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C1 SECT A.

1. find remainder when $(x^3+2x^2-5) \div (x-3)$

DO THE LONG DIVISION .... OR

if $f(x) = x^3 + 2x^2 - 5$

then $f(3) = 3^3 + 2(3^2) - 5 = 27 + 18 - 5 = \underline{\underline{40}}$

$\therefore$ remainder is $\underline{\underline{40}}$.

OR
{by long division ....

$$
\begin{array}{r}
x^2 + 5x + 15 \\
x-3 \overline{) x^3 + 2x^2 \qquad - 5} \\
-(x^3 - 3x^2) \qquad \\
\hline
5x^2 \quad - 5 \\
-(5x^2 - 15x) \\
\hline
15x - 5 \\
-(15x - 45) \\
\hline
\text{remainder } \underline{\underline{40}}
\end{array}
$$

2. $3x - 5y = y - mx$ (make x the subject)

$3x + mx = y + 5y$

$x(3+m) = y + 5y$

$x = \dfrac{y+5y}{3+m} = \underline{\underline{\dfrac{6y}{3+m}}} \Rightarrow x = \underline{\underline{\dfrac{6y}{3+m}}}$

3. Smallest integer is n $\therefore$ next two are $n+1$, $n+2$

$n + n+1 + n+2 = 3n + 3$

$= 3(n+1)$; a multiple of 3 !

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4. $3x + 5y = 12$ find gradient and coordinates of intersections with axes!

$$5y = -3x + 12$$

$$y = -\frac{3}{5}x + \frac{12}{5} \quad \therefore \text{ gradient } m = -3/5$$

when $x = 0$ $y = 12/5$ $(0, 12/5)$ on y axis.

when $y = 0$ $\frac{3x}{5} = \frac{12}{5}$ $3x = 12$ $x = 4$

$(4, 0)$ on x axis.

OR using $3x + 5y = 12$ $x = 0$ $5y = 12$ $y = 12/5 \rightarrow (0, 12/5)$

$y = 0$ $3x = 12$ $x = 4$ $(4, 0)$

5. $(2 - x)^3 = 1 \times 2^3 - 3 \times 2^2 x + 3 \times 2^1 x^2 - 1 \times x^3$

$$= 8 - 12x + 6x^2 - x^3$$

6. $a^0 = \underline{1}$; $a^6 \div a^{-2} = a^{6-(-2)} = \underline{a^8}$

$$(9a^6b^2)^{-1/2} = \frac{1}{(9a^6b^2)^{1/2}} = \frac{1}{3a^3b} \left\{ = (3a^3b)^{-1} \right\}$$

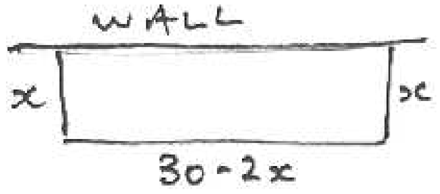
(or other correct alternative).

7. $\sqrt{24} + \sqrt{6} = \sqrt{4 \times 6} + \sqrt{6} = 2\sqrt{6} + \sqrt{6} = \underline{\underline{3\sqrt{6}}}$

$$\frac{(36)}{(5 - \sqrt{7})} \times \frac{(5 + \sqrt{7})}{(5 + \sqrt{7})} = \frac{180 + 36\sqrt{7}}{25 - 7} = \frac{180 + 36\sqrt{7}}{18}$$

$$= \underline{10 + 2\sqrt{7}}$$

8.



total fence $= 30$

$\therefore$ length of encl. is $30-2x$

Area $= 112$ Area $= x(30-2x)$

hence $x(30-2x) = 112$

$$30x - 2x^2 = 112$$

$$\Rightarrow \quad 2x^2 - 30x + 112 = 0$$

$\div 2)$ $\underline{x^2 - 15x + 56 = 0}$ (as reqd.)

$(x-8)(x-7) = 0 \Rightarrow x = 8 \;,\; 7$

$\therefore$ width 8 length $(30-2x) = 14$

or width 7 length $(30-2x) = 16$

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9. if $y = 3x+2$ and $y = 3x^2 - 7x + 1$

then $3x^2 - 7x + 1 = 3x + 2$

$\Rightarrow$ $3x^2 - 10x - 1 = 0$ $a = 3$ $b = -10$ $c = -1$

$$\therefore x = \frac{-(-10) \pm \sqrt{(-10)^2 - 4 \times 3 \times (-1)}}{6}$$

$$= \frac{10 \pm \sqrt{100+12}}{6} = \frac{10}{6} \pm \frac{\sqrt{112}}{6}$$

$$= \frac{10}{6} \pm \frac{\sqrt{16 \times 7}}{6}$$

$$= \frac{5}{3} \pm \frac{4\sqrt{7}}{6} = \underline{\underline{\frac{5}{3} \pm \frac{2\sqrt{7}}{3}}}$$

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9. (contd.)

with $x = \frac{5}{3} \pm \frac{2\sqrt{7}}{3}$

then subst into $y = 3x+2$

$$y = 3\left(\frac{5}{3} + \frac{2\sqrt{7}}{3}\right) + 2 = 7 + 2\sqrt{7}$$

and $$y = 3\left(\frac{5}{3} - \frac{2\sqrt{7}}{3}\right) + 2 = 7 - 2\sqrt{7}$$

pts. of intersection are

$$\left(\frac{5}{3} + \frac{2\sqrt{7}}{3} \;,\; 7 + 2\sqrt{7}\right)$$

and $$\left(\frac{5}{3} - \frac{2\sqrt{7}}{3} \;,\; 7 - 2\sqrt{7}\right)$$