)$ is $\boxed{18b^5-27b^4+9b^3-72b^2}$

Answer 5PQ.

Numbers are said to be in ascending order when they are arranged from smallest to largest.

The given polynomial is $4x^2+9x-12+5x^3$

There is one constant term -12 in the polynomial which can be written as $-12x^0$ because $x^0=1$

Now arranging the terms of the polynomial so that powers of *x* in ascending order, therefore

$-12x^0+9x+4x^2+5x^3$

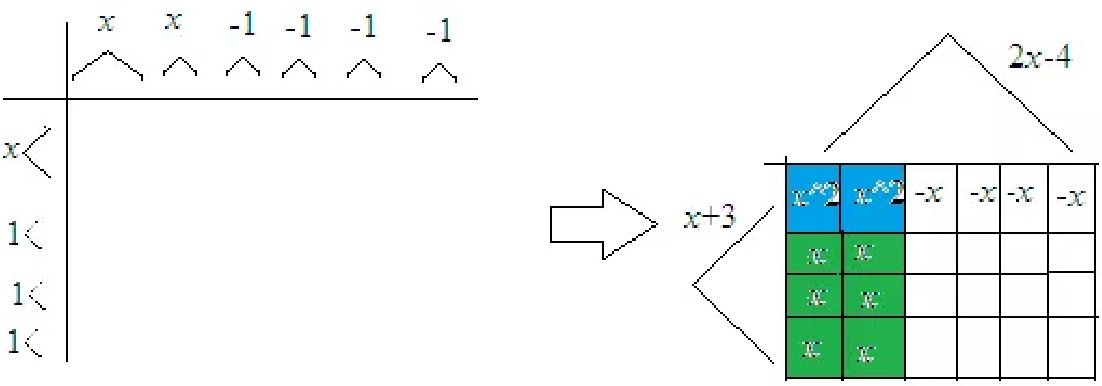
Hence the arrangement of the terms of the polynomial is $\boxed{-12x^0+9x+4x^2+5x^3}$

Answer 6AA.

Find the product of $(x+3)(2x-4)$ using algebra tiles.

The rectangle will have a width of $x+3$ and a length of $2x-4$. Use algebra tiles to mark off the dimensions on a product mat and then complete the rectangle with algebra tiles.

Therefore

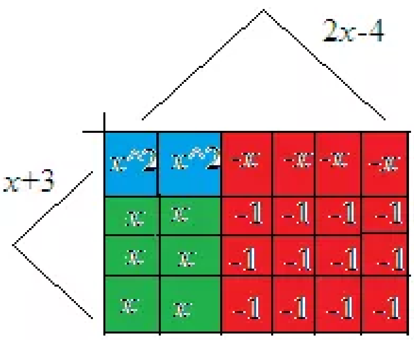


Now determine what color *x* tiles and what color 1 tiles to use to complete the rectangle. The area of each *x* tile is the product of *x* and -1. This is represented by a red $-x$ tile.

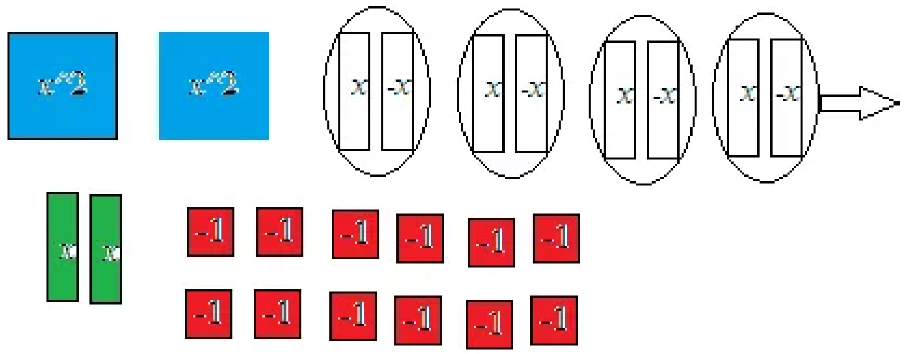
And the area of the 1 tile is represented by the product of 1 and -1 or 1. This is represented by a red 1 tile.

In the above rectangle 1 is multiplied by -1 which is equal to -1 so this is represented by a red 1 tile. So complete the rectangle with 4 red $-x$ tiles and 12 red -1 tiles.

Therefore



Rearrange the tiles to simplify the polynomial you have formed. A zero pair is formed by one positive and one negative *x* tile.



Now there are 2 blue x^2 tile, 2 green *x* tiles and 12 red -1 tiles. So, the area of the rectangle is $2x^2+2x-12$

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

Hence the product of $(x+3)(2x-4)$ using algebra tiles is $\boxed{2x^2+2x-12}$

Answer 6CU.

Find the product $2x(4a^4-3ax+6x^2)$

To multiply $2x$ with $(4a^4-3ax+6x^2)$, firstly use the distributive property $a(b+c+d)=ab+ac+ad$, therefore

$$2x(4a^4-3ax+6x^2)=2x\cdot(4a^4)-2x\cdot(3ax)+2x\cdot6x^2$$

Now to solve the above expression, multiply coefficients and exponents separately and use product of powers property that is $a^m\times a^n=a^{m+n}$, therefore

$$\begin{aligned}2x(4a^4-3ax+6x^2)&=2x\cdot(4a^4)-2x\cdot(3ax)+2x\cdot6x^2\\&=2\times4\cdot a^4\cdot x-2\times3\cdot a\cdot x\times x+2\times6\cdot x\times x^2\\&=8\cdot a^4\cdot x-6\cdot a\cdot x^{1+1}+12\cdot x^{2+1}\\&=8a^4x-6ax^2+12x^3\end{aligned}$$

Hence the product of $2x(4a^4-3ax+6x^2)$ is $\boxed{8a^4x-6ax^2+12x^3}$

Answer 6PQ.

Numbers are said to be in ascending order when they are arranged from smallest to largest.

The given polynomial is $2xy^4 + x^3y^5 + 5x^5y - 13x^2$

Now arranging the terms of the polynomial so that powers of x in ascending order, therefore

$$2xy^4 - 13x^2 + x^3y^5 + 5x^5y$$

Hence the arrangement of the terms of the polynomial is $\boxed{2xy^4 - 13x^2 + x^3y^5 + 5x^5y}$

Answer 7CU.

Find the product $-4xy\left(5x^2 - 12xy + 7y^2\right)$

To multiply $-4xy$ with $\left(5x^2 - 12xy + 7y^2\right)$, firstly use the distributive property $a(b+c+d) = ab + ac + ad$, therefore

$$-4xy\left(5x^2 - 12xy + 7y^2\right) = -4xy\cdot\left(5x^2\right) - (-4xy)\cdot(12xy) + (-4xy)\cdot\left(7y^2\right)$$

Now to solve the above expression, multiply coefficients and exponents separately and use product of powers property that is $a^m \times a^n = a^{m+n}$, therefore

$$\begin{aligned}-4xy\left(5x^2 - 12xy + 7y^2\right) &= -4xy\cdot\left(5x^2\right) - (-4xy)\cdot(12xy) + (-4xy)\cdot\left(7y^2\right)\\ &= (-4)\times 5\cdot x \times x^2 \cdot y - (-4)\times 12\cdot x \times x \cdot y \times y + (-4)\times 7\cdot x\cdot y \times y^2\\ &= -20\cdot x^{1+2}\cdot y - (-48)\cdot x^{1+1}\cdot y^{1+1} + (-28)\cdot x\cdot y^{2+1} \quad \left\{a^m \times a^n = a^{m+n}\right\}\\ &= -20x^3y + 48x^2y^2 - 28xy^3\end{aligned}$$

Hence the product of $-4xy\left(5x^2 - 12xy + 7y^2\right)$ is $\boxed{-20x^3y + 48x^2y^2 - 28xy^3}$

Answer 7PQ.

Find the sum of $\left(7n^2 - 4n + 10\right) + \left(3n^2 - 8\right)$

To find the sum of the above polynomials, firstly open the brackets therefore

$$\left(7n^2 - 4n + 10\right) + \left(3n^2 - 8\right) = 7n^2 - 4n + 10 + 3n^2 - 8$$

Now combine the like terms and then solve therefore

$$\begin{aligned}\left(7n^2 - 4n + 10\right) + \left(3n^2 - 8\right) &= 7n^2 - 4n + 10 + 3n^2 - 8\\ &= 7n^2 + 3n^2 - 4n + 10 - 8\\ &= 10n^2 - 4n + 2\end{aligned}$$

Hence the sum of the expression $\left(7n^2 - 4n + 10\right) + \left(3n^2 - 8\right)$ is $\boxed{10n^2 - 4n + 2}$

Answer 8CU.

Simplify $t(5t-9)-2t$

To simplify $t(5t-9)-2t$, firstly apply the distributive property $a(b-c)=ab-ac$, therefore

$$t(5t-9)-2t=t\cdot(5t)-9\cdot t-2t$$

Now use product of powers property that is $a^m \times a^n = a^{m+n}$, therefore

$$\begin{aligned} t(5t-9)-2t &= t\cdot(5t)-9\cdot t-2t \\ &= 5\cdot t\times t-9t-2t \\ &= 5\cdot t^{1+1}-9t-2t \quad \{a^m \times a^n = a^{m+n}\} \\ &= 5t^2-9t-2t \end{aligned}$$

Combining like terms, therefore

$$\begin{aligned} t(5t-9)-2t &= 5t^2-9t-2t \\ &= 5t^2-11t \end{aligned}$$

Hence the simplification of $t(5t-9)-2t$ is $\boxed{5t^2-11t}$

Answer 8PQ.

Find the difference of $(3g^3-5g)-(2g^3+5g^2-3g+1)$

To find the difference of the above polynomials, firstly open the brackets and change the signs of the second bracket therefore

$$(3g^3-5g)-(2g^3+5g^2-3g+1)=3g^3-5g-2g^3-5g^2+3g-1$$

Now combine the like terms and then solve therefore

$$\begin{aligned} (3g^3-5g)-(2g^3+5g^2-3g+1) &= 3g^3-5g-2g^3-5g^2+3g-1 \\ &= 3g^3-2g^3-5g^2-5g+3g-1 \\ &= g^3-5g^2-2g-1 \end{aligned}$$

Hence the difference of the expression $(3g^3-5g)-(2g^3+5g^2-3g+1)$ is $\boxed{g^3-5g^2-2g-1}$

Answer 9CU.

Simplify $5n(4n^3+6n^2-2n+3)-4(n^2+7n)$

To simplify $5n(4n^3+6n^2-2n+3)-4(n^2+7n)$, firstly apply the distributive property, therefore

$$
\begin{aligned}
&5n(4n^3+6n^2-2n+3)-4(n^2+7n)\\
&=5n\cdot(4n^3)+5n\cdot(6n^2)-5n\cdot(2n)+5n\cdot(3)-4\cdot(n^2)-4\cdot 7n
\end{aligned}
$$

Now using product of powers property that is $a^m\times a^n=a^{m+n}$, therefore

$$
\begin{aligned}
&5n(4n^3+6n^2-2n+3)-4(n^2+7n)\\
&=5n\cdot(4n^3)+5n\cdot(6n^2)-5n\cdot(2n)+5n\cdot(3)-4\cdot(n^2)-4\cdot 7n\\
&=5\times 4\cdot n\times n^3+5\times 6\cdot n\times n^2-5\times 2\cdot n\times n+5\times 3\cdot n-4n^2-28n\\
&=20\cdot n^{1+3}+30\cdot n^{1+2}-10\cdot n^{1+1}+15n-4n^2-28n \quad \{a^m\times a^n=a^{m+n}\}\\
&=20n^4+30n^3-10n^2+15n-4n^2+28n
\end{aligned}
$$

Combining like terms, therefore

$$
\begin{aligned}
&5n(4n^3+6n^2-2n+3)-4(n^2+7n)\\
&=20n^4+30n^3-10n^2+15n-4n^2-28n\\
&=20n^4+30n^3-10n^2-4n^2+15n-28n\\
&=20n^4+30n^3-14n^2-13n
\end{aligned}
$$

Hence the simplification of $5n(4n^3+6n^2-2n+3)-4(n^2+7n)$ is $\boxed{20n^4+30n^3-14n^2-13n}$

Answer 9PQ.

Find the product of $5a^2(3a^3b-2a^2b^2+6ab^3)$

To multiply $5a^2$ with $(3a^3b-2a^2b^2+6ab^3)$, firstly use the distributive property $a(b+c+d)=ab+ac+ad$, therefore

$$5a^2(3a^3b-2a^2b^2+6ab^3)=5a^2\cdot(3a^3b)+5a^2\cdot(-2a^2b^2)+5a^2\cdot(6ab^3)$$

Now to solve the above expression, multiply coefficients and exponents separately and use product of powers property that is $a^m\times a^n=a^{m+n}$, therefore

$$
\begin{aligned}
5a^2(3a^3b-2a^2b^2+6ab^3)&=5a^2\cdot(3a^3b)+5a^2\cdot(-2a^2b^2)+5a^2\cdot(6ab^3)\\
&=5\times 3\cdot a^2\times a^3\cdot b+5\times(-2)\cdot a^2\times a^2\cdot b^2+5\times 6\cdot a^2\times a\cdot b^3\\
&=15\cdot a^{2+3}\cdot b-10\cdot a^{2+2}\cdot b^2+30\cdot a^{2+1}\cdot b^3\\
&=15a^5b-10a^4b^2+30a^3b^3
\end{aligned}
$$

Hence the product of $5a^2(3a^3b-2a^2b^2+6ab^3)$ is $\boxed{15a^5b-10a^4b^2+30a^3b^3}$

Answer 10CU.

