N5 Practice Paper C – Solutions (P1)

1) $5.04 + 8.4 \div 7$

$= 5.04 + 1.2$

$= \boxed{6.24}$

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2) $\frac{2}{7}\left(1\frac{3}{4} + \frac{3}{8}\right)$

$= \frac{2}{7}\left(\frac{7}{4} + \frac{3}{8}\right)$

$= \frac{2}{7}\left(\frac{14}{8} + \frac{3}{8}\right)$

$= \frac{2^{1}}{7}\left(\frac{17}{8_{4}}\right)$

$= \boxed{\frac{17}{28}}$

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

$= 6x - 12 - 12x - 4$

$= \boxed{-6x - 16}$

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4) $f(x) = 7 - 4x$

(a) $f(-2) = 7 - 4(-2)$

$f(-2) = 7 + 8$

$\boxed{f(-2) = 15}$

(b) $f(t) = 7 - 4t = 9$

$7 - 4t = 9$

$4t = 7 - 9$

$4t = -2$

$\boxed{t = -\frac{1}{2}}$

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5) $7 + 6x - x^2 = 0$

$x^2 - 6x - 7 = 0$

$(x - 7)(x + 1) = 0$

$x - 7 = 0, \; x + 1 = 0$

$\boxed{x = 7, x = -1}$

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6) (a)

6 7 12 (13) 14 25 26 | 29 29 32 (35) 37 42 44

(i) $\text{Median} = Q_2 = \frac{26+29}{2} = \frac{55}{2}$

$\therefore$ **Median = Q_2 = 27·5**

(ii) **$Q_1 = 13$**

(iii) **$Q_3 = 35$**

(b) $SIQR = \frac{Q_3 - Q_1}{2}$

$SIQR = \frac{35-13}{2}$

$SIQR = \frac{22}{2}$

$SIQR = 11$

(c) On average, both companies have the same waiting times, as $27{\cdot}5 = 27{\cdot}5$.

Waiting times for Fast-Cabs are more consistent, as $2{\cdot}5 < 11$.

7) $y = a\sin(x+b)$

$$\boxed{a = 4,\ b = -30}$$

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8) (a)

$(-1, -7)$

$(4, 3)$

$$m_{AB} = \frac{-7-3}{-1-4}$$

$$m_{AB} = \frac{-10}{-5}$$

$$\boxed{m_{AB} = 2}$$

(b) $\boxed{y = 2x - 5}$

(c) $y = 2x - 5$

$(\overset{x}{3k}, \overset{y}{k})$

$$k = 2(3k) - 5$$

$$k = 6k - 5$$

$$-5k = -5$$

$$\boxed{k = 1}$$

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9) (a) $f(x) = x^2 + 6x - 7$

$f(x) = (x+3)^2 - 3^2 - 7$

$f(x) = (x+3)^2 - 9 - 7$

$\boxed{f(x) = (x+3)^2 - 16}$

(b) $\boxed{(-3, -16)}$

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10) (a) Let n be the cost of 1 night's stay.

Let b be the cost of 1 breakfast.

(Both in €s).

$\boxed{3n + 2b = 145}$

(b) $\boxed{5n + 3b = 240}$

(c) $3n + 2b = 145$ ① $\times 5$

$5n + 3b = 240$ ② $\times 3$

$15n + 10b = 725$ ③

$15n + 9b = 720$ ④

③ − ④:

$b = 5$

$\therefore$ $\boxed{1 \text{ breakfast costs } €5}$

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11) (a) $8^{2/3}$

$= \left(\sqrt[3]{8}\right)^2$

$= 2^2$

$= \boxed{4}$

(b) $\dfrac{\sqrt{24}}{\sqrt{2}}$

$= \sqrt{\dfrac{24}{2}}$

$= \sqrt{12}$

$= \sqrt{4}\sqrt{3}$

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

(c) $\dfrac{2x+2}{(x+1)^2}$

$= \dfrac{2(x+1)}{(x+1)(x+1)}$

$= \boxed{\dfrac{2}{x+1}}$

N5 Practice Paper C – Solutions (P2)

