

N5 Practice Paper B - Solutions

(P 1)

1) $7.18 - 2.1 \times 3$

$= 7.18 - 6.3$

$= \boxed{0.88}$

$$\begin{array}{r} 7.18 \\ - 6.30 \\ \hline 0.88 \end{array}$$

2) $1 \frac{1}{8} \div \frac{3}{4}$

$= \frac{9}{8} \div \frac{3}{4}$

$= \frac{9^3}{8^2} \times \frac{4^1}{3^1}$

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

3) $5 - x > 2(x + 1)$

$5 - x > 2x + 2$

$5 > 3x + 2$

$3 > 3x$

$\boxed{x < 1}$

4)

$$f(x) = x^2 + 5x$$

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

$$f(-3) = 9 - 15$$

$$f(-3) = -6$$

5)

$$\underline{u} = \begin{pmatrix} 3 \\ -2 \\ -1 \end{pmatrix}, \quad \underline{v} = \begin{pmatrix} 2 \\ -4 \\ 1 \end{pmatrix}$$

$$4\underline{u} - 2\underline{v} = 4 \begin{pmatrix} 3 \\ -2 \\ -1 \end{pmatrix} - 2 \begin{pmatrix} 2 \\ -4 \\ 1 \end{pmatrix}$$

$$4\underline{u} - 2\underline{v} = \begin{pmatrix} 12 \\ -8 \\ -4 \end{pmatrix} - \begin{pmatrix} 4 \\ -8 \\ 2 \end{pmatrix}$$

$$4\underline{u} - 2\underline{v} = \begin{pmatrix} 8 \\ 0 \\ -6 \end{pmatrix}$$

$$|4\underline{u} - 2\underline{v}| = \sqrt{8^2 + 0^2 + (-6)^2}$$

$$|4\underline{u} - 2\underline{v}| = \sqrt{64 + 36}$$

$$|4\underline{u} - 2\underline{v}| = \sqrt{100}$$

$$|4\underline{u} - 2\underline{v}| = 10$$

$$6) \quad (a) \quad p^2 - 4q^2 = (p - 2q)(p + 2q)$$

$$(b) \quad \frac{p^2 - 4q^2}{3p + 6q}$$
$$= \frac{(p - 2q)(p + 2q)}{3(p + 2q)}$$
$$= \frac{p - 2q}{3}$$

$$7) \quad m = \frac{20 - 5}{6 - 0} \quad (6, 20)$$
$$(0, 5)$$

$$m = \frac{15}{6}$$

$$m = \frac{5}{2} \quad ; \quad c = 5$$

$$y = \frac{5}{2}x + 5$$

$$8) \quad \alpha = 90^\circ + 30^\circ, \quad 270^\circ - 30^\circ$$

$$\alpha = 120^\circ, \quad 240^\circ$$

$$9) \quad (x - 3)(x^2 + 4x - 1)$$

$$= x^3 + 4x^2 - x$$
$$- 3x^2 - 12x + 3$$

$$= x^3 + x^2 - 13x + 3$$

10) (a)

1 1 1 1 (2) 2 2 2 3 (3) 3 3 4 4 (4 4) 4 4 5 6

$$\text{Median} = Q_2 = 3$$

$$Q_1 = \frac{1+2}{2} \Rightarrow Q_1 = 1.5$$

$$Q_3 = \frac{4+4}{2} \Rightarrow Q_3 = 4$$

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

$$SIQR = \frac{4 - 1.5}{2}$$

$$SIQR = \frac{2.5}{2}$$

$$SIQR = 1.25$$

(c) On average, the students went to more football matches than to the cinema, as $5 > 3$.

The number of times the students visited the cinema was more consistent, as $1.25 < 3$.

11)

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

$$g(x) = 5x + 3$$

$$f(x) = g(x)$$

$$x^2 + 2x - 1 = 5x + 3$$

$$x^2 - 3x - 4 = 0$$

$$(x - 4)(x + 1) = 0$$

$$x - 4 = 0, x + 1 = 0$$

$$x = 4, x = -1$$

12)

$$y^8 \times (y^3)^{-2}$$

$$= y^8 \times y^{-6}$$

$$= y^{8+(-6)}$$

$$= y^2$$

13)

$$(a) (1, -16)$$

(b)

$$x = 1$$

$$\begin{aligned} 14) \quad (a) \quad & \sqrt{45} - 2\sqrt{5} \\ &= \sqrt{9}\sqrt{5} - 2\sqrt{5} \\ &= 3\sqrt{5} - 2\sqrt{5} \\ &= \boxed{\sqrt{5}} \end{aligned}$$

$$\begin{aligned} (b) \quad & \frac{1}{x^2} + \frac{1}{x} \\ &= \frac{1}{x^2} + \frac{x}{x^2} \\ &= \boxed{\frac{1+x}{x^2}} \end{aligned}$$

N5 Practice Paper B - Solutions

(P2)

1) $1.8 \times 19.06 \times 10^{-5} = 0.0034308$

$= 3.4308 \times 10^{-3} \text{ kg}$

2) $120\% \text{ of } x = \text{£}150$

$1.2 \times x = \text{£}150$

$x = \text{£}150 \div 1.2$

$x = \text{£}125$

3) (a) $\bar{x} = \frac{(66+70+89+75+79+59)}{6}$

$\bar{x} = 73$

x	$x - \bar{x}$	$(x - \bar{x})^2$
66	-7	49
70	-3	9
89	16	256
75	2	4
79	6	36
59	14	196
		550

$\sum (x - \bar{x})^2 = 550, n = 6$

$s = \sqrt{\frac{\sum (x - \bar{x})^2}{n-1}}$

$s = \sqrt{\frac{550}{6-1}}$

$s = \sqrt{110}$

$s = 10.488...$

$s = 10.49 \text{ (2 d.p.)}$

(b) On average, the price of milk is the same in both supermarkets and local shops, as $73 = 73$.