Solve the equation $-2(w+1)+w=7-4w$

To solve the above equation, firstly apply the distributive property, therefore

$$-2(w+1)+w=7-4w$$
$$-2(w)+(-2)(1)+w=7-4w$$
$$-2w-2+w=7-4w$$

Combining like terms and solve the equation, therefore

$$-2w-2+w=7-4w$$
$$-w-2=7-4w$$
$$-w+4w-2=7 \quad \{\text{adding } 4w \text{ each side}\}$$
$$3w-2=7$$
$$3w=7+2 \quad \{\text{adding 2 each side}\}$$
$$3w=9$$
$$w=\frac{9}{3} \quad \{\text{dividing each side by 3}\}$$
$$w=3$$

Hence the solution of the equation $-2(w+1)+w=7-4w$ is $\boxed{3}$

Now check the solution by substituting it in the original equation.

The original equation is $-2(w+1)+w=7-4w$

Substitute $w=3$ in the above equation, therefore

$$-2(w+1)+w=7-4w$$
$$-2(3+1)+3=7-4(3) \quad \{w=3\}$$
$$-8+3=7-12 \quad \{\text{multiplying}\}$$
$$-5=-5 \quad \{\text{adding}\}$$

Answer 10PQ.

Find the product of $7x^2y(5x^2-3xy+y)$

To multiply $7x^2y$ with $(5x^2-3xy+y)$, firstly use the distributive property $a(b+c+d)=ab+ac+ad$, therefore

$$7x^2y(5x^2-3xy+y)=7x^2y\cdot(5x^2)+7x^2y\cdot(-3xy)+7x^2y\cdot(y)$$

Now to solve the above expression, multiply coefficients and exponents separately and use product of powers property that is $a^m \times a^n = a^{m+n}$, therefore

$$\begin{aligned} 7x^2y\left(5x^2-3xy+y\right) &= 7x^2y\cdot\left(5x^2\right)+7x^2y\cdot\left(-3xy\right)+7x^2y\cdot\left(y\right) \\ &= 7\times5\cdot x^2\times x^2\cdot y+7\times\left(-3\right)\cdot x^2\times x\cdot y\times y+7\cdot x^2\cdot y\times y \\ &= 35\cdot x^{2+2}\cdot y-21\cdot x^{1+2}\cdot y^{1+1}+7\cdot x^2\cdot y^{1+1} \\ &= 35x^4y-21x^3y^2+7x^2y^2 \end{aligned}$$

Hence the product of $7x^2y\left(5x^2-3xy+y\right)$ is $\boxed{35x^4y-21x^3y^2+7x^2y^2}$

Answer 11CU.

Solve the equation $x\left(x+2\right)-3x=x\left(x-4\right)+5$

To solve the above equation, firstly apply the distributive property, therefore

$$x\left(x+2\right)-3x=x\left(x-4\right)+5$$
$$x\left(x\right)+x\left(2\right)-3x=x\left(x\right)-x\left(4\right)+5$$
$$x^2+2x-3x=x^2-4x+5$$

Combining like terms and solve the equation, therefore

$$x^2+2x-3x=x^2-4x+5$$
$$x^2-x=x^2-4x+5$$
$$-x=-4x+5 \quad \{\text{subtracting } x^2 \text{ from each side}\}$$
$$-x+4x=5 \quad \{\text{adding } 4x \text{ each side}\}$$
$$3x=5 \quad \{\text{adding}\}$$
$$x=\frac{5}{3} \quad \{\text{dividing each side by } 3\}$$

Hence the solution of the equation $x\left(x+2\right)-3x=x\left(x-4\right)+5$ is $\boxed{\frac{5}{3}}$

Now check the solution by substituting it in the original equation.

The original equation is $x(x+2)-3x=x(x-4)+5$

Substitute $x=\frac{5}{3}$ in the above equation, therefore

$$x(x+2)-3x=x(x-4)+5$$
$$\frac{5}{3}\left(\frac{5}{3}+2\right)-3\left(\frac{5}{3}\right)=\frac{5}{3}\left(\frac{5}{3}-4\right)+5 \quad \left\{x=\frac{5}{3}\right\}$$
$$\frac{5}{3}\left(\frac{5+6}{3}\right)-3\left(\frac{5}{3}\right)=\frac{5}{3}\left(\frac{5-12}{3}\right)+5 \quad \{\text{L.C.M } 3\}$$
$$\frac{5}{3}\left(\frac{11}{3}\right)-3\left(\frac{5}{3}\right)=\frac{5}{3}\left(\frac{-7}{3}\right)+5 \quad \{\text{adding}\}$$
$$\frac{55}{9}-\frac{15}{3}=\frac{-35}{9}+5 \quad \{\text{multiplying}\}$$
$$\frac{55-45}{9}=\frac{-35+45}{9} \quad \{\text{L.C.M.}=9\}$$
$$\frac{10}{9}=\frac{10}{9} \quad \{\text{adding}\}$$

Answer 12CU.

Let *x* amount be deposited in the saving amount. Therefore the remaining amount be $(10,000-x)$

Now with the rest amount, Kenzie buys a certificate of deposit and earns 7% per year.

So the interest she will get $=(10,000-x)\times\frac{7}{100}$

And total amount of the certificate deposit $\text{CD}=\text{Principal}+\text{ interest}$

Therefore total amount of the certificate deposit is

$$\begin{aligned}\text{CD}&=\text{Principal} \quad + \text{ interest}\\&=(10,000-x)+\frac{(10,000-x)\times 7}{100}\\&=\frac{1,000,000-100x+70,000-7x}{100} \quad \{\text{L.C.M.}=100\}\\&=\frac{1070000-107x}{100} \quad \{\text{add }\}\end{aligned}$$
$$=\frac{10,70,000}{100}-\frac{107x}{100}$$
$$=10,700-1.07x$$

Hence the expression to represent the amount of CD is $\boxed{-1.07x+10,700}$

Answer 13CU.

Let x amount be deposited in the saving amount. Therefore the remaining amount be $(10,000 - x)$

She earns 4% per year into a saving account.

So, interest for saving is $\frac{x \times 4}{100}$

Now total amount for saving is $= \text{Principal} + \text{ interest}$

$$\begin{aligned} \text{Saving amount} &= \text{Principal} + \text{ interest} \\ &= x + \frac{4x}{100} \\ &= \frac{100x + 4x}{100} \\ &= \frac{104x}{100} \end{aligned}$$

Therefore total amount for saving is $\frac{104x}{100}$ ...... (1)

Now with the rest amount $(10,000 - x)$, Kenzie buys a certificate of deposit and earns 7% per year.

So the interest she will get $= (10,000 - x) \times \frac{7}{100}$

Now total amount of the certificate deposit $\text{CD} = \text{Principal} + \text{ interest}$

$$\begin{aligned} \text{CD} &= \text{Principal} \quad + \text{ interest} \\ &= (10,000 - x) + \frac{(10,000 - x) \times 7}{100} \\ &= \frac{1,000,000 - 100x + 70,000 - 7x}{100} \quad \{\text{L.C.M.} = 100\} \\ &= \frac{1070000 - 107x}{100} \quad \{\text{add}\} \end{aligned}$$

Therefore total amount of the certificate deposit is $\frac{1070000 - 107x}{100}$ ...... (2)

So, the total amount of money *T* she will have saved after one year is

$$\text{saving amount} + \text{certificate of deposit amount}$$

Therefore total amount *T* is

$$\begin{aligned} T &= \text{saving amount} + \text{CD} \\ &= \frac{104x}{100} + \frac{1070000 - 107x}{100} \quad \{\text{from equation (1) and (2)}\} \\ &= \frac{104x + 1070000 - 107x}{100} \quad \{\text{L.C.M.}=100\} \\ &= \frac{1070000 - 3x}{100} \end{aligned}$$

$$= 10700 - 0.03x$$

Hence the expression for the total amount *T* is $\boxed{10700 - 0.03x}$

Answer 14CU.

Let *x* amount be deposited in the saving amount. Therefore the remaining amount be $(10,000 - x)$

She earns 4% per year into a saving account.

So, interest for saving is $\frac{x \times 4}{100}$

Now total amount for saving is

$$\begin{aligned} \text{Saving amount} &= \text{Principal} + \text{interest} \\ &= x + \frac{4x}{100} \\ &= \frac{100x + 4x}{100} \\ &= \frac{104x}{100} \end{aligned}$$

Therefore total amount for saving is $\frac{104x}{100}$ ...... (1)

Now with the rest amount $(10,000 - x)$, Kenzie buys a certificate of deposit and earns 7% per year.

So the interest she will get $= (10,000 - x) \times \frac{7}{100}$

Now total amount of the certificate deposit $\text{CD} = \text{Principal} + \text{interest}$

$$\begin{aligned}
\text{CD} &= \text{Principal} \quad + \text{interest} \\
&= (10,000 - x) + \frac{(10,000 - x) \times 7}{100} \\
&= \frac{1,000,000 - 100x + 70,000 - 7x}{100} \quad \{\text{L.C.M.} = 100\} \\
&= \frac{1070000 - 107x}{100} \quad \{\text{add}\}
\end{aligned}$$

Therefore total amount of the certificate deposit is $\frac{1070000 - 107x}{100}$ ...... (2)

So, the total amount of money *T* she will have saved after one year is

$\text{saving amount} + \text{certificate of deposit amount}$

Therefore total amount *T* is

$$\begin{aligned}
T &= \text{saving amount} + \text{CD} \\
&= \frac{104x}{100} + \frac{1070000 - 107x}{100} \quad \{\text{from equation (1) and (2)}\} \\
&= \frac{104x + 1070000 - 107x}{100} \quad \{\text{L.C.M.=100}\} \\
&= \frac{1070000 - 3x}{100}
\end{aligned}$$

$= 10700 - 0.03x$ ...... (3)

Now she put $\$3000$ in savings therefore $x = 3000$

Substitute $x = 3000$ in above equation (3), therefore

$$\begin{aligned}
T &= 10700 - 0.03x \\
&= 10700 - 0.03(3000) \\
&= 10700 - 90 \\
&= 10603
\end{aligned}$$

Hence $\boxed{\$10603}$, she will have after one year.

Answer 15PA.

Find the product $r\left(5r+r^2\right)$

To multiply r with $5r+r^2$, firstly use the distributive property $a\left(b+c\right)=ab+ac$, therefore

$$r\left(5r+r^2\right)=r\cdot\left(5r\right)+r\cdot\left(r^2\right)$$

Now to solve the above expression $r\cdot\left(5r\right)+r\cdot\left(r^2\right)$, multiply coefficients and exponents separately and use product of powers property that is $a^m\times a^n=a^{m+n}$, therefore

$$\begin{aligned} r\left(5r+r^2\right) &= r\cdot\left(5r\right)+r\cdot\left(r^2\right) \\ &= 5\cdot r^1\times r^1+r\times r^2 \\ &= 5\cdot r^{1+1}+r^{1+2} \quad \{\text{product of power rule}\} \\ &= 5r^2+r^3 \end{aligned}$$

Hence the product of $r\left(5r+r^2\right)$ is $\boxed{5r^2+r^3}$

Answer 16PA.

Find the product $w\left(2w^3-9w^2\right)$

To multiply w with $2w^3-9w^2$, firstly use the distributive property $a\left(b-c\right)=ab-ac$, therefore

$$w\left(2w^3-9w^2\right)=w\cdot\left(2w^3\right)-w\cdot\left(9w^2\right)$$

Now to solve the above expression, multiply coefficients and exponents separately and use product of powers property that is $a^m\times a^n=a^{m+n}$, therefore

$$\begin{aligned} w\left(2w^3-9w^2\right) &= w\cdot\left(2w^3\right)-w\cdot\left(9w^2\right) \\ &= 2\cdot w\times w^3-9\cdot w\times w^2 \\ &= 2\cdot w^{1+3}-9w^{1+2} \quad \{\text{product of power rule}\} \\ &= 2w^4-9w^3 \end{aligned}$$

Hence the product of $w\left(2w^3-9w^2\right)$ is $\boxed{2w^4-9w^3}$

Answer 17PA.

Find the product $-4x(8+3x)$

To multiply $-4x$ with $8+3x$, firstly use the distributive property $a(b+c)=ab+ac$, therefore

$$-4x(8+3x)=(-4x)\cdot(8)+(-4x)\cdot(3x)$$

Now to solve the above expression, multiply coefficients and exponents separately and use product of powers property that is $a^m \times a^n = a^{m+n}$, therefore

$$\begin{aligned}-4x(8+3x)&=(-4x)\cdot(8)+(-4x)\cdot(3x)\\&=(-4)\times 8\cdot x+(-4)\times 3\cdot x\times x\\&=-32\cdot x-12x^{1+1} \qquad \{\text{product of power rule}\}\\&=-32x-12x^2\end{aligned}$$

Hence the product of $-4x(8+3x)$ is $\boxed{-32x-12x^2}$

Answer 18PA.

Find the product $5y(-2y^2-7y)$

To multiply $5y$ with $(-2y^2-7y)$, firstly use the distributive property $a(b-c)=ab-ac$, therefore

$$5y(-2y^2-7y)=5y\cdot(-2y^2)-5y\cdot(7y)$$

Now to solve the above expression, multiply coefficients and exponents separately and use product of powers property that is $a^m \times a^n = a^{m+n}$, therefore

$$\begin{aligned}5y(-2y^2-7y)&=5y\cdot(-2y^2)-5y\cdot(7y)\\&=5\times(-2)\cdot y\times y^2-5\times 7\cdot y\times y\\&=-10\cdot y^{1+2}-35y^{1+1} \qquad \{\text{product of power rule}\}\\&=-10y^3-35y^2\end{aligned}$$

Hence the product of $5y(-2y^2-7y)$ is $\boxed{-10y^3-35y^2}$

Answer 19PA.

