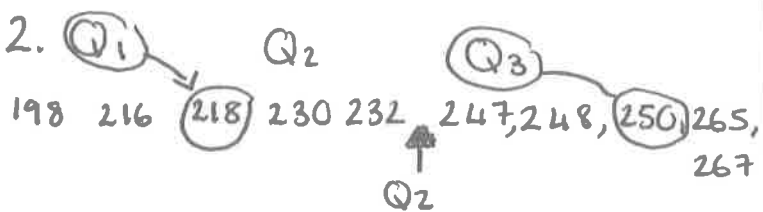


National 5 2017 Paper 1

1. $f(x) = x^2 + 3x$
 $f(-5) = (-5)^2 + 3(-5)$
 $= 25 - 15$
 $= \underline{\underline{10}}$



$$SIQR = \frac{250 - 218}{2} = \frac{32}{2} = \underline{\underline{16}}$$

3. $3\frac{5}{6} \div \frac{3}{4}$

$6 \times 3 + 5 = 23$

$$= \frac{23}{6} \times \frac{4}{3}$$

$$= \frac{23}{3} \times \frac{2}{3}$$

$$= \frac{46}{9}$$

$$= \underline{\underline{5\frac{1}{9}}}$$

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

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

$$= \underline{\underline{2x^3 - 5x^2 - 10x + 3}}$$

5. $B(0, 6, 6)$
 $C(3, 3, 9)$

(cube: all sides 6)
 pyramid $h = 3$

6. $m = -2$
 $(a, b) = (3, -2)$

$$y + 2 = -2(x - 3)$$

$$y + 2 = -2x + 6$$

$$\underline{\underline{y = -2x + 4}}$$

$$m_{AB} = \frac{y_A - y_B}{x_A - x_B}$$

$$= \frac{6 - (-2)}{-1 - 3}$$

$$= \frac{8}{-4}$$

$$= \underline{\underline{-2}}$$

7. Area = $\frac{1}{2} d f s \sin E$

$$= \frac{1}{2} (12)(8)(\frac{2}{3})$$

$$= 4 (12)(\frac{2}{3})$$

$$= 4 (8)$$

$$= \underline{\underline{32 \text{ cm}^2}}$$

8. $19 + x > 15 + 3(x - 2)$

$$19 + x > 15 + 3x - 6$$

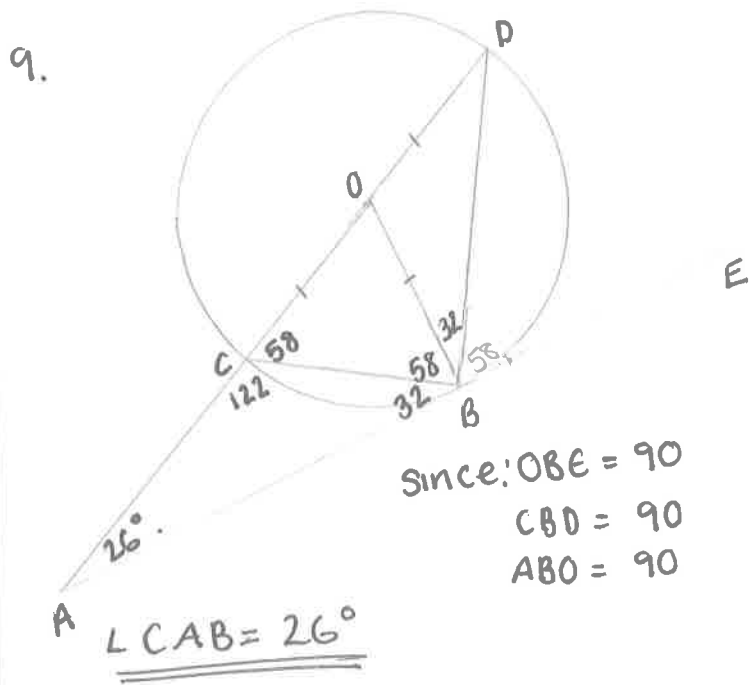
$$19 + x > 9 + 3x$$

$$-9 - x \quad -9 - x$$

$$10 > 2x$$

$$5 > x$$

$$\underline{\underline{x < 5}}$$



10. $F = \frac{t^2 + 4b}{c}$

$$F \times c = t^2 + 4b$$

$$CF - t^2 = 4b$$

$$\frac{CF - t^2}{4} = b$$

$$\therefore b = \underline{\underline{\frac{CF - t^2}{4}}}$$

