Factoring, Rational Expressions and Solving Review

① $$\frac{(x-1)^2-9}{x-4}$$

$$\frac{\cancel{(x-4)}(x+2)}{\cancel{(x-4)}}$$

$$x+2$$

→ two ways to factor

① difference of squares $(x-1)^2-9$

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

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

② $(x-1)^2-9$ expand

$(x-1)(x-1)-9$

$x^2-2x+1-9$

x^2-2x-8

$(x-4)(x+2)$ factor

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② $\boxed{A} = \boxed{A}$ ①

$x^2 = 2x^2-7x-30$

$2x^2-7x-30-x^2=0$

$x^2-7x-30=0$

$(x-10)(x+3)=0$

$x=10$ $\quad \cancel{x=-3}$

reject b/c length cannot be negative

when $x=10$

② we need to FACTOR. So we can find length + width

③ $2x^2-7x-30$

$\underline{-12} \times \underline{5} = -60$

$\underline{-12} + \underline{5} = -7$

$2x^2-12x+5x-30$

$2x(x-6)+5(x-6)$

$(x-6)(2x+5)$

④ 25

$(2x+5)$

$(x-6)$ 4

$P = 25+4+25+4$

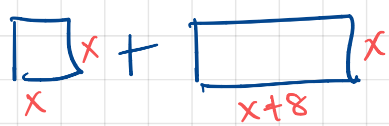
$= 58$ cm

③

$$
\begin{array}{r|l}
 & 2x + 3 \\
\hline
x - 4 & 2x^2 - 5x - 12 \\
 & -(2x^2 - 8x) \\
\hline
 & \quad 3x - 12 \\
 & -(3x - 12) \\
\hline
 & \quad 0
\end{array}
$$

answer: $2x+3$

④ The area of ABCD is 120 ... that's the ENTIRE figure ...



square + rectangle = 120

$$x^2 + (x+8)(x) = 120$$

$$x^2 + x^2 + 8x - 120 = 0$$

$$2x^2 + 8x - 120 = 0$$

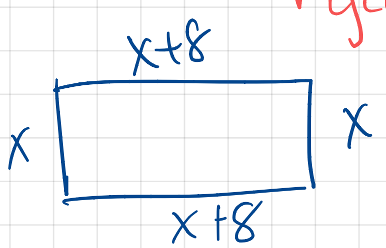
Z.P.P $\longrightarrow$ $(2)(x^2+4x-60) = 0$

FACTOR!! $(2)(x+10)(x-6) = 0$

$\cancel{x = -10}$ $\quad x = 6$

reject b/c length cannot be negative

P=



$\therefore$ P = $14 + 6 + 14 + 6$

= 40 cm

⑤

$$\frac{x+5}{x^2-16} + \frac{3}{x-4}$$

$$\frac{x+5}{(x+4)(x-4)} + \frac{3(x+4)}{(x-4)(x+4)}$$

$$\frac{x+5}{(x+4)(x-4)} + \frac{3x+12}{(x+4)(x-4)}$$

$$\frac{x+5+3x+12}{(x+4)(x-4)} = \frac{4x+17}{(x+4)(x-4)}$$

B

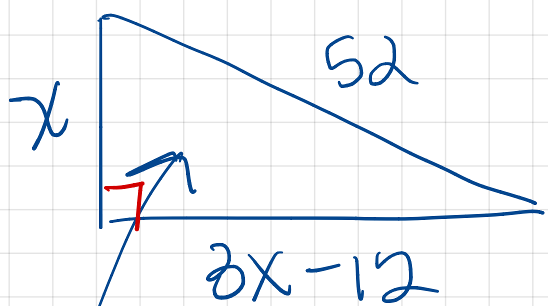
⑥

$$\begin{array}{r} 2c^2 - 5c + 1 \\ c+3 \enclose{longdiv}{2c^3 + c^2 - 14c + 3} \\ -(2c^3 + 6c^2) \\ \hline -5c^2 - 14c \\ -(-5c^2 - 15c) \\ \hline 1c + 3 \\ -(1c + 3) \\ \hline 0 \end{array}$$

answer: $2c^2 - 5c + 1$

⑦ Do ~~NOT~~ NOT let the unknown side of rectangle be equal to x. That is because x has already been used in this problem. You cannot use x twice for 2 different measures.