Find the product $7ag\left(g^3+2ag\right)$

To multiply $7ag$ with $\left(g^3+2ag\right)$, firstly use the distributive property $a(b+c)=ab+ac$, therefore

$$7ag\left(g^3+2ag\right)=7ag\cdot\left(g^3\right)+7ag\cdot(2ag)$$

Now to solve the above expression, multiply coefficients and exponents separately and use product of powers property that is $a^m\times a^n=a^{m+n}$, therefore

$$\begin{aligned}7ag\left(g^3+2ag\right)&=7ag\cdot\left(g^3\right)+7ag\cdot(2ag)\\&=7a\cdot g\times g^3+7\times2\cdot a\times a\cdot g\times g\\&=7a\cdot g^{1+3}+14a^{1+1}g^{1+1}\qquad\{\text{product of power rule}\}\\&=7ag^4+14a^2g^2\end{aligned}$$

Hence the product of $7ag\left(g^3+2ag\right)$ is $\boxed{7ag^4+14a^2g^2}$

Answer 20PA.

Find the product $-3np\left(n^2-2p\right)$

To multiply $-3np$ with $\left(n^2-2p\right)$, firstly use the distributive property $a(b-c)=ab-ac$, therefore

$$-3np\left(n^2-2p\right)=(-3np)\cdot\left(n^2\right)-(-3np)\cdot(2p)$$

Now to solve the above expression, multiply coefficients and exponents separately and use product of powers property that is $a^m\times a^n=a^{m+n}$, therefore

$$\begin{aligned}-3np\left(n^2-2p\right)&=(-3np)\cdot\left(n^2\right)-(-3np)\cdot(2p)\\&=(-3p)\cdot n\times n^2-(-3)\times2\cdot n\cdot p\times p\\&=(-3p)\cdot n^{1+2}-(-6)np^{1+1}\qquad\{\text{product of power rule}\}\\&=-3pn^3+6np^2\end{aligned}$$

Hence the product of $-3np\left(n^2-2p\right)$ is $\boxed{-3pn^3+6np^2}$

Answer 21PA.

Find the product $-2b^2(3b^2-4b+9)$

To multiply $-2b^2$ with $3b^2-4b+9$, firstly use the distributive property, therefore

$$-2b^2(3b^2-4b+9)=(-2b^2)\cdot(3b^2)-(-2b^2)\cdot(4b)+(-2b^2)\cdot 9$$

Now to solve the above expression, multiply coefficients and exponents separately and use product of powers property that is $a^m \times a^n = a^{m+n}$, therefore

$$\begin{aligned}-2b^2(3b^2-4b+9)&=(-2b^2)\cdot(3b^2)-(-2b^2)\cdot(4b)+(-2b^2)\cdot 9\\&=(-2)\times 3\cdot b^2\times b^2-(-2)\times 4\cdot b^2\times b+(-2)\times 9\cdot b^2\\&=-6\cdot b^{2+2}-(-8)\cdot b^{2+1}+(-18)\cdot b^2\\&=-6b^4+8b^3-18b^2\end{aligned}$$

Hence the product of $-2b^2(3b^2-4b+9)$ is $\boxed{-6b^4+8b^3-18b^2}$

Answer 22PA.

Find the product $6x^3(5+3x-11x^2)$

To multiply $6x^3$ with $(5+3x-11x^2)$, firstly use the distributive property, therefore

$$6x^3(5+3x-11x^2)=6x^3\cdot(5)+6x^3\cdot(3x)-6x^3\cdot(11x^2)$$

Now to solve the above expression, multiply coefficients and exponents separately and use product of powers property that is $a^m \times a^n = a^{m+n}$, therefore

$$\begin{aligned}6x^3(5+3x-11x^2)&=6x^3\cdot(5)+6x^3\cdot(3x)-6x^3\cdot(11x^2)\\&=6\times 5\cdot x^3+6\times 3\cdot x^3\times x-6\times 11\cdot x^3\times x^2\\&=30x^3+18\cdot x^{3+1}-66\cdot x^{3+2}\\&=30x^3+18x^4-66x^5\end{aligned}$$

Hence the product of $6x^3(5+3x-11x^2)$ is $\boxed{30x^3+18x^4-66x^5}$

Answer 23PA.

Find the product $8x^2y(5x+2y^2-3)$

To multiply $8x^2y$ with $(5x+2y^2-3)$, firstly use the distributive property, therefore

$$8x^2y(5x+2y^2-3)=8x^2y\cdot(5x)+8x^2y\cdot(2y^2)-8x^2y\cdot(3)$$

Now to solve the above expression, multiply coefficients and exponents separately and use product of powers property that is $a^m \times a^n = a^{m+n}$, therefore

$$\begin{aligned}8x^2y(5x+2y^2-3)&=8x^2y\cdot(5x)+8x^2y\cdot(2y^2)-8x^2y\cdot(3)\\&=8\times5\cdot x^2\times x\cdot y+8\times2\cdot x^2\cdot y\times y^2-8\times3\cdot x^2\cdot y\\&=40x^{2+1}\cdot y+16\cdot x^2\cdot y^{1+2}-24\cdot x^2\cdot y\\&=40x^3y+16x^2y^3-24x^2y\end{aligned}$$

Hence the product of $8x^2y(5x+2y^2-3)$ is $\boxed{40x^3y+16x^2y^3-24x^2y}$

Answer 24PA.

Find the product $-cd^2(3d+2c^2d-4c)$

To multiply $-cd^2$ with $(3d+2c^2d-4c)$, firstly use the distributive property, therefore

$$-cd^2(3d+2c^2d-4c)=(-cd^2)\cdot(3d)+(-cd^2)\cdot(2c^2d)-(-cd^2)\cdot(4c)$$

Now to solve the above expression, multiply coefficients and exponents separately and use product of powers property that is $a^m \times a^n = a^{m+n}$, therefore

$$\begin{aligned}-cd^2(3d+2c^2d-4c)&=(-cd^2)\cdot(3d)+(-cd^2)\cdot(2c^2d)-(-cd^2)\cdot(4c)\\&=(-1)\times3\cdot c\cdot d^2\times d+(-1)\times2\cdot c\times c^2\cdot d\times d^2-(-1)\times4\cdot c\times c\cdot d^2\\&=-3\cdot c\cdot d^{2+1}-2\cdot c^{1+2}\cdot d^{1+2}-(-4)\cdot c^{1+1}\cdot d^2\\&=-3cd^3-2c^3d^3+4c^2d^2\end{aligned}$$

Hence the product of $-cd^2(3d+2c^2d-4c)$ is $\boxed{-3cd^3-2c^3d^3+4c^2d^2}$

Answer 25PA.

Find the product $-\frac{3}{4}hk^2\left(20k^2+5h-8\right)$

To multiply $-\frac{3}{4}hk^2$ with $\left(20k^2+5h-8\right)$, firstly use the distributive property, therefore

$$-\frac{3}{4}hk^2\left(20k^2+5h-8\right)=\left(-\frac{3}{4}hk^2\right)\cdot\left(20k^2\right)+\left(-\frac{3}{4}hk^2\right)\cdot\left(5h\right)-\left(-\frac{3}{4}hk^2\right)\cdot\left(8\right)$$

Now to solve the above expression, multiply coefficients and exponents separately and use product of powers property that is $a^m \times a^n = a^{m+n}$, therefore

$$\begin{aligned}-\frac{3}{4}hk^2\left(20k^2+5h-8\right)&=\left(-\frac{3}{4}hk^2\right)\cdot\left(20k^2\right)+\left(-\frac{3}{4}hk^2\right)\cdot\left(5h\right)-\left(-\frac{3}{4}hk^2\right)\cdot\left(8\right)\\&=\left(-\frac{3}{4}\right)\times 20\cdot h\cdot k^2\times k^2+\left(-\frac{3}{4}\right)\times 5\cdot h\times h\cdot k^2-\left(-\frac{3}{4}\right)\times 8\cdot h\cdot k^2\\&=-3\times 5\cdot h\cdot k^{2+2}-\frac{15}{4}\cdot h^{1+1}\cdot k^2-\left(-3\times 2\right)\cdot h\cdot k^2 \quad \{\text{cancelling 20 and 8 by 4}\}\\&=-15hk^4-\frac{15}{4}h^2k^2+6hk^2\end{aligned}$$

Hence the product of $-\frac{3}{4}hk^2\left(20k^2+5h-8\right)$ is $\boxed{-15hk^4-\frac{15}{4}h^2k^2+6hk^2}$

Answer 26PA.

Find the product $\frac{2}{3}a^2b\left(6a^3-4ab+9b^2\right)$

To multiply $\frac{2}{3}a^2b$ with $\left(6a^3-4ab+9b^2\right)$, firstly use the distributive property, therefore

$$\frac{2}{3}a^2b\left(6a^3-4ab+9b^2\right)=\left(\frac{2}{3}a^2b\right)\cdot\left(6a^3\right)-\left(\frac{2}{3}a^2b\right)\cdot\left(4ab\right)+\left(\frac{2}{3}a^2b\right)\cdot\left(9b^2\right)$$

Now to solve the above expression, multiply coefficients and exponents separately and use product of powers property that is $a^m \times a^n = a^{m+n}$, therefore

$$\begin{aligned}\frac{2}{3}a^2b\left(6a^3-4ab+9b^2\right)&=\left(\frac{2}{3}a^2b\right)\cdot\left(6a^3\right)-\left(\frac{2}{3}a^2b\right)\cdot\left(4ab\right)+\left(\frac{2}{3}a^2b\right)\cdot\left(9b^2\right)\\&=\left(\frac{2}{3}\right)\times 6\cdot a^2\times a^3\cdot b-\left(\frac{2}{3}\right)\times 4\cdot a^2\times a\cdot b\times b+\left(\frac{2}{3}\right)\times 9\cdot a^2\cdot b\times b^2\\&=2\times 2\cdot a^{2+3}\cdot b-\frac{8}{3}\cdot a^{2+1}\cdot b^{1+1}+\left(2\times 3\right)\cdot a^2\cdot b^{1+2} \quad \{\text{cancelling 6 and 9 by 3}\}\\&=4a^5b-\frac{8}{3}a^3b^2+6a^2b^3\end{aligned}$$

Hence the product of $\frac{2}{3}a^2b\left(6a^3-4ab+9b^2\right)$ is $\boxed{4a^5b-\frac{8}{3}a^3b^2+6a^2b^3}$

Answer 27PA.

Find the product $-5a^3b\left(2b+5ab-b^2+a^3\right)$

To multiply $-5a^3b$ with $\left(2b+5ab-b^2+a^3\right)$, firstly use the distributive property, therefore

$$\begin{aligned}&-5a^3b\left(2b+5ab-b^2+a^3\right)\\&=\left(-5a^3b\right)\cdot(2b)+\left(-5a^3b\right)\cdot(5ab)-\left(-5a^3b\right)\cdot\left(b^2\right)+\left(-5a^3b\right)\cdot\left(a^3\right)\end{aligned}$$

Now to solve the above expression, multiply coefficients and exponents separately and use product of powers property that is $a^m\times a^n=a^{m+n}$, therefore

$$\begin{aligned}&-5a^3b\left(2b+5ab-b^2+a^3\right)\\&=\left(-5a^3b\right)\cdot(2b)+\left(-5a^3b\right)\cdot(5ab)-\left(-5a^3b\right)\cdot\left(b^2\right)+\left(-5a^3b\right)\cdot\left(a^3\right)\\&=(-5)\times2\cdot a^3\cdot b\times b+(-5)\times5\cdot a^3\times a\cdot b\times b-(-5)\cdot a^3\cdot b\times b^2+(-5)\cdot a^3\times a^3\cdot b\\&=-10\cdot a^3\cdot b^{1+1}-25\cdot a^{3+1}\cdot b^{1+1}+5\cdot a^3\cdot b^{2+1}-5\cdot a^{3+3}\cdot b\\&=-10a^3b^2-25a^4b^2+5a^3b^3-5a^6b\end{aligned}$$

Hence the product of $-5a^3b\left(2b+5ab-b^2+a^3\right)$ is $\boxed{-10a^3b^2-25a^4b^2+5a^3b^3-5a^6b}$

Answer 28PA.

Find the product $4p^2q^2\left(2p^2-q^2+9p^3+3q\right)$

To multiply $4p^2q^2$ with $\left(2p^2-q^2+9p^3+3q\right)$, firstly use the distributive property, therefore

$$4p^2q^2\left(2p^2-q^2+9p^3+3q\right)=4p^2q^2\cdot\left(2p^2\right)-4p^2q^2\cdot\left(q^2\right)+4p^2q^2\cdot\left(9p^3\right)+4p^2q^2\cdot(3q)$$

Now to solve the above expression, multiply coefficients and exponents separately and use product of powers property that is $a^m\times a^n=a^{m+n}$, therefore

$$\begin{aligned}&4p^2q^2\left(2p^2-q^2+9p^3+3q\right)\\&=4p^2q^2\cdot\left(2p^2\right)-4p^2q^2\cdot\left(q^2\right)+4p^2q^2\cdot\left(9p^3\right)+4p^2q^2\cdot(3q)\\&=4\times2\cdot p^2\times p^2\cdot q^2-4\cdot p^2\cdot q^2\times q^2+4\times9\cdot p^2\times p^3\cdot q^2+4\times3\cdot p^2\cdot q^2\times q\\&=8\cdot p^{2+2}\cdot q^2-4\cdot p^2\cdot q^{2+2}+36\cdot p^{2+3}\cdot q^2+12\cdot p^2\cdot q^{2+1}\\&=8p^4q^2-4p^2q^4+36p^5q^2+12p^2q^3\end{aligned}$$

Hence the product of $4p^2q^2\left(2p^2-q^2+9p^3+3q\right)$ is $\boxed{8p^4q^2-4p^2q^4+36p^5q^2+12p^2q^3}$

Answer 29PA.

