1. Multiply or divide as indicated. Be sure to reduce all answers to lowest terms. $\dfrac{2a-8}{a^3} \cdot \dfrac{a^4}{6a-24}$

$$\dfrac{2a-8}{a^3} \cdot \dfrac{a^4}{6a-24}$$

$$\dfrac{2(a-4)}{a^3} \cdot \dfrac{a^4}{6(a-4)}$$

← First factor out what each group has it common, if able.
← Then cancel cut what is the same on top and bottom

$$\dfrac{2\,a^4}{6\,a^3} =$$

← write down what's left.
← type numbers (fraction) into calculator to reduce.

$$\dfrac{1}{3}\,a^{4-3} =$$

← for like variables, subtract exponents (since it is division problem)

$$\boxed{\dfrac{1}{3}\,a}$$

2. Multiply or divide as indicated. Be sure to reduce all answers to lowest terms. $\dfrac{a^2-a}{4a} \cdot \dfrac{5a^2}{a^2-4a}$

$$\dfrac{a^2-a}{4a} \cdot \dfrac{5a^2}{a^2-4a}$$

$$\dfrac{a(a-1)}{4a} \cdot \dfrac{5a^2}{a(a-4)}$$

← First factor out what each group has it common, if able.
← Then cancel cut what is the same on top and bottom

$$\dfrac{a^{2-1}}{a} = \dfrac{5a^2(a-1)}{4a(a-4)}$$

← write down what's left.
← for like variables, subtract exponents (since it is division problem)

$$\boxed{\dfrac{5a(a-1)}{4(a-4)}}$$

← Rewrite

3. Multiply and simplify. You may leave the denominator in factored form. $\dfrac{x+4}{x^2+12x+32} \cdot \dfrac{x+8}{2}$

$\dfrac{x+4}{x^2+12x+32} \cdot \dfrac{x+8}{2}$

$(x+4)(x+8)$ 32

1·32
2·16
4·8

← first factor the polynomial. Write down the last number to the side, + list the pairs of numbers that multiply together to get that number.
• Then determine which pair add or subtract to get the middle number.

$\dfrac{x+4}{(x+4)(x+8)} \cdot \dfrac{x+8}{2} =$

← Rewrite problem with factored polynomial.
← cancel out what top + bottom have in common.

$\boxed{\dfrac{1}{2}}$

← write down what's left over.
* If there's nothing on top of fraction, put a "1".

4. Simplify. $\dfrac{y^2+7y-18}{y^2+5y+6} \cdot \dfrac{y+2}{y+9}$

$(y-2)(y+9)$

18
1·18
2·9
3·6

$\dfrac{y^2+7y-18}{y^2+5y+6} \cdot \dfrac{y+2}{y+9}$

$(y+2)(y+3)$ 6

1·6
2·3

← first factor the polynomials. Write down the last number to the side, + list the pairs of numbers that multiply together to get that number.
• Then determine which pair add or subtract to get the middle number.

$\dfrac{(y-2)(y+9)}{(y+2)(y+3)} \cdot \dfrac{y+2}{y+9}$

← Rewrite problem with factored polynomial.
← cancel out what top + bottom have in common.

$\boxed{\dfrac{(y-2)}{(y+3)}}$

← Write down what's left over.

5. Simplify. $\dfrac{a^2 + 5a + 4}{a^2 - 3a - 40} \div \dfrac{a+4}{a+5}$

* We don't divide fractions! Change to multiplication & flip 2nd fraction upside down (reciprocal)

$(a+1)(a+4)$

$\dfrac{a^2 + 5a + 4}{a^2 - 3a - 40} \cdot \dfrac{a+5}{a+4}$

4
$1 \cdot 4$
$2 \cdot 2$

← first factor the polynomials. Write down the last number to the side, & list the pairs of numbers that multiply together to get that number.
· Then determine which pair add or subtract to get the middle number.

$(a+5)(a-8)$ 40

$1 \cdot 40$
$2 \cdot 20$
$4 \cdot 10$
$5 \cdot 8$

$\dfrac{(a+1)(a+4)}{(a+5)(a-8)} \cdot \dfrac{a+5}{a+4}$

← Rewrite problem with factored polynomial.
← cancel out what top & bottom have in common.

$\boxed{\dfrac{a+1}{a-8}}$

← Write down what's left over.

6. Multiply or divide as indicated. Be sure to reduce all answers to lowest terms.

$\dfrac{y^2 + 6y + 5}{4y + 20} \div \dfrac{4y + 4}{y + 5}$

* We don't divide fractions! Change to multiplication & flip 2nd fraction upside down (reciprocal)

$(y+1)(y+5)$

5
$1 \cdot 5$

$\dfrac{y^2 + 6y + 5}{4y + 20} \cdot \dfrac{y+5}{4y+4}$

← Factor each numerator & denominator if possible.

$4(y+5)$ $4(y+1)$

$\dfrac{(y+1)(y+5)}{4(y+5)} \cdot \dfrac{y+5}{4(y+1)}$

← Rewrite problem with factored polynomial.
← cancel out what top & bottom have in common.

$\dfrac{y+5}{4 \cdot 4} = \boxed{\dfrac{y+5}{16}}$

← write down what's left over & simplify

7. Simplify. $\dfrac{a^2+17a+72}{a^2+6a+8} \div \dfrac{a+8}{a+4}$

*We don't divide fractions! Change to multiplication & flip 2nd fraction upside down (reciprocal)

$(a+8)(a+9)$

$\dfrac{a^2+17a+72}{a^2+6a+8} \cdot \dfrac{a+4}{a+8}$

72
1·72
2·36
3·24
4·18
6·12
8·9

$(a+2)(a+4)$

1·8
2·4

← Factor each numerator & denominator if possible.

$\dfrac{(a+8)(a+9)}{(a+2)(a+4)} \cdot \dfrac{a+4}{a+8}$

← Rewrite problem with factored polynomial
← Cancel out what top & bottom have in common.

$\boxed{\dfrac{a+9}{a+2}}$

← write down what's left over

8. Multiply or divide as indicated. Be sure to reduce all answers to lowest terms.

$\dfrac{a^2-4a+4}{a-2} \div \dfrac{a^2-4}{a+2}$

*We don't divide fractions! Change to multiplication & flip 2nd fraction upside down (reciprocal)

$(a-2)(a-\ )$

4
1·4
2·2

$\dfrac{a^2-4a+4}{a-2} \cdot \dfrac{a+2}{a^2-4}$

← Factor each numerator & denominator if possible.

$\sqrt{a^2}=a \quad \sqrt{4}=2$

$(a-2)(a+2)$

$\dfrac{(a-2)(a-2)}{a-2} \cdot \dfrac{a+2}{(a-2)(a+2)}$

← Rewrite problem with factored polynomial
← Cancel out what top & bottom have in common.

$\dfrac{1}{1} = \boxed{1}$

← If everything cancels out, then the answer is "1".