1) $50\,000 \times (1.046)^5$

$= 62\,607.79...$

$\therefore$ **62 600 bacteria (3 s.f.)**

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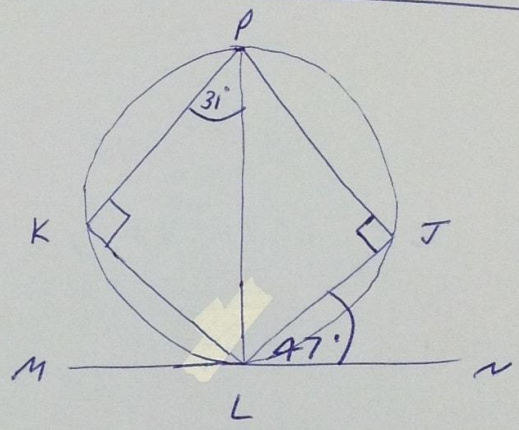
2) MN is a tangent to circle means



$P\hat{L}J = 90° - 47°$

$\Rightarrow P\hat{L}J = 43°$

$P\hat{L}K = 180° - 90° - 31°$

$P\hat{L}K = 59°$

$J\hat{L}K = P\hat{L}J + P\hat{L}K$

$\Rightarrow J\hat{L}K = 43° + 59°$

$\Rightarrow$ **$J\hat{L}K = 102°$**

3) $y = ax^3 + c$

$ax^3 = y - c$

$x^3 = \frac{y-c}{a}$

$x = \sqrt[3]{\frac{y-c}{a}}$

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4) (a) $V = \pi r^2 h$ $\quad (r = 10 \div 2 = 5)$

$V = \pi \times 5^2 \times 14$

$V = 1099.557429...$

$V = 1099.5574 \text{ cm}^3$ (4 d.p.)

(b) $1000 \text{ ml} = 1000 \text{ cm}^3$

$\therefore 600 \text{ ml} = 600 \text{ cm}^3$

$V = \pi r^2 h$

$\pi \times 25 \times h = 600$

$h = \frac{600}{(25 \times \pi)}$

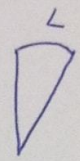
$h = 7.639...$

$h = 7.64 \text{ cm}$

5) Sector angle $\theta^\circ = \frac{360^\circ}{16} \Rightarrow \theta^\circ = 22.5^\circ$

$L = \frac{\theta^\circ}{360^\circ} \times 2 \times \pi \times r$

$L = \frac{22.5^\circ}{360^\circ} \times 2 \times \pi \times 9$



$L = 3.534\ldots$

$\therefore \quad 7 \times L = 7 \times 3.534\ldots = 24.7400\ldots$

$\therefore$ Distance round from T to P = 24.74 m (2 d.p.)

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6) $2x^2 + 4x - 9 = 0$

$(a = 2, \ b = 4, \ c = -9)$

$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$x = \frac{-4 \pm \sqrt{4^2 - 4(2)(-9)}}{2(2)}$

$x = \frac{-4 \pm \sqrt{16 + 72}}{4}$

$x = \frac{-4 \pm \sqrt{88}}{4}$

$x = \frac{(-4 + \sqrt{88})}{4}, \ x = \frac{(-4 - \sqrt{88})}{4}$

$x = -3.34\ldots, \ 1.34\ldots$

$\therefore \quad x = -3.3, \ 1.3$ (1 d.p.)

7) $LSF = k = \frac{9}{6}$

$VSF = k^3 = \left(\frac{9}{6}\right)^3$

$V_L = k^3 \times V_S$

$V_L = \left(\frac{9}{6}\right)^3 \times 30$

$\boxed{V_L = 101.25 \text{ ml}}$

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8) $(x-2)^2 - 5x = 0$

$x^2 - 4x + 4 - 5x = 0$

$x^2 - 9x + 4 = 0$

$D = b^2 - 4ac$

$\begin{pmatrix} a = 1 \\ b = -9 \\ c = 4 \end{pmatrix}$

$D = (-9)^2 - 4(1)(4)$

$D = 81 - 16$

$D = 65$

As $D > 0$, the roots are real and distinct

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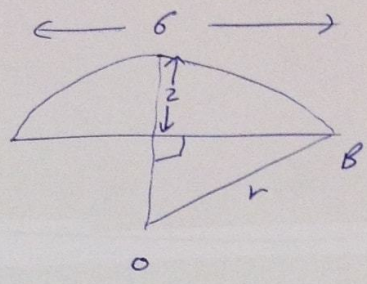
9)