Simplify $d(-2d+4)+15d$

To simplify $d(-2d+4)+15d$, firstly apply the distributive property $a(b+c)=ab+ac$, therefore

$$d(-2d+4)+15d = d\cdot(-2d)+d\cdot 4+15d$$

Now use product of powers property that is $a^m \times a^n = a^{m+n}$, therefore

$$\begin{aligned} d(-2d+4)+15d &= d\cdot(-2d)+d\cdot 4+15d \\ &= (-2)\cdot d\times d+4d+15d \\ &= (-2)\cdot d^{1+1}+4d+15d \quad \{a^m\times a^n = a^{m+n}\} \\ &= (-2)d^2+4d+15d \end{aligned}$$

Combining like terms, therefore

$$\begin{aligned} d(-2d+4)+15d &= -2d^2+4d+15d \\ &= -2d^2+19d \end{aligned}$$

Hence the simplification of $d(-2d+4)+15d$ is $\boxed{-2d^2+19d}$

Answer 30PA.

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

To simplify $x(4x^2-2x)-5x^3$, firstly apply the distributive property $a(b-c)=ab-ac$, therefore

$$x(4x^2-2x)-5x^3 = x\cdot(4x^2)+x\cdot(-2x)-5x^3$$

Now use product of powers property that is $a^m \times a^n = a^{m+n}$, therefore

$$\begin{aligned} x(4x^2-2x)-5x^3 &= x\cdot(4x^2)+x\cdot(-2x)-5x^3 \\ &= 4\cdot x\times x^2+(-2)\cdot x\times x-5x^3 \\ &= 4\cdot x^{1+2}-2x^{1+1}-5x^3 \quad \{a^m\times a^n=a^{m+n}\} \\ &= 4x^3-2x^2-5x^3 \end{aligned}$$

Combining like terms, therefore

$$\begin{aligned} x(4x^2-2x)-5x^3 &= 4x^3-2x^2-5x^3 \\ &= 4x^3-5x^3-2x^2 \\ &= -x^3-2x^2 \end{aligned}$$

Hence the simplification of $x(4x^2-2x)-5x^3$ is $\boxed{-x^3-2x^2}$

Answer 31PA.

Simplify $3w(6w-4)+2(w^2-3w+5)$

To simplify $3w(6w-4)+2(w^2-3w+5)$, firstly apply the distributive property, therefore

$$3w(6w-4)+2(w^2-3w+5)=3w\cdot(6w)+3w\cdot(-4)+2(w^2)+2(-3w)+2(5)$$

Now use product of powers property that is $a^m \times a^n = a^{m+n}$, therefore

$$\begin{aligned} 3w(6w-4)+2(w^2-3w+5) &= 3w\cdot(6w)+3w\cdot(-4)+2(w^2)+2(-3w)+2(5) \\ &= 3\times 6\cdot w\times w+3\times(-4)\cdot w+2w^2+2\times(-3)\cdot w+10 \\ &= 18\cdot w^{1+1}-12w+2w^2-6w+10 \quad \{a^m\times a^n=a^{m+n}\} \\ &= 18w^2-12w+2w^2-6w+10 \end{aligned}$$

Combining like terms, therefore

$$\begin{aligned} 3w(6w-4)+2(w^2-3w+5) &= 18w^2-12w+2w^2-6w+10 \\ &= 18w^2+2w^2-12w-6w+10 \\ &= 20w^2-18w+10 \end{aligned}$$

Hence the simplification of $3w(6w-4)+2(w^2-3w+5)$ is $\boxed{20w^2-18w+10}$

Answer 32PA.

Simplify $5n(2n^3+n^2+8)+n(4-n)$

To simplify $5n(2n^3+n^2+8)+n(4-n)$, firstly apply the distributive property, therefore

$$5n(2n^3+n^2+8)+n(4-n)=5n\cdot(2n^3)+5n\cdot(n^2)+5n(8)+n(4)+n(-n)$$

Now use product of powers property that is $a^m \times a^n = a^{m+n}$, therefore

$$\begin{aligned}5n(2n^3+n^2+8)+n(4-n) &= 5n\cdot(2n^3)+5n\cdot(n^2)+5n(8)+n(4)+n(-n)\\ &= 5\times 2\cdot n\times n^3+5\cdot n\times n^2+5\times 8\cdot n+4n-n\times n\\ &= 10\cdot n^{1+3}+5\cdot n^{1+2}+40n+4n-n^2 \qquad \{a^m\times a^n=a^{m+n}\}\\ &= 10n^4+5n^3+40n+4n-n^2\end{aligned}$$

Combining like terms, therefore

$$\begin{aligned}5n(2n^3+n^2+8)+n(4-n) &= 10n^4+5n^3+40n+4n-n^2\\ &= 10n^4+5n^3-n^2+44n\end{aligned}$$

Hence the simplification of $5n(2n^3+n^2+8)+n(4-n)$ is $\boxed{10n^4+5n^3-n^2+44n}$

Answer 33PA.

Simplify $10(4m^3-3m+2)-2m(-3m^2-7m+1)$

To simplify $10(4m^3-3m+2)-2m(-3m^2-7m+1)$, firstly apply the distributive property, therefore

$$\begin{aligned}&10(4m^3-3m+2)-2m(-3m^2-7m+1)\\ &=10\cdot(4m^3)+10\cdot(-3m)+10\cdot(2)-2m\cdot(-3m^2)-2m(-7m)-2m(1)\end{aligned}$$

Now use product of powers property that is $a^m \times a^n = a^{m+n}$, therefore

$$10(4m^3 - 3m + 2) - 2m(-3m^2 - 7m + 1)$$
$$= 10\cdot(4m^3) + 10\cdot(-3m) + 10\cdot(2) - 2m\cdot(-3m^2) - 2m(-7m) - 2m(1)$$
$$= 10\times 4\cdot m^3 + 10\times(-3)\cdot m + 20 - 2\times(-3)\cdot m\times m^2 - 2\times(-7)\cdot m\times m - 2m$$
$$= 40\cdot m^3 - 30m + 20 + 6m^{1+2} + 14m^{1+1} - 2m \qquad \{a^m \times a^n = a^{m+n}\}$$
$$= 40m^3 - 30m + 20 + 6m^3 + 14m^2 - 2m$$

Combining like terms, therefore

$$10(4m^3 - 3m + 2) - 2m(-3m^2 - 7m + 1)$$
$$= 40m^3 - 30m + 20 + 6m^3 + 14m^2 - 2m$$
$$= 40m^3 + 6m^3 + 14m^2 - 30m - 2m + 20$$
$$= 46m^3 + 14m^2 - 32m + 20$$

Hence the simplification of $10(4m^3 - 3m + 2) - 2m(-3m^2 - 7m + 1)$ is

$$\boxed{46m^3 + 14m^2 - 32m + 20}$$

Answer 34PA.

Simplify $4y(y^2 - 8y + 6) - 3(2y^3 - 5y^2 + 2)$

To simplify $4y(y^2 - 8y + 6) - 3(2y^3 - 5y^2 + 2)$, firstly apply the distributive property, therefore

$$4y(y^2 - 8y + 6) - 3(2y^3 - 5y^2 + 2)$$
$$= 4y\cdot(y^2) + 4y\cdot(-8y) + 4y\cdot(6) - 3\cdot(2y^3) - 3(-5y^2) - 3(2)$$

Now use product of powers property that is $a^m \times a^n = a^{m+n}$, therefore

$$4y(y^2 - 8y + 6) - 3(2y^3 - 5y^2 + 2)$$
$$= 4y\cdot(y^2) + 4y\cdot(-8y) + 4y\cdot(6) - 3\cdot(2y^3) - 3(-5y^2) - 3(2)$$
$$= 4\cdot y\times y^2 + 4\times(-8)\cdot y\times y + 4\times 6\cdot y - 3\times 2\cdot y^3 - 3\times(-5)\cdot y^2 - 6$$
$$= 4\cdot y^{1+2} - 32\cdot y^{1+1} + 24y - 6y^3 + 15y^2 - 6 \qquad \{a^m \times a^n = a^{m+n}\}$$
$$= 4y^3 - 32y^2 + 24y - 6y^3 + 15y^2 - 6$$

Combining like terms, therefore

$$4y\left(y^2-8y+6\right)-3\left(2y^3-5y^2+2\right)$$
$$=4y^3-32y^2+24y-6y^3+15y^2-6$$
$$=4y^3-6y^3-32y^2+15y^2+24y-6$$
$$=-2y^3-17y^2+24y-6$$

Hence the simplification of $4y\left(y^2-8y+6\right)-3\left(2y^3-5y^2+2\right)$ is $\boxed{-2y^3-17y^2+24y-6}$

Answer 35PA.

Simplify $-3c^2(2c+7)+4c\left(3c^2-c+5\right)+2\left(c^2-4\right)$

To simplify $-3c^2(2c+7)+4c\left(3c^2-c+5\right)+2\left(c^2-4\right)$, firstly apply the distributive property, therefore

$$-3c^2(2c+7)+4c\left(3c^2-c+5\right)+2\left(c^2-4\right)$$
$$=\left(-3c^2\right)\cdot(2c)+\left(-3c^2\right)\cdot(7)+4c\cdot\left(3c^2\right)+4c\cdot(-c)+4c(5)+2\left(c^2\right)+2(-4)$$

Now use product of powers property that is $a^m\times a^n=a^{m+n}$, therefore

$$-3c^2(2c+7)+4c\left(3c^2-c+5\right)+2\left(c^2-4\right)$$
$$=\left(-3c^2\right)\cdot(2c)+\left(-3c^2\right)\cdot(7)+4c\cdot\left(3c^2\right)+4c\cdot(-c)+4c(5)+2\left(c^2\right)+2(-4)$$
$$=(-3)\times 2\cdot c^2\times c+(-3)\times 7\cdot c^2+4\times 3\cdot c\times c^2+4\times(-1)\cdot c\times c+4\times 5\cdot c+2c^2-8$$
$$=-6\cdot c^{2+1}-21\cdot c^2+12\cdot c^{1+2}-4\cdot c^{1+1}+20c+2c^2-8 \qquad \left\{a^m\times a^n=a^{m+n}\right\}$$
$$=-6c^3-21c^2+12c^3-4c^2+20c+2c^2-8$$

Combining like terms, therefore

$$-3c^2(2c+7)+4c\left(3c^2-c+5\right)+2\left(c^2-4\right)$$
$$=-6c^3-21c^2+12c^3-4c^2+20c+2c^2-8$$
$$=-6c^3+12c^3-21c^2-4c^2+2c^2+20c-8$$
$$=6c^3-23c^2+20c-8$$

Hence the simplification of $-3c^2(2c+7)+4c\left(3c^2-c+5\right)+2\left(c^2-4\right)$ is $\boxed{6c^3-23c^2+20c-8}$

Answer 36PA.

Simplify $4x^2(x+2)+3x(5x^2+2x-6)-5(3x^2-4x)$

To simplify $4x^2(x+2)+3x(5x^2+2x-6)-5(3x^2-4x)$, firstly apply the distributive property, therefore

$$\begin{aligned}&4x^2(x+2)+3x(5x^2+2x-6)-5(3x^2-4x)\\&=4x^2\cdot(x)+4x^2\cdot(2)+3x\cdot(5x^2)+3x\cdot(2x)+3x(-6)-5(3x^2)-5(-4x)\end{aligned}$$

Now use product of powers property that is $a^m \times a^n = a^{m+n}$, therefore

$$\begin{aligned}&4x^2(x+2)+3x(5x^2+2x-6)-5(3x^2-4x)\\&=4x^2\cdot(x)+4x^2\cdot(2)+3x\cdot(5x^2)+3x\cdot(2x)+3x(-6)-5(3x^2)-5(-4x)\\&=4\cdot x^2\times x+4\times 2\cdot x^2+3\times 5\cdot x\times x^2+3\times 2\cdot x\times x+3\times(-6)\cdot x-5\times 3\cdot x^2-5\times(-4)\cdot x\\&=4\cdot x^{2+1}+8\cdot x^2+15\cdot x^{1+2}+6\cdot x^{1+1}-18x-15x^2+20x \qquad \{a^m\times a^n=a^{m+n}\}\\&=4x^3+8x^2+15x^3+6x^2-18x-15x^2+20x\end{aligned}$$

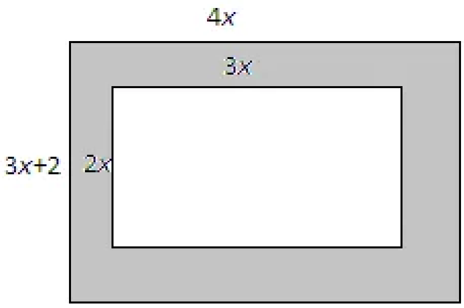
Combining like terms, therefore

$$\begin{aligned}&4x^2(x+2)+3x(5x^2+2x-6)-5(3x^2-4x)\\&=4x^3+8x^2+15x^3+6x^2-18x-15x^2+20x\\&=4x^3+15x^3+8x^2+6x^2-15x^2-18x+20x\\&=19x^3-x^2+2x\end{aligned}$$

Hence the simplification of $4x^2(x+2)+3x(5x^2+2x-6)-5(3x^2-4x)$ is $\boxed{19x^3-x^2+2x}$

Answer 37PA.

Find the area of the below shaded region



To find the area of the shaded region, firstly find the area of the internal rectangle whose length (l) is $3x$ and breadth (b) is $2x$.