(Continued) 2017 Paper 1

11. $\frac{3}{a^2} - \frac{2}{a}$ • common denom. a^2

$$\therefore \frac{3}{a^2} - \frac{2a}{a^2}$$

$$= \frac{3-2a}{a^2}$$

12. $1+4+6+3+6 = 20$ $n=5$
 $\bar{x} = 20 \div 5 = 4$

x	$x - \bar{x}$	$(x - \bar{x})^2$
1	-3	9
4	0	0
6	2	4
3	-1	1
6	2	4

$$\sum (x - \bar{x})^2 = 18$$

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

$$= \sqrt{\frac{18}{4}}$$

$$= \frac{\sqrt{18}}{2}$$

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

$a = 3$
 $b = 2.$

13.

$$3x - y = 2$$

$$(x3) x + 3y = 19 \quad (x3)$$

$$\begin{array}{r} 3x - y = 2 \\ - 3x + 9y = 57 \\ \hline \end{array}$$

$$-10y = -55$$

$$10y = 55$$

$$y = 5.5$$

Sub $y = 5.5$

$$3x - 5.5 = 2$$

$$3x = 7.5$$

$$x = 2.5$$

(2.5, 5.5)

14. $y = (x+a)^2 + b$

$a = 5$ (axis of symmetry $x = -5$)

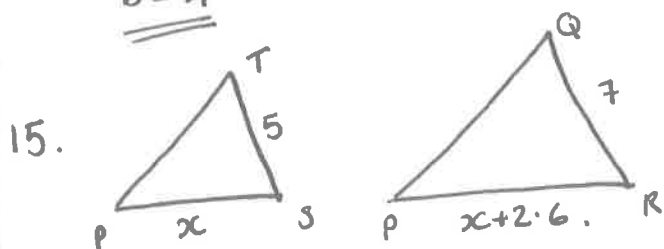
$$y = (x+5)^2 + b$$

at $(-3, 8)$,

$$8 = (-3+5)^2 + b$$

$$8 = 2^2 + b$$

$$b = 4$$



$$SF = \frac{7}{5}$$

$$\therefore \frac{7}{5}x = x + 2.6$$

$$1 = \frac{5}{5}$$

$$-\frac{2}{5}x = 2.6$$

$$2x = 13$$

$$x = \frac{13}{2}$$

$$x = 6.5 \text{ cm}$$

$$\begin{array}{r} 2.6 \\ \times 5 \\ \hline 13.0 \end{array}$$

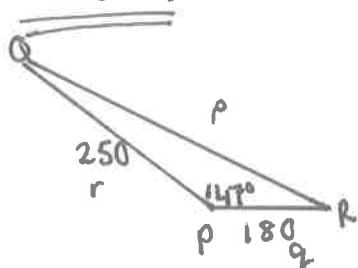
2017 National 5 Paper 2

$$1. |V| = \sqrt{18^2 + (-14)^2 + 3^2}$$

$$= \underline{\underline{23}}$$

$$2. 100 + 4.5 = 104.5\% \rightarrow 1.045$$

$$1200 \times 1.045^3 = \underline{\underline{1369}}$$



3.