You have to only look at the Δ to start



Pythagorean Theorem

$a^2+b^2=c^2$

① $x^2+(3x-12)^2=52^2$

$x^2+(3x-12)(3x-12)=52^2$

$x^2+9x^2-36x-36x+144-2704=0$

$10x^2-72x-2560=0$

solve for x

QF

② $\Delta=(-72)^2-4(10)(-2560)$

$=5184+102400$

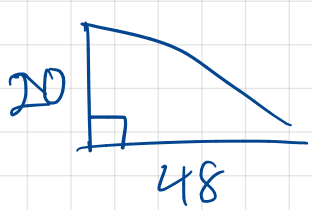
$=107584$

$$x=\frac{-(-72)\pm\sqrt{107584}}{2(10)}$$

$\boxed{x=20}$ $\quad x=\cancel{-12.8}$

cannot be neg.

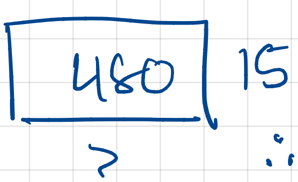
③ Area of Δ



$A=\frac{b\times h}{2}$

$=480$

So



$\therefore l=\frac{480}{15}$

$=32$

8. $$\frac{a^3b+4a^2b-ab-4b}{a^2-1}$$

FACTOR

* $(b)(a^3+4a^2-a-4)$

$(b)(a^2(a+4)-1(a+4))$

$(b)(a+4)(a^2-1)$

$(b)(a+4)(a+1)(a-1)$

* a^2-1

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

$$\frac{(b)\boxed{(a+4)}\cancel{(a+1)}\cancel{(a-1)}}{\cancel{(a+1)}\cancel{(a-1)}}$$

9. $$\frac{6ab-15a+12b-30}{6b-15}$$

FACTOR numerator & denominator

* $6ab-15a+12b-30$

$(3)(2ab-5a+4b-10)$

$(3)(a(2b-5)+2(2b-5))$

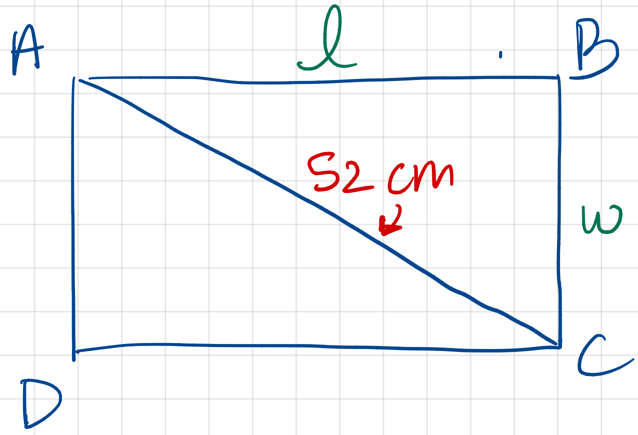
$(3)(2b-5)(a+2)$

* $6b-15$

$(3)(2b-5)$

$$\frac{\cancel{(3)}\cancel{(2b-5)}\boxed{(a+2)}}{\cancel{(3)}\cancel{(2b-5)}}$$

(11)



$a^2+b^2=c^2$

$l^2+w^2=52^2$

• Use area to find dimensions by FACTORING (length x width)

(1)

$5x^2+38x-63$

$\_\_\_ \times \_\_\_ = -315$

$\_\_\_ + \_\_\_ = 38$

-1	315
-3	105
-5	63
-7	45

$5x^2+45x-7x-63$

$5x(x+9)-7(x+9)$

$\underset{l}{(x+9)}\underset{w}{(5x-7)}$

(2) now, use Pythagorean Theorem $a^2+b^2=c^2$

$(x+9)^2+(5x-7)^2=52^2$

$x^2+18x+81 + 25x^2-70x+49 = 2704$

$26x^2-52x-2574=0$

(3)

$\Delta = (-52)^2-(4)(26)(-2574)$

$= 2704 + 267\,696$

$= 270\,400$

(4)

$x=\dfrac{-(-52)\pm\sqrt{\Delta}}{2(26)}$

$x=11$

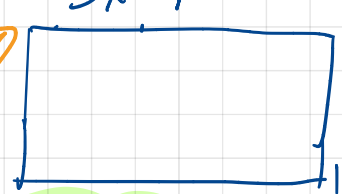
$\cancel{x=-9}$

cannot have a negative length

(5)

$5x-7=5(11)-7$

$=48$



$x+9=$

$11+9$

$=20$

$P=136$