The area of a rectangle can be found by using the formula $A = l \times b$, where A is the area, l is the length and b is the breadth of the rectangle.

So substituting $l = 3x$ and $b = 2x$ in the above formula of area, therefore

$$\begin{aligned}A&=l\times b\\&=3x\times 2x\\&=6x^2\end{aligned}$$

Now find the area of the external rectangle whose length (l) is $4x$ and breadth (b) is $3x+2$

Again substituting the length of the rectangle that is $l=4x$ and breadth $b=3x+2$ in the above formula of area that is $A=l\times b$, therefore

$$\begin{aligned} A &= l\times b \\ &= 4x\times(3x+2) \\ &= 4x\times 3x+4x\times 2 \quad \{\text{distributive property}\} \\ &= 12x^2+8x \end{aligned}$$

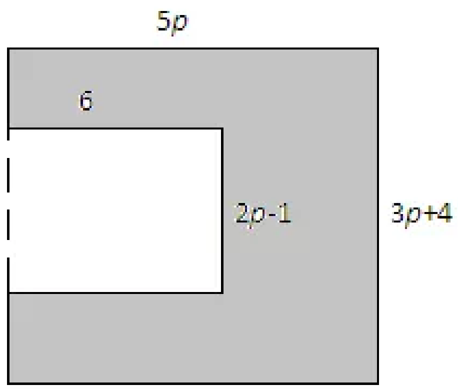
Now to find the area of the shaded region, subtract the area of the internal rectangle from the area of the external rectangle, therefore

$$\begin{aligned} \text{Area of shaded region} &= \text{area of external retangle} - \text{area of the internal rectangle} \\ &= (12x^2+8x)-6x^2 \\ &= 12x^2+8x-6x^2 \\ &= 6x^2+8x \quad \{\text{combining like terms}\} \end{aligned}$$

Hence the area of the shaded region is $\boxed{6x^2+8x}$

Answer 38PA.

Find the area of the below shaded region



To find the area of the shaded region, firstly find the area of the internal rectangle whose length (l) is 6 and breadth (b) is $2p-1$.

The area of a rectangle can be found by using the formula $A=l\times b$, where *A* is the area, *l* is the length and *b* is the breadth of the rectangle.

So substituting $l=6$ and $b=2p-1$ in the above formula of area, therefore

$$\begin{aligned} A &= l\times b \\ &= 6\times(2p-1) \\ &= 12p-6 \end{aligned}$$

Now find the area of the external rectangle whose length (l) is 5*p* and breadth (b) is $3p+4$

Again substituting the length of the rectangle that is $l=5p$ and breadth $b=3p+4$ in the above formula of area that is $A=l\times b$, therefore

$$\begin{aligned}A&=l\times b\\&=5p\times(3p+4)\\&=5p\times 3p+5p\times 4 \quad \{\text{distributive property}\}\\&=15p^2+20p\end{aligned}$$

Now to find the area of the shaded region, subtract the area of the internal rectangle from the area of the external rectangle, therefore

$$\begin{aligned}\text{Area of shaded region}&=\text{area of external retangle}-\text{area of the internal rectangle}\\&=(15p^2+20p)-(12p-6)\\&=15p^2+20p-12p+6\\&=15p^2+8p+6 \qquad \{\text{combining like terms}\}\end{aligned}$$

Hence the area of the shaded region is $\boxed{15p^2+8p+6}$

Answer 39PA.

Solve the equation $2(4x-7)=5(-2x-9)-5$

To solve the above equation, firstly apply the distributive property, therefore

$$\begin{aligned}&2(4x-7)=5(-2x-9)-5\\&2(4x)+2(-7)=5(-2x)+5(-9)-5\\&8x-14=-10x-45-5\end{aligned}$$

Combining like terms and solve the equation, therefore

$$\begin{aligned}2(4x-7)&=5(-2x-9)-5\\8x-14&=-10x-45-5\\8x-14&=-10x-50 \quad \{\text{combining like terms}\}\\8x+10x-14&=-50 \qquad \{\text{adding } 10x \text{ each side}\}\\18x&=-50+14 \quad \{\text{adding 14 each side}\}\\18x&=-36\\x&=-\frac{36}{18} \qquad \{\text{dividing each side by 18}\}\\x&=-2\end{aligned}$$

Hence the solution of the equation $2(4x-7)=5(-2x-9)-5$ is $\boxed{-2}$

Now check the solution by substituting it in the original equation.

The original equation is $2(4x-7)=5(-2x-9)-5$

Substitute $x=-2$ in the above equation, therefore

$$\begin{aligned} 2(4x-7)&=5(-2x-9)-5 \\ 2(4(-2)-7)&=5(-2(-2)-9)-5 \quad \{x=-2\} \\ 2(-8-7)&=5(4-9)-5 \quad \{\text{multiplying}\} \\ 2(-15)&=5(-5)-5 \quad \{\text{adding}\} \end{aligned}$$

$$-30=-25-5$$
$$-30=-30$$

Answer 40PA.

Solve the equation $2(5a-12)=-6(2a-3)+2$

To solve the above equation, firstly apply the distributive property, therefore

$$\begin{aligned} 2(5a-12)&=-6(2a-3)+2 \\ 2(5a)+2(-12)&=-6(2a)-6(-3)+2 \\ 10a-24&=-12a+18+2 \end{aligned}$$

Combining like terms and solve the equation, therefore

$$\begin{aligned} 2(5a-12)&=-6(2a-3)+2 \\ 10a-24&=-12a+18+2 \\ 10a-24&=-12a+20 \quad \{\text{combining like terms}\} \\ 10a+12a-24&=20 \quad \{\text{adding } 12a \text{ each side}\} \end{aligned}$$

$$22a=20+24 \quad \{\text{adding 24 each side}\}$$
$$22a=44$$
$$a=\frac{44}{22} \quad \{\text{dividing each side by 22}\}$$
$$a=2$$

Hence the solution of the equation $2(5a-12)=-6(2a-3)+2$ is $\boxed{2}$

Now check the solution by substituting it in the original equation.

The original equation is $2(5a-12)=-6(2a-3)+2$

Substitute $a=2$ in the above equation, therefore

$$\begin{aligned} 2(5a-12)&=-6(2a-3)+2 \\ 2(5(2)-12)&=-6(2(2)-3)+2 \quad \{x=2\} \\ 2(10-12)&=-6(4-3)+2 \quad \{\text{multiplying}\} \\ 2(-2)&=-6(1)+2 \quad \{\text{adding}\} \end{aligned}$$

$$-4=-6+2$$
$$-4=-4$$

Answer 41PA.

Solve the equation $4(3p+9)-5=-3(12p-5)$

To solve the above equation, firstly apply the distributive property, therefore

$$4(3p+9)-5=-3(12p-5)$$
$$4(3p)+4(9)-5=-3(12p)-3(-5)$$
$$12p+36-5=-36p+15$$

Combining like terms and solve the equation, therefore

$$4(3p+9)-5=-3(12p-5)$$
$$12p+36-5=-36p+15$$
$$12p+31=-36p+15 \quad \{\text{combining like terms}\}$$
$$12p+36p+31=15 \quad \{\text{adding } 36p \text{ each side}\}$$
$$48p=15-31 \quad \{\text{subtract } 31 \text{ from each side}\}$$
$$48p=-16$$
$$p=-\frac{16}{48} \quad \{\text{dividing each side by } 48\}$$
$$p=-\frac{1}{3}$$

Hence the solution of the equation $4(3p+9)-5=-3(12p-5)$ is $\boxed{-\frac{1}{3}}$

Now check the solution by substituting it in the original equation.

The original equation is $4(3p+9)-5=-3(12p-5)$

Substitute $p=-\frac{1}{3}$ in the above equation, therefore

$$4(3p+9)-5=-3(12p-5)$$
$$4\left(3\left(-\frac{1}{3}\right)+9\right)-5=-3\left(12\left(-\frac{1}{3}\right)-5\right) \quad \left\{p=\left(-\frac{1}{3}\right)\right\}$$
$$4(-1+9)-5=-3(-4-5) \quad \{\text{multiplying}\}$$
$$4(8)-5=-3(-9) \quad \{\text{adding}\}$$
$$32-5=27 \quad \{\text{multiplying}\}$$
$$27=27$$

Answer 42PA.

Solve the equation $7(8w-3)+13=2(6w+7)$

To solve the above equation, firstly apply the distributive property, therefore

$$7(8w-3)+13=2(6w+7)$$
$$7(8w)+7(-3)+13=2(6w)+2(7)$$
$$56w-21+13=12w+14$$

Combining like terms and solve the equation, therefore

$$7(8w-3)+13=2(6w+7)$$
$$56w-21+13=12w+14$$
$$56w-8=12w+14 \quad \{\text{combining like terms}\}$$
$$56w-12w-8=14 \quad \{\text{subtract } 12w \text{ from each side}\}$$
$$44w=14+8 \quad \{\text{adding 8 each side}\}$$
$$44w=22$$
$$w=\frac{22}{44} \quad \{\text{dividing each side by 44}\}$$
$$w=\frac{1}{2}$$

Hence the solution of the equation $7(8w-3)+13=2(6w+7)$ is $\boxed{\frac{1}{2}}$

Now check the solution by substituting it in the original equation.

The original equation is $7(8w-3)+13=2(6w+7)$

Substitute $w=\frac{1}{2}$ in the above equation, therefore

$$7(8w-3)+13=2(6w+7)$$
$$7\left(8\left(\frac{1}{2}\right)-3\right)+13=2\left(6\left(\frac{1}{2}\right)+7\right) \quad \left\{w=\frac{1}{2}\right\}$$
$$7(4-3)+13=2(3+7) \quad \{\text{multiplying}\}$$
$$7(1)+13=2(10) \quad \{\text{adding}\}$$
$$7+13=20$$
$$20=20$$

Answer 43PA.

Solve the equation $d(d-1)+4d=d(d-8)$

To solve the above equation, firstly apply the distributive property, therefore

$$\begin{aligned} d(d-1)+4d &= d(d-8) \\ d(d)+d(-1)+4d &= d(d)+d(-8) \\ d^2-d+4d &= d^2-8d \end{aligned}$$

Combining like terms and solve the equation, therefore

$$\begin{aligned} d^2-d+4d &= d^2-8d \\ d^2+3d &= d^2-8d && \{\text{combining like terms}\} \\ 3d &= -8d && \{\text{subtract } d^2 \text{ from each side}\} \\ 3d+8d &= 0 && \{\text{adding 8d each side}\} \\ 11d &= 0 \\ d &= \frac{0}{11} && \{\text{dividing each side by } 11\} \\ d &= 0 \end{aligned}$$

Hence the solution of the equation $d(d-1)+4d=d(d-8)$ is $\boxed{0}$

Now check the solution by substituting it in the original equation.

The original equation is $d(d-1)+4d=d(d-8)$

Substitute $d=0$ in the above equation, therefore

$$\begin{aligned} d(d-1)+4d &= d(d-8) \\ 0(0-1)+4(0) &= 0(0-8) && \{d=0\} \\ 0+0 &= 0 && \{\text{multiplying}\} \\ 0 &= 0 \end{aligned}$$

Answer 44PA.

Solve the equation $c(c+3)-c(c-4)=9c-16$

To solve the above equation, firstly apply the distributive property, therefore

$$\begin{aligned} c(c+3)-c(c-4)&=9c-16 \\ c(c)+c(3)-c(c)-c(-4)&=9c-16 \\ c^2+3c-c^2+4c&=9c-16 \end{aligned}$$

Combining like terms and solve the equation, therefore

$$\begin{aligned} c^2+3c-c^2+4c&=9c-16 \\ 7c&=9c-16 \quad \{\text{combining like terms, cencelling } c^2\} \\ 7c-9c&=-16 \quad \{\text{subtract } 9c \text{ from each side}\} \\ -2c&=-16 \quad \{\text{adding}\} \\ c&=\frac{-16}{-2} \quad \{\text{dividing each side by } -2\} \\ c&=8 \end{aligned}$$

Hence the solution of the equation $c(c+3)-c(c-4)=9c-16$ is $\boxed{8}$

Now check the solution by substituting it in the original equation.

The original equation is $c(c+3)-c(c-4)=9c-16$

Substitute $c=8$ in the above equation, therefore

$$\begin{aligned} c(c+3)-c(c-4)&=9c-16 \\ 8(8+3)-8(8-4)&=9(8)-16 \quad \{c=8\} \\ 8(11)-8(4)&=9(8)-16 \quad \{\text{adding}\} \\ 88-32&=72-16 \quad \{\text{multiplying}\} \\ 56&=56 \quad \{\text{adding}\} \end{aligned}$$

Answer 45PA.

Solve the equation $y(y+12)-8y=14+y(y-4)$

To solve the above equation, firstly apply the distributive property, therefore

$$\begin{aligned} y(y+12)-8y&=14+y(y-4) \\ y(y)+y(12)-8y&=14+y(y)-4(y) \\ y^2+12y-8y&=14+y^2-4y \end{aligned}$$

Combining like terms and solve the equation, therefore

$$y^2+12y-8y=14+y^2-4y$$

$$y^2+4y=14+y^2-4y \qquad \{\text{combining like terms}\}$$

$$4y=14-4y \qquad \{\text{subtract } y^2 \text{ from each side}\}$$

$$4y+4y=14 \qquad \{\text{adding } 4y \text{ each side}\}$$

$$8y=14 \qquad \{\text{adding}\}$$

$$y=\frac{14}{8} \qquad \{\text{dividing each side by 8}\}$$

$$y=\frac{7}{4} \qquad \{\text{cancelling by 2}\}$$

Hence the solution of the equation $y(y+12)-8y=14+y(y-4)$ is $\boxed{\frac{7}{4}}$

Now check the solution by substituting it in the original equation.