$$p^2 = q^2 + r^2 - 2rq \cos p$$

$$= 180^2 + 250^2 - 2(180)(250) \cos 147$$

$$= 170380.3511 \dots$$

$$p = \sqrt{\text{ans}}$$

$$= 412.771 \dots$$

$$= \underline{\underline{412.77 \text{ m}}}$$

$$4. a = 2 \quad b = 5 \quad c = -4$$

$$x = \frac{-5 \pm \sqrt{5^2 - 4(2)(-4)}}{2(2)}$$

$$= \frac{-5 \pm \sqrt{25 + 32}}{4}$$

$$= \frac{-5 \pm \sqrt{57}}{4}$$

$$x_1 = 0.637 \dots \quad x_2 = -3.137 \dots$$

$$= \underline{\underline{0.6}} \quad = \underline{\underline{-3.1}}$$

5.

$$115\% = 4830$$

$$(\div 115) \quad (\div 115)$$

$$1\% = 42$$

$$(\times 100) \quad (\times 100)$$

$$\underline{\underline{100\% = 4200}}$$

$$6. V_{\text{sphere}} = \frac{4}{3} \pi r^3$$

$$V_{\text{large}} = \frac{4}{3} \pi (12^3)$$

$$= 7238.229 \dots$$

$$= \underline{\underline{7238.2 \text{ mm}^3}}$$

$$V_{\text{small}} = \frac{4}{3} \pi (9^3)$$

$$= 3053.628 \dots$$

$$= 3053.6 \text{ mm}^3$$

$$V_{\text{ choc }} = 7238.2 - 3053.6$$

$$= 4184.601 \dots$$

$$= \underline{\underline{4180 \text{ mm}^3}}$$

$$7. a^2 + b^2 = 8^2 + 19^2 = 425.$$

$$c^2 = 22^2 = 484$$

$$8^2 + 19^2 \neq 22^2$$

\therefore not \square by converse of Pythagoras.

$$8a) \underline{d} - \underline{c}$$

$$b) \vec{TR} = \vec{TP} + \vec{PV}$$

$$= \underline{d} + \frac{1}{2}(\underline{d} - \underline{c})$$

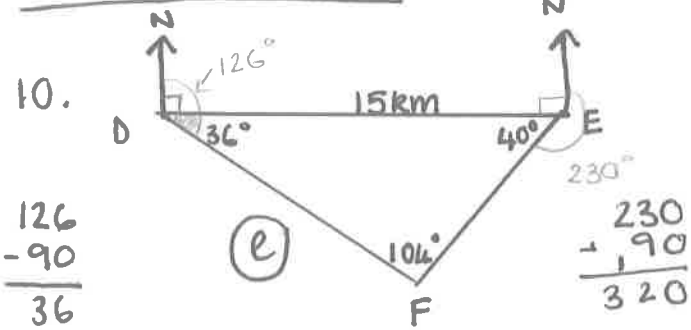
$$= \underline{d} + \frac{1}{2}\underline{d} - \frac{1}{2}\underline{c}$$

$$= \frac{3}{2}\underline{d} - \frac{1}{2}\underline{c}.$$

$$9a) (2x + 5)(2x - 5)$$

$$b) \frac{4x^2 - 25}{2x^2 - x - 10} = \frac{(2x + 5)(2x - 5)}{(2x - 5)(x + 2)}$$

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



$$\begin{array}{r} 126 \\ -90 \\ \hline 36 \end{array}$$

$$\begin{array}{r} 230 \\ -90 \\ \hline 140 \\ +36 \\ \hline 176 \end{array}$$

$$\frac{e}{\sin E} = \frac{15}{\sin F}$$

$$\Rightarrow \frac{e}{\sin 40} = \frac{15}{\sin 104}$$

$$e = \frac{15 \sin 40}{\sin 104}$$

$$= 9.936 \dots$$

$$= \underline{\underline{9.9 \text{ km}}}$$

11. $3x - 5y - 10 = 0 \rightarrow y = mx + c$
 gradient

$$3x - 10 = 5y$$

$$5y = 3x - 10$$

$$y = \frac{3}{5}x - 2$$