The price of milk is more consistent in supermarkets, as $10.49 < 17.7$.

4)

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

$$28.6 = \frac{\theta'}{360} \times 2 \times \pi \times 20$$

$$\theta' = \frac{28.6 \times 360}{(2 \times \pi \times 20)}$$

$$\theta' = 81.93\dots$$

$$\theta' = 81.9 \text{ (1 d.p.)}$$

5)

$$V = \frac{1}{3} \pi (8)^2 (32) - \frac{1}{3} \pi (5)^2 (20)$$

$$V = 2144.66\dots - 523.59\dots$$

$$V = 1621.06\dots$$

$$V = 2000 \text{ cm}^3$$

$$6) \quad 2x^2 + 3x - 1 = 0$$

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

$$\begin{pmatrix} a = 2 \\ b = 3 \\ c = -1 \end{pmatrix}$$

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

$$x = \frac{-3 \pm \sqrt{9 + 8}}{4}$$

$$x = \frac{-3 \pm \sqrt{17}}{4}$$

$$x = \frac{(-3 + \sqrt{17})}{4}, \quad x = \frac{(-3 - \sqrt{17})}{4}$$

$$x = 0.28\dots, \quad -1.78\dots$$

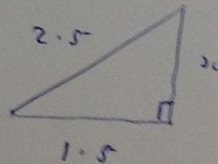
$$\therefore \boxed{x = 0.3, -1.8 \text{ (l.d.p.)}}$$

$$7) \quad x^2 = 2.5^2 - 1.5^2$$

$$x^2 = 6.25 - 2.25$$

$$x^2 = 4$$

$$x = 2$$



$$d = 2.5 - x$$

$$d = 2.5 - 2$$

$$\boxed{d = 0.5 \text{ m}}$$

8)

Newtown

$$50\,000 \times (1.05) = 52\,500$$

$$50\,000 \times (1.05)^2 = 55\,125$$

$$50\,000 \times (1.05)^3 = 57\,881.25$$

Auld town

$$108\,000 \times (0.8) = 86\,400$$

$$108\,000 \times (0.8)^2 = 69\,120$$

$$108\,000 \times (0.8)^3 = 55\,296$$

$$57\,881.25 > 55\,296$$

∴

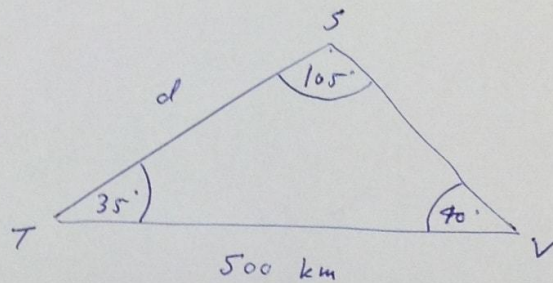
3 years

9)

$$\frac{d}{\sin 70^\circ} = \frac{500}{\sin 105^\circ}$$

$$d = \frac{500 \times \sin 70^\circ}{\sin 105^\circ}$$

$$d = 332.73\dots$$

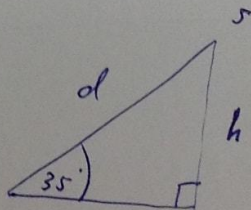


$$\sin 35^\circ = \frac{h}{d}$$

$$h = d \times \sin 35^\circ$$

$$h = 332.73\dots \times \sin 35^\circ$$

$$h = 190.84\dots$$



$$h = 190.8 \text{ km (1 d.p.)}$$

$$10) \quad r = 3p - 2t$$

$$3p = r + 2t$$

$$p = \frac{r + 2t}{3}$$

$$11) \quad (a) \quad F(5, 3, 0)$$

$$(b) \quad G(0, 3, 0)$$

$$(c) \quad D(0, 3, 1), \quad C(5, 0, 0)$$

$$d_{DC} = \sqrt{(0-5)^2 + (3-0)^2 + (1-0)^2}$$

$$d_{DC} = \sqrt{25 + 9 + 1}$$

$$d_{DC} = \sqrt{35}$$

$$12) \quad (a) \quad H(t) = 10 + 5 \sin t$$

$$H(10) = 10 + 5 \sin 10$$

$$H(10) = 10 + 0.868 \dots$$

$$H(10) = 10.87 \text{ m (1 d.p.)}$$

$$(b) \quad H = 12.5, H = 10 + 5 \sin t'$$

$$10 + 5 \sin t' = 12.5$$

$$5 \sin t' = 2.5$$

$$\sin t' = 0.5 \quad \leftarrow \text{sin is +ve}$$

$$RA = \sin^{-1}(0.5)$$

$$\underline{RA = 30^\circ}$$

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

$$t' = RA, 180^\circ - RA$$

$$\underline{t' = 30^\circ, 150^\circ}$$

$$\therefore \boxed{t = 30s, 150s}$$