The original equation is $y(y+12)-8y=14+y(y-4)$

Substitute $y=\frac{7}{4}$ in the above equation, therefore

$$y(y+12)-8y=14+y(y-4)$$

$$\frac{7}{4}\left(\frac{7}{4}+12\right)-8\left(\frac{7}{4}\right)=14+\frac{7}{4}\left(\frac{7}{4}-4\right) \qquad \left\{y=\frac{7}{4}\right\}$$

$$\frac{7}{4}\left(\frac{7+48}{4}\right)-2(7)=14+\frac{7}{4}\left(\frac{7-16}{4}\right) \qquad \{\text{solving}\}$$

$$\frac{7}{4}\left(\frac{55}{4}\right)-14=14+\frac{7}{4}\left(\frac{-9}{4}\right)$$

$$\frac{385}{16}-14=14-\frac{63}{16}$$

$$\frac{385-224}{16}=\frac{224-63}{16}$$

$$\frac{161}{16}=\frac{161}{16}$$

Answer 46PA.

Solve the equation $k(k-7)+10=2k+k(k+6)$

To solve the above equation, firstly apply the distributive property, therefore

$$k(k-7)+10=2k+k(k+6)$$
$$k(k)+k(-7)+10=2k+k(k)+k(6)$$
$$k^2-7k+10=2k+k^2+6k$$

Combining like terms and solve the equation, therefore

$$k^2-7k+10=2k+k^2+6k$$
$$k^2-7k+10=k^2+8k \qquad \{\text{combining like terms}\}$$
$$-7k+10=8k \qquad \{\text{subtract } k^2 \text{ from each side}\}$$
$$10=8k+7k \qquad \{\text{adding } 7k \text{ each side}\}$$
$$10=15k \qquad \{\text{adding}\}$$
$$\frac{10}{15}=k \qquad \{\text{dividing each side by } 15\}$$
$$\frac{2}{3}=k$$

Hence the solution of the equation $k(k-7)+10=2k+k(k+6)$ is $\boxed{\frac{2}{3}}$

Now check the solution by substituting it in the original equation.

The original equation is $k(k-7)+10=2k+k(k+6)$

Substitute $k=\frac{2}{3}$ in the above equation, therefore

$$k(k-7)+10=2k+k(k+6)$$
$$\frac{2}{3}\left(\frac{2}{3}-7\right)+10=2\left(\frac{2}{3}\right)+\frac{2}{3}\left(\frac{2}{3}+6\right) \qquad \left\{k=\frac{2}{3}\right\}$$
$$\frac{2}{3}\left(\frac{2-21}{3}\right)+10=\frac{4}{3}+\frac{2}{3}\left(\frac{2+18}{3}\right) \qquad \{\text{solving}\}$$
$$\frac{2}{3}\left(\frac{-19}{3}\right)+10=\frac{4}{3}+\frac{2}{3}\left(\frac{20}{3}\right)$$
$$\frac{2}{3}\left(\frac{-19}{3}\right)+10=\frac{4}{3}+\frac{2}{3}\left(\frac{20}{3}\right)$$
$$\frac{-38}{9}+10=\frac{4}{3}+\frac{40}{9}$$
$$\frac{-38+90}{9}=\frac{12+40}{9}$$
$$\frac{52}{9}=\frac{52}{9}$$

Answer 47PA.

Solve the equation $2n(n+4)+18=n(n+5)+n(n-2)-7$

To solve the above equation, firstly apply the distributive property, therefore

$$2n(n+4)+18=n(n+5)+n(n-2)-7$$
$$2n(n)+2n(4)+18=n(n)+n(5)+n(n)+n(-2)-7$$
$$2n^2+8n+18=n^2+5n+n^2-2n-7$$

Combining like terms and solve the equation, therefore

$$2n^2+8n+18=2n^2+3n-7 \quad \{\text{combining like terms}\}$$
$$8n+18=3n-7 \quad \{\text{subtract } 2n^2 \text{ from each side}\}$$
$$8n-3n+18=-7 \quad \{\text{subtract } 3n \text{ from each side}\}$$
$$5n+18=-7$$
$$5n=-7-18 \quad \{\text{subtract 18 from each side}\}$$
$$5n=-25 \quad \{\text{adding}\}$$
$$n=-\frac{25}{5} \quad \{\text{dividing each side by 5}\}$$
$$n=-5$$

Hence the solution of the equation $2n(n+4)+18=n(n+5)+n(n-2)-7$ is $\boxed{-5}$

Now check the solution by substituting it in the original equation.

The original equation is $2n(n+4)+18=n(n+5)+n(n-2)-7$

Substitute $n=-5$ in the above equation, therefore

$$2n(n+4)+18=n(n+5)+n(n-2)-7$$
$$2(-5)(-5+4)+18=-5(-5+5)+(-5)(-5-2)-7 \quad \{n=-5\}$$
$$-10(-1)+18=-5(0)-5(-7)-7 \quad \{\text{solving}\}$$
$$10+18=0+35-7$$
$$28=28$$

Answer 48PA.

Solve the equation $3g(g-4)-2g(g-7)=g(g+6)-28$

To solve the above equation, firstly apply the distributive property, therefore

$$3g(g-4)-2g(g-7)=g(g+6)-28$$
$$3g(g)+3g(-4)-2g(g)-2g(-7)=g(g)+g(6)-28$$
$$3g^2-12g-2g^2+14g=g^2+6g-28$$

Combining like terms and solve the equation, therefore

$$3g^2-12g-2g^2+14g=g^2+6g-28$$
$$g^2+2g=g^2+6g-28 \quad \{\text{combining like terms}\}$$
$$2g=6g-28 \quad \{\text{subtract } g^2 \text{ from each side}\}$$
$$2g-6g=-28 \quad \{\text{subtract } 6g \text{ from each side}\}$$
$$-4g=-28$$
$$g=\frac{-28}{-4} \quad \{\text{dividing each side by } -4\}$$
$$g=7$$

Hence the solution of the equation $3g(g-4)-2g(g-7)=g(g+6)-28$ is $\boxed{7}$

Now check the solution by substituting it in the original equation.

The original equation is $3g(g-4)-2g(g-7)=g(g+6)-28$

Substitute $g=7$ in the above equation, therefore

$$3g(g-4)-2g(g-7)=g(g+6)-28$$
$$3\times7(7-4)-2\times7(7-7)=7(7+6)-28 \quad \{g=7\}$$
$$21(3)-14(0)=7(13)-28 \quad \{\text{solving}\}$$
$$63-0=91-28$$
$$63=63$$

Answer 49PA.

Let *x* amount be deposited in the saving amount. Therefore the remaining amount be $(6000-x)$

She earns 3% per year into a saving account.

So, interest for saving is $\frac{x\times 3}{100}$

Now total amount for saving is $=\text{Principal}+\text{ interest}$

$$\begin{aligned}\text{Saving amount} &= \text{Principal}+\text{ interest}\\ &= x+\frac{3x}{100}\\ &= \frac{100x+3x}{100}\\ &= \frac{103x}{100}\end{aligned}$$

Therefore total amount for saving is $\frac{103x}{100}$ ...... (1)

Now with the rest amount $(6000-x)$, Marta buys a certificate of deposit and earns 6% per year.

So the interest she will get $=(6000-x)\times\frac{6}{100}$

Now total amount of the certificate deposit $\text{CD}=\text{Principal}+\text{ interest}$

$$\begin{aligned}\text{CD} &= \text{Principal} + \text{ interest}\\ &= (6000-x)+\frac{(6000-x)\times 6}{100}\\ &= \frac{600000-100x+36,000-6x}{100} && \{\text{L.C.M.}=100\}\\ &= \frac{636000-106x}{100} && \{\text{add }\}\end{aligned}$$

Therefore total amount of the certificate deposit is $\frac{636000-106x}{100}$ ...... (2)

So, the total amount of money T she will have saved after one year is

$\text{saving amount} + \text{certificate of deposit amount}$

Therefore total amount T is

$$\begin{aligned} T &= \text{saving amount} + \text{CD} \\ &= \frac{103x}{100} + \frac{636000 - 106x}{100} \quad \{\text{from equation (1) and (2)}\} \\ &= \frac{103x + 636000 - 106x}{100} \quad \{\text{L.C.M.=100}\} \\ &= \frac{636000 - 3x}{100} \\ &= 6360 - 0.03x \end{aligned}$$

Hence the expression for the total amount T is $\boxed{6360 - 0.03x}$

Answer 50PA.

Let x amount be deposited in the saving amount. Therefore the remaining amount be $(6000 - x)$

She earns 3% per year into a saving account.

So, interest for saving is $\frac{x \times 3}{100}$

Now total amount for saving is $= \text{Principal} + \text{ interest}$

$$\begin{aligned} \text{Saving amount} &= \text{Principal} + \text{ interest} \\ &= x + \frac{3x}{100} \\ &= \frac{100x + 3x}{100} \\ &= \frac{103x}{100} \end{aligned}$$

Therefore total amount for saving is $\frac{103x}{100}$ ...... (1)

Now with the rest amount $(6000 - x)$, Marta buys a certificate of deposit and earns 6% per year.

So the interest she will get $= (6000 - x) \times \frac{6}{100}$

Now total amount of the certificate deposit $\text{CD} = \text{Principal} + \text{interest}$

$$\begin{aligned}\text{CD} &= \text{Principal} + \text{interest}\\ &= (6000-x) + \frac{(6000-x)\times 6}{100}\\ &= \frac{600000-100x+36,000-6x}{100} \quad \{\text{L.C.M.} = 100\}\\ &= \frac{636000-106x}{100} \quad \{\text{add}\}\end{aligned}$$

Therefore total amount of the certificate deposit is $\frac{636000-106x}{100}$ ...... (2)

So, the total amount of money T she will have saved after one year is $\text{saving amount} + \text{certificate of deposit amount}$

Therefore total amount T is

$$\begin{aligned}T &= \text{saving amount} + \text{CD}\\ &= \frac{103x}{100} + \frac{636000-106x}{100} \quad \{\text{from equation (1) and (2)}\}\\ &= \frac{103x+636000-106x}{100} \quad \{\text{L.C.M.=100}\}\\ &= \frac{636000-3x}{100}\\ &= 6360-0.03x \quad \text{...... (3)}\end{aligned}$$

Now she has a total of $\$6315$ therefore $T = 6315$

Substitute $T = 6315$ in the above equation (3) therefore

$$\begin{aligned}T &= 6360-0.03x\\ 6315 &= 6360-0.03x\\ 0.03x+6315 &= 6360 \quad \{\text{add } 0.03x \text{ each side}\}\\ 0.03x &= 6360-6315 \quad \{\text{subtract 6315 from each side}\}\end{aligned}$$

$$\begin{aligned}0.03x &= 45 \quad \{\text{subtract}\}\\ x &= \frac{45}{0.03} \quad \{\text{divide each side by 0.03}\}\\ &= 1500\end{aligned}$$

Therefore she invested $\$1500$ in saving account and with $6000-1500=\$4500$, she buys certificate of deposit certificate.

Hence $\boxed{\$1500 \text{ and } \$4500}$, she invested in each account.

Answer 51PA.

Let the length (l) of the garden is 5*x* and width (w) of the garden is 4*x*.

As you know that the area of a rectangular garden can be found by using the formula $A = l \times b$, where *A* is the area, *l* is the length and *b* is the breadth of the rectangle.

So substituting $l = 5x$ and $w = 4x$ in the above formula of area to find the area of the garden, therefore

$$\begin{aligned} A &= l \times w \\ &= 5x \times 4x \\ &= 20x^2 \end{aligned}$$

Now according to the statement, length is increased by the 12 feet. So, the new length (l) of the garden will be $(5x+12)$ feet and width will be same.

Again substitute the new length $l = 5x+12$ and $w = 4x$ in the above formula of area, so the new area of the rectangle is

$$\begin{aligned} A &= l \times w \\ &= (5x+12) \times 4x \\ &= 5x(4x)+12(4x) \quad \{\text{distributive property}\} \\ &= 20x^2 + 48x \end{aligned}$$

Hence the expression for the new area is $\boxed{20x^2 + 48x}$

Answer 52PA.

Let the distance is *m* miles and *t* taxis are needed.

According to the given condition, the fare is $\$2.75$ for the first mile and $\$1.25$ for each additional mile.

Therefore the expression for the cost to transport the group is $(2.75+(m-1)1.25)t$

Hence the expression for the cost to transport the group is $\boxed{(2.75+(m-1)1.25)t}$

Answer 53PA.

Let *x* be an odd integer. So the next odd integer will be $x+2$

Now prove why $x+2$ is the next odd integer

Let us take $x = 3$ $\{3 \text{ is an odd integer}\}$

Now if you take $x+1$ then you will get $3+1=4$ $\{x=3\}$ and 4 is not an odd integer. It is an even integer.

And if you take $x+2$ then you will get $3+2=5$ $\{x=3\}$ and 5 is an odd integer. So, the next odd integer will be $x+2$.

Hence the expression for the next odd integer is $\boxed{x+2}$

Answer 54PA.

Let *x* be an odd integer. So the next odd integer will be $x+2$

Now prove why $x+2$ is the next odd integer.

Let us take $x=3$ $\{3 \text{ is an odd integer}\}$

Now if you take $x+1$ then you will get $3+1=4$ $\{x=3\}$ and 4 is not an odd integer. It is an even number.

And if you take $x+2$ then you will get $3+2=5$ $\{x=3\}$ and 5 is an odd integer. So, the next odd integer will be $x+2$.