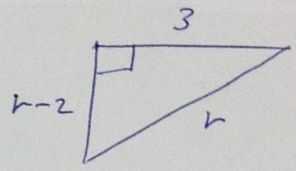
$r^2 = 3^2 + (r-2)^2$

$r^2 = 9 + r^2 - 4r + 4$

$0 = 13 - 4r$

$4r = 13$

$r = 3.25\ m$



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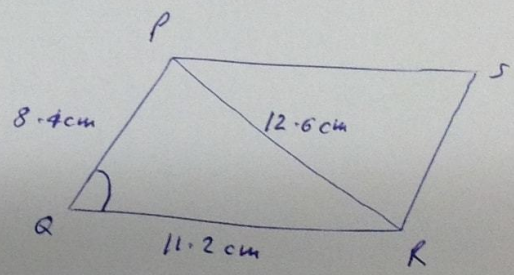
10) (a)



$\cos Q = \dfrac{p^2 + r^2 - q^2}{2pr}$

$\cos Q = \dfrac{(11.2^2 + 8.4^2 - 12.6^2)}{(2 \times 11.2 \times 8.4)}$

$\begin{pmatrix} p = 11.2 \\ q = 12.6 \\ r = 8.4 \end{pmatrix}$

$\cos Q = 0.1979..$

$Q = 78.58..$

$P\hat{Q}R = 78.6^\circ$ (1 d.p.)

(b) $\text{Area} = \frac{1}{2} \times 8.4 \times 11.2 \times \sin P\hat{Q}R \times 2$

$\text{Area} = \frac{1}{2} \times 8.4 \times 11.2 \times \sin 78.6^\circ \times 2$

$\text{Area} = 46.109... \times 2$

$\text{Area} = 92.218...$

$\text{Area} = 92.22 \text{ cm}^2$ (2 d.p.)

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11) (a) $2 \tan x^\circ + 7 = 0 \quad (0 \leq x \leq 360)$

$\tan x^\circ = -\frac{7}{2}$

$RA = \tan^{-1}(7 \div 2)$

$RA = 74.1^\circ$

$\tan$ is -ve

S	A
$180^\circ - RA$	RA
$180^\circ + RA$	$360^\circ - RA$
T	C

$x^\circ = 180^\circ - RA, \ 360^\circ - RA$

$x^\circ = 180^\circ - 74.1^\circ, \ 360^\circ - 74.1^\circ$

$x^\circ = 105.9^\circ, \ 285.9^\circ$

(b) $\sin^3 x + \sin x \cos^2 x = \sin x$ (*)

$LHS = \sin^3 x + \sin x \cos^2 x$

$= \sin x (\sin^2 x + \cos^2 x)$

$= \sin x (1)$ $\quad (\sin^2 x + \cos^2 x = 1)$

$= \sin x$

$= RHS$

As LHS = RHS, result (*) is true

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12) (a) $T = \frac{D}{S}$

$T = \frac{x}{75}$ hours

(b) $\xrightarrow{\quad x \quad}$

$T_1 = \frac{x}{75}$

$\xleftarrow{\quad x \quad}$

$T_2 = \frac{x}{50}$

Total time of journey is $T_T = T_1 + T_2$:

$T_T = \frac{x}{75} + \frac{x}{50}$

$$T_T = \frac{50x}{75 \times 50} + \frac{75x}{75 \times 50}$$

$$T_T = \frac{125x}{3750}$$

$$T_T = \frac{x}{30}$$

$$S = \frac{D}{T}$$

$$S = \frac{2x}{\left(\frac{x}{30}\right)}$$

$$S = \frac{2x}{1} \div \frac{x}{30}$$

$$S = \frac{2x}{1} \times \frac{30}{x}$$

$$\boxed{S = 60 \text{ km/h}}$$