Now find the product of *x* and the next odd integer which is $x+2$. Therefore

$$x(x+2) = x(x)+x(2) \quad \{\text{distributive property}\}$$
$$= x^2+2x$$

Hence the product of *x* and the next odd integer is $\boxed{x^2+2x}$

Answer 55PA.

According to the statement, an even number can be represented by 2*x* where *x* is an integer.

So another even integer will be 2*y* where *y* is an integer.

Now the product of these two even integers 2*x* and 2*y* is

$2x \cdot 2y = 4xy$ Which is also an even number because 4 is divisible by 2

Hence the product of two even integers is always an even number.

Answer 56PA.

According to the given condition, an even number can be represented by 2*x* where *x* is an integer.

And as per the definition of an odd integer: - an odd integer is any integer that cannot be divided by 2. For example, 5 cannot be divided by 2, so 5 is an odd integer. Similarly 3, 5, 7, 9… all are the odd integers.

So, the representation for an odd number is: - A number *n* is odd if there exist a number *k*, such that $n=2k+1$ where *k* is an integer because if *n* is divided by 2 then you will always get a quotient *k* with a remainder of 1. Having a remainder of 1 means that *n* cannot be divided by 2.

So $n=2k+1$ is an odd integer where *k* is an integer.

Hence the representation for an odd integer is $\boxed{n=2k+1}$

Answer 57PA.

According to the given condition, an even number can be represented by 2*x* where *x* is an integer.

Let *y* be an integer therefore $2y+1$ is an odd number.

The product of the even number 2*x* and odd number $2y+1$ is always even which is shown as below

$$\begin{aligned}2x(2y+1) &= 2x(2y)+2x \\ &= 4xy+2x \\ &= 2(2xy+x)\end{aligned}$$

Now the product $2(2xy+x)$ is even because it can be divisible by 2.

Hence the product of an even and odd integer is always even.

Answer 58PA.

The cost of each apple is given as $\$0.25$ and cost of each orange is given as $\$0.20$.

Let *a* represent the number of apples and *o* represent the number of oranges and T represent the total amount of money.

So, the polynomial for the total amount of money spend on fruit for each basket is

$$T = 0.25(a)+0.20(o)$$

Hence the polynomial for the total amount of money spend on fruit for each basket is $\boxed{0.25(a)+0.20(o)}$

Answer 59PA.

The cost of each apple is given as $\$0.25$ and cost of each orange is given as $\$0.20$.

Let *a* represent the number of apples and *o* represent the number of oranges and T represent the total amount of money.

So, the polynomial for the total amount of money spend on fruit for each basket is

$$T = 0.25(a)+0.20(o)$$

Now according to the given statement, Laura uses 4 apples in each basket. So, $a=4$

If $a=4$ apples used by the Laura in each basket then $(10-a)$ that is $(10-4)=6$ oranges will be used in each basket. So you get $o=6$

To find the total cost for these fruits, substitute the values of *a* and *o* in the above polynomial $T = 0.25(a)+0.20(o)$, therefore

$$\begin{aligned}T &= 0.25(a)+0.20(o) \\ &= 0.25(4)+0.20(6) \\ &= 1+1.20 \\ &= \$2.20\end{aligned}$$

Hence the total cost for fruit is $\boxed{\$2.20}$

Answer 60PA.

Let the retail price of the inline skates is *p*.

There are 30% discount on the retail price on all the equipments. So, the discount on the inline skate is $P\times\frac{30}{100}$

Therefore, the new price of inline skates after having the discount will be

$$\begin{aligned} P-\frac{30p}{100} &= \frac{100p-30p}{100} \\ &= \frac{70p}{100} \\ &= \frac{7p}{10} \end{aligned}$$

Now there is additional *n* percent off on one of the purchase. So, you have $\frac{7p}{10}\times\frac{n}{100}=\frac{7pn}{1000}$

Therefore, the cost of the inline skates with retail price *p* after receiving both discounts is

$$\frac{7p}{10}-\frac{7pn}{1000}$$

Hence the expression for cost of the inline skates with retail price *p* after receiving both discounts is $\boxed{\frac{7p}{10}-\frac{7pn}{1000}}$

Answer 61PA.

The price of the inline skates is given as $\$200$

There are 30% discount on the retail price on all the equipments. So, the discount on the inline skate is $200\times\frac{30}{100}=\$60$

Therefore, the new price of inline skates after having the discount will be

$$\$200-\$60=\$140$$

Now there is additional 10 percent off on one of the purchase. So, you have $140\times\frac{10}{100}=\$14$

Therefore, the cost of the inline skates after receiving the discounts is

$$\$140-\$14=\$126$$

Hence the cost of the inline skates with additional discount is $\boxed{\$126}$

Answer 63PA.

The product of a monomial and a polynomial can be modeled using an area model. The area of the figure shown at the beginning of the lesson is the product of its length 2*x* and width $(x+3)$

And this product can be found by using distributive property $a(b+c)=ab+ac$ which is shown as below

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

The same result $2x^2+6x$ obtained when the areas of the algebra tiles are added together at the beginning of the lesson.

Now show the product of a monomial and a polynomial using algebra tiles and multiplication by taking another example like 3*x* and $(2x+1)$

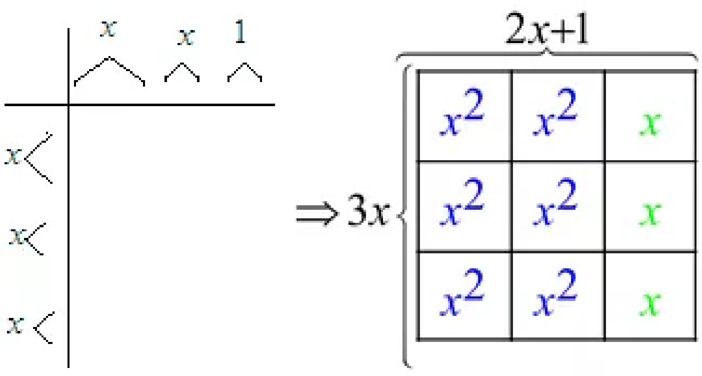
Firstly showing the product using multiplication

The product can be found by using distributive property $a(b+c)=ab+ac$ which is shown as below

$$3x(2x+1)=3x(2x)+3x(1)$$
$$=6x^2+3x$$

So, the product of 3*x* and $(2x+1)$ is $6x^2+3x$ using multiplication.

Now the product of a monomial and a polynomial using algebra tiles is shown as below



The rectangle consists of 6 blue x^2 tiles and 3 green tiles. Therefore the area of the rectangle is $6x^2+3x$

Answer 64PA.

Simplify $\left[\left(3x^2-2x+4\right)-\left(x^2+5x-2\right)\right](x+2)$

To solve above expression, firstly subtract the polynomials in the bracket, therefore

$$\begin{aligned}&\left[\left(3x^2-2x+4\right)-\left(x^2+5x-2\right)\right](x+2)\\=&\left[3x^2-2x+4-x^2-5x+2\right](x+2)\\=&\left[2x^2-7x+6\right](x+2) \qquad \{\text{combining like terms}\}\end{aligned}$$

Now multiplying the above polynomials using the distributive property, therefore you have

$$\begin{aligned}&=\left(2x^2-7x+6\right)(x+2)\\&=x\left(2x^2\right)+x(-7x)+x(6)+2\left(2x^2\right)+2(-7x)+2(6)\\&=2x^3-7x^2+6x+4x^2-14x+12 \qquad \{\text{product of power property}\}\\&=2x^3-3x^2-8x+12\end{aligned}$$

Therefore the simplification of the expression is $2x^3-3x^2-8x+12$ which is option B

Hence option $\boxed{\text{B}}$ is correct.

Answer 65PA.

The charges of plumber for the first thirty minutes is $\$70$ and for each additional minute is $\$4$

The plumber charges $\$122$ for her time.

To find the amount of time in minutes write $\$122$ as

$$\$122=\$70+\$52$$

Now she charges $\$70$ for the first 30 minutes and $\$4$ for each additional minute therefore $\frac{52}{4}=13\text{ minutes}$, she works extra.

So, $30\text{ minutes}+13\text{ minutes}=43\text{ minutes}$ the plumber works which is option A.

Hence correct option is $\boxed{\text{A}}$

Answer 66MYS.

Find the sum of $\left(4x^2+5x\right)+\left(-7x^2+x\right)$

To find the sum of the above polynomials, firstly open the brackets therefore

$$\left(4x^2+5x\right)+\left(-7x^2+x\right)=4x^2+5x-7x^2+x$$

Now combine the like terms and then solve therefore

$$\begin{aligned}\left(4x^2+5x\right)+\left(-7x^2+x\right)&=4x^2+5x-7x^2+x\\&=4x^2-7x^2+5x+x\\&=-3x^2+6x\end{aligned}$$

Hence the sum of the expression $\left(4x^2+5x\right)+\left(-7x^2+x\right)$ is $\boxed{-3x^2+6x}$

Answer 67MYS.

Find the difference of $(3y^2+5y-6)-(7y^2-9)$

To find the difference of the above polynomials, firstly open the brackets and change the signs of the second bracket therefore

$$(3y^2+5y-6)-(7y^2-9)=3y^2+5y-6-7y^2+9$$

Now combine the like terms and then solve therefore

$$\begin{aligned}(3y^2+5y-6)-(7y^2-9)&=3y^2+5y-6-7y^2+9\\&=3y^2-7y^2+5y-6+9\\&=-4y^2+5y+3\end{aligned}$$

Hence the difference of the expression $(3y^2+5y-6)-(7y^2-9)$ is $\boxed{-4y^2+5y+3}$

Answer 68MYS.

Find the difference of $(5b-7ab+8a)-(5ab-4a)$

To find the difference of the above polynomials, firstly open the brackets and change the signs of the second bracket therefore

$$(5b-7ab+8a)-(5ab-4a)=5b-7ab+8a-5ab+4a$$

Now combine the like terms and then solve therefore

$$\begin{aligned}(5b-7ab+8a)-(5ab-4a)&=5b-7ab+8a-5ab+4a\\&=5b-7ab-5ab+8a+4a\\&=5b-12ab+12a\end{aligned}$$

Hence the difference of the expression $(5b-7ab+8a)-(5ab-4a)$ is $\boxed{5b-12ab+12a}$

Answer 69MYS.

Find the sum of $(6p^3+3p^2-7)+(p^3-6p^2-2p)$

To find the sum of the above polynomials, firstly open the brackets therefore

$$(6p^3+3p^2-7)+(p^3-6p^2-2p)=6p^3+3p^2-7+p^3-6p^2-2p$$

Now combine the like terms and then solve therefore

$$\begin{aligned}(6p^3+3p^2-7)+(p^3-6p^2-2p)&=6p^3+3p^2-7+p^3-6p^2-2p\\&=6p^3+p^3+3p^2-6p^2-7-2p\\&=7p^3-3p^2-2p-7\end{aligned}$$

Hence the sum of the expression $(6p^3+3p^2-7)+(p^3-6p^2-2p)$ is $\boxed{7p^3-3p^2-2p-7}$

Answer 70MYS.

According to the definition of the polynomial: - An expression of more than two algebraic terms, especially the sum of several terms that contain different powers of same variable.

With the help of above definition of polynomial, the given expression $4x^2-10ab+6$ is a polynomial.

Now there are 3 terms in the above polynomial $4x^2-10ab+6$ therefore it is a trinomial.

Hence $\boxed{Yes}$ $4x^2-10ab+6$ is a polynomial and it is a $\boxed{\text{trinomial}}$

Answer 71MYS.

According to the definition of the polynomial: - An expression of more than two algebraic terms, especially the sum of several terms that contain different powers of same variable. A polynomial can have constants, variables and exponents, but never division by a variable.

So, with the help of above definition of polynomial, the given expression $4c+ab-c$ is a polynomial.

Now on combining the like terms of the above polynomial you will get

$$4c+ab-c=3c+ab$$

Now there are 2 terms in the above polynomial $4c+ab-c$ therefore it is a binomial.

Hence $\boxed{Yes}$ $4c+ab-c$ is a polynomial and it is a $\boxed{\text{binomial}}$

Answer 72MYS.

According to the definition of the polynomial: - An expression of more than two algebraic terms, especially the sum of several terms that contain different powers of same variable. A polynomial can have constants, variables and exponents, but never division by a variable.

So, with the help of above definition of polynomial, the given expression $\frac{7}{y}+y^2$ is not a polynomial because its first term is divided by a variable.

Hence $\boxed{No}$ $\frac{7}{y}+y^2$ is not a polynomial.

Answer 73MYS.

According to the definition of the polynomial: - An expression of more than two algebraic terms, especially the sum of several terms that contain different powers of same variable. A polynomial can have constants, variables and exponents, but never division by a variable.

So, with the help of above definition of polynomial, the given expression $\frac{n^2}{3}$ is a polynomial because it is not divided by a variable.

Now there is 1 term in the above polynomial $\frac{n^2}{3}$ therefore it is a monomial.

Hence $\boxed{Yes}$ $\frac{n^2}{3}$ is a polynomial and it is a $\boxed{\text{monomial}}$

Answer 74MYS.

Let the number be *x*.

Now according to the statement, six increased by ten times a number is less than nine times the number. Therefore the inequality will be

$$6+10x \le 9x$$

So, the inequality is $6+10x \le 9x$

Now solve the above inequality by subtracting 9*x* from each side, therefore

$$\begin{aligned} 6+10x &\le 9x \\ 6+10x-9x &\le 0 \\ 6+x &\le 0 \end{aligned}$$

Now subtracting 6 from both sides and solve, therefore

$$\begin{aligned} 6+x &\le 0 \\ x &\le 0-6 \\ x &\le -6 \end{aligned}$$

Hence the inequality is $\boxed{6+10x \le 9x}$ and solution for the inequality is $\boxed{x \le -6}$

Check the above solution by substituting it in the above inequality $6+10x \le 9x$, therefore

$$\begin{aligned} 6+10x &\le 9x \\ 6+10(-6) &\le 9(-6) \\ 6-60 &\le -54 \\ -54 &\le -54 \quad \text{which is true} \end{aligned}$$

Answer 75MYS.

Let the number be *x*.

Now according to the statement, nine times a number increased by four is no less than seven decreased by thirteen times the number

Therefore the inequality will be

$$9x+4 \ge 7-13x$$

So, the inequality is $9x+4 \ge 7-13x$

Now solve the above inequality by adding 13*x* each side, therefore

$$\begin{aligned} 9x+4 &\ge 7-13x \\ 9x+13x+4 &\ge 7 \\ 22x+4 &\ge 7 \end{aligned}$$

Now subtracting 4 from both sides and solve, therefore

$$\begin{aligned} 22x+4 &\ge 7 \\ 22x &\ge 7-4 \\ 22x &\ge 3 \end{aligned}$$

Divide both sides by 22, therefore

$$\begin{aligned} 22x &\ge 3 \\ x &\ge \frac{3}{22} \end{aligned}$$

Hence the inequality is $\boxed{9x+4 \ge 7-13x}$ and solution for the inequality is $\boxed{x \ge \frac{3}{22}}$

Check the above solution by substituting it in the above inequality $6+10x \leq 9x$, therefore

$$\begin{aligned} 9x+4 &\geq 7-13x \\ 9\left(\frac{3}{22}\right)+4 &\geq 7-13\left(\frac{3}{22}\right) \\ \frac{27}{22}+4 &\geq 7-\frac{39}{22} \\ \frac{27+88}{22} &\geq \frac{154-39}{22} \end{aligned}$$

$\frac{115}{22} \geq \frac{115}{22}$ which is true

Answer 76MYS.

To find the equation of the line which passes through the points $(-3,-8),(1,4)$, let us firstly find the slope m by using the slope formula $m=\frac{y_2-y_1}{x_2-x_1}$ which passes through the points

$(-3,-8),(1,4)$

Here (x_1, y_1) is the first point $(-3,-8)$ and (x_2, y_2) is the second point $(1,4)$

Now substitute the values $x_1=-3, x_2=1, y_1=-8$ and $y_2=4$ in the above slope formula

$m=\frac{y_2-y_1}{x_2-x_1}$, therefore

$$\begin{aligned} m &= \frac{y_2-y_1}{x_2-x_1} \\ &= \frac{4-(-8)}{1-(-3)} \\ &= \frac{4+8}{1+3} \\ &= \frac{12}{4} \end{aligned}$$

$=3$

So, the slope is $m=3$

Now let us use the point- slope formula $y - y_1 = m(x - x_1)$ to find the equation of the line where m is the slope of the line and (x_1, y_1) is the given point.

Substitute the values $m = 3$, $x_1 = -3$ and $y_1 = -8$ in the above point-slope formula and solve, therefore

$$\begin{aligned} y - y_1 &= m(x - x_1) \\ y - (-8) &= 3(x - (-3)) \\ y + 8 &= 3(x + 3) \\ y + 8 &= 3x + 9 \quad \{\text{distributive property}\} \end{aligned}$$

$$\begin{aligned} y &= 3x + 9 - 8 \quad \{\text{subtracting 8 from each side}\} \\ y &= 3x + 1 \quad \{\text{adding}\} \end{aligned}$$

Hence the equation of the line which passes through the points $(-3, -8), (1, 4)$ is $\boxed{y = 3x + 1}$

Answer 77MYS.

To find the equation of the line which passes through the points $(-4, 5), (2, -7)$, let us firstly find the slope m by using the slope formula $m = \frac{y_2 - y_1}{x_2 - x_1}$ which passes through the points $(-4, 5), (2, -7)$

Here (x_1, y_1) is the first point $(-4, 5)$ and (x_2, y_2) is the second point $(2, -7)$

Now substitute the values $x_1 = -4, x_2 = 2, y_1 = 5 \text{ and } y_2 = -7$ in the above slope formula $m = \frac{y_2 - y_1}{x_2 - x_1}$, therefore

$$\begin{aligned} m &= \frac{y_2 - y_1}{x_2 - x_1} \\ &= \frac{-7 - 5}{2 - (-4)} \\ &= \frac{-12}{2 + 4} \\ &= -\frac{12}{6} \end{aligned}$$

$= -2$

So, the slope is $m = -2$

Now let us use the point- slope formula $y - y_1 = m(x - x_1)$ to find the equation of the line where *m* is the slope of the line and (x_1, y_1) is the given point.

Substitute the values $m = -2$, $x_1 = -4$ and $y_1 = 5$ in the above point-slope formula and solve, therefore

$$\begin{aligned}
y - y_1 &= m(x - x_1) \\
y - 5 &= -2(x - (-4)) \\
y - 5 &= -2(x + 4) \\
y - 5 &= -2x - 8 \quad \{\text{distributive property}\}
\end{aligned}$$

$$\begin{aligned}
y &= -2x - 8 + 5 \quad \{\text{adding 5 each side}\} \\
y &= -2x - 3 \quad \{\text{adding}\}
\end{aligned}$$

Hence the equation of the line which passes through the points $(-4, 5), (2, -7)$ is $\boxed{y = -2x - 3}$

Answer 78MYS.

To find the equation of the line which passes through the points $(3, -1), (-3, 2)$, let us firstly find the slope *m* by using the slope formula $m = \frac{y_2 - y_1}{x_2 - x_1}$ which passes through the points

$(3, -1), (-3, 2)$

Here (x_1, y_1) is the first point $(3, -1)$ and (x_2, y_2) is the second point $(-3, 2)$

Now substitute the values $x_1 = 3, x_2 = -3, y_1 = -1$ and $y_2 = 2$ in the above slope formula

$m = \frac{y_2 - y_1}{x_2 - x_1}$, therefore

$$\begin{aligned}
m &= \frac{y_2 - y_1}{x_2 - x_1} \\
&= \frac{2 - (-1)}{-3 - 3} \\
&= \frac{2 + 1}{-6} \\
&= -\frac{3}{6} \\
&= -\frac{1}{2}
\end{aligned}$$

So, the slope is $m = -\frac{1}{2}$

Now let us use the point- slope formula $y-y_1=m(x-x_1)$ to find the equation of the line where *m* is the slope of the line and (x_1,y_1) is the given point.

Substitute the values $m=-\frac{1}{2}$, $x_1=3$ and $y_1=-1$ in the above point-slope formula and solve, therefore

$$y-y_1=m(x-x_1)$$
$$y-3=-\frac{1}{2}(x-3)$$
$$y-3=\left(-\frac{1}{2}\right)x+\frac{3}{2} \qquad \{\text{distributive property}\}$$
$$y=\left(-\frac{1}{2}\right)x+\frac{3}{2}+3 \qquad \{\text{adding 3 each side}\}$$
$$y=\left(-\frac{1}{2}\right)x+\frac{3+6}{2} \qquad \{\text{combining like terms}\}$$
$$y=\left(-\frac{1}{2}\right)x+\frac{9}{2}$$

Hence the equation of the line which passes through the points $(3,-1),(-3,2)$ is

$$\boxed{y=\left(-\frac{1}{2}\right)x+\frac{9}{2}}$$

Answer 79MYS.

Let original amount be *x*

She spent one-fifth of her money on gasoline. So, one-fifth of the total amount is $\frac{1}{5}x$

Therefore total amount after spent on gasoline is

$$x-\frac{x}{5}=\frac{5x-x}{5}$$
$$=\frac{4x}{5}$$

Now she spent half of her money on hair cut and spent $\$7$ on lunch and had $\$13$ left.

Therefore

$$\frac{4x}{5}\times\frac{1}{2}-7=13$$
$$\frac{2x}{5}-7=13$$
$$\frac{2x-35}{5}=13 \qquad \{\text{L.C.M}=5\}$$
$$2x-35=65 \qquad \{\text{cros multiplication}\}$$

$$2x=65+35 \qquad \{\text{add 35 both sides}\}$$
$$2x=100$$
$$x=\frac{100}{2}$$
$$=50$$

So, original amount be $\$50$

Hence $\boxed{\$50}$, she had originally.

Answer 80MYS.

The 'stem' is the left-hand column which contains the tens digits and the leaves are the lists in the right-hand column, showing all the ones digits for each of the tens, twenties, thirties and forties.

Now make a stem- and- leaf plot for the following set of data

49 51 55 62 47 32 56 57 48 47 33 68 53 45 30

To make the stem and leaf plot, firstly arrange the above data from least to greatest, therefore

30, 32, 33, 45, 47, 47, 48, 49, 51, 53, 55, 56, 57, 62, 68

Now make the stem by writing the tens digit from least to greatest and make the leaf by writing the ones digit in order to right of its tens digit and draw a line to separate the stem and leaf.

Therefore

Stem	Leaf
3	0, 2, 3
4	5, 7, 7, 8, 9
5	1, 3, 5, 6, 7
6	2, 8

Hence the stem and leaf plot is

Stem	Leaf
3	0, 2, 3
4	5, 7, 7, 8, 9
5	1, 3, 5, 6, 7
6	2, 8

Answer 81MYS.

The 'stem' is the left-hand column which contains the tens digits and the leaves are the lists in the right-hand column, showing all the ones digits for each of the tens, twenties, thirties and forties.

Now make a stem- and- leaf plot for the following set of data

21 18 34 30 20 15 14 10 22 21 18 43 44 20 18

To make the stem and leaf plot, firstly arrange the above data from least to greatest, therefore

10, 14, 15, 18, 18, 18, 20, 20, 21, 21, 22, 30, 34, 43, 44

Now make the stem by writing the tens digit from least to greatest and make the leaf by writing the ones digit in order to right of its tens digit and draw a line to separate the stem and leaf. Therefore

Stem	Leaf
1	0, 4, 5, 8, 8, 8
2	0, 0, 1, 1, 2
3	0, 4
4	3, 4

And the key is $3/4 = 34$

Hence the stem and leaf plot is

Stem	Leaf
1	0, 4, 5, 8, 8, 8
2	0, 0, 1, 1, 2
3	0, 4
4	3, 4

and key is $\boxed{3/4 = 34}$

Answer 82MYS.

Simplify $a(a)$

To simplify the above expression, separate the coefficients and variables and use product of powers property $a^m \cdot a^n = a^{m+n}$, therefore

$$\begin{aligned} a(a) &= a^{1+1} \\ &= a^2 \end{aligned}$$

Hence the simplification of the expression $a(a)$ is $\boxed{a^2}$

Answer 83MYS.

Simplify $2x(3x^2)$

To simplify the above expression, separate the coefficients and variables and use product of powers property $a^m \cdot a^n = a^{m+n}$, therefore

$$\begin{aligned} 2x(3x^2) &= 2\times 3\cdot x\times x^2 \\ &= 6\cdot x^{1+2} \\ &= 6x^3 \end{aligned}$$

Hence the simplification of the expression $2x(3x^2)$ is $\boxed{6x^3}$

Answer 84MYS.

Simplify $-3y^2(8y^2)$

To simplify the above expression, separate the coefficients and variables and use product of powers property $a^m \cdot a^n = a^{m+n}$, therefore

$$\begin{aligned} -3y^2(8y^2) &= (-3)\times 8\cdot y^2\times y^2 \\ &= -24\cdot y^{2+2} \\ &= -24y^4 \end{aligned}$$

Hence the simplification of the expression $-3y^2(8y^2)$ is $\boxed{-24y^4}$

Answer 85MYS.

Simplify $4y(3y)-4y(6)$

To simplify the above expression, separate the coefficients and variables and use product of powers property $a^m \cdot a^n = a^{m+n}$ and solve, therefore

$$\begin{aligned} 4y(3y)-4y(6) &= 4\times 3\cdot y\times y-4\times 6\cdot y \\ &= 12\cdot y^{1+1}-24y \\ &= 12y^2-24y \end{aligned}$$

Hence the simplification of the expression $4y(3y)-4y(6)$ is $\boxed{12y^2-24y}$

Answer 86MYS.

Simplify $-5n(2n^2)-(-5n)(8n)+(-5n)(4)$

To simplify the above expression, separate the coefficients and variables and use product of powers property $a^m \cdot a^n = a^{m+n}$ and solve, therefore

$$\begin{aligned} &-5n(2n^2)-(-5n)(8n)+(-5n)(4) \\ &= (-5)\times 2\cdot n\times n^2-(-5)\times 8\cdot n\times n+(-5)\times 4\cdot n \\ &= -10\cdot n^{1+2}+40\cdot n^{1+1}-20n \\ &= -10n^3+40n^2-20n \end{aligned}$$

Hence the simplification of the expression $-5n(2n^2)-(-5n)(8n)+(-5n)(4)$ is

$\boxed{-10n^3+40n^2-20n}$

Answer 87MYS.

Simplify $3p^2(6p^2)-3p^2(8p)+3p^2(12)$

To simplify the above expression, separate the coefficients and variables and use product of powers property $a^m \cdot a^n = a^{m+n}$ and solve, therefore

$$\begin{aligned}
&3p^2(6p^2)-3p^2(8p)+3p^2(12) \\
&= 3\times 6\cdot p^2 \times p^2 - 3\times 8\cdot p^2 \times p + 3\times 12\cdot p^2 \\
&= 18\cdot p^{2+2} - 24\cdot p^{2+1} + 36p^2 \\
&= 18p^4 - 24p^3 + 36p^2
\end{aligned}$$

Hence the simplification of the expression $3p^2(6p^2)-3p^2(8p)+3p^2(12)$ is

$$\boxed{18p^4 - 24p^3 + 36p^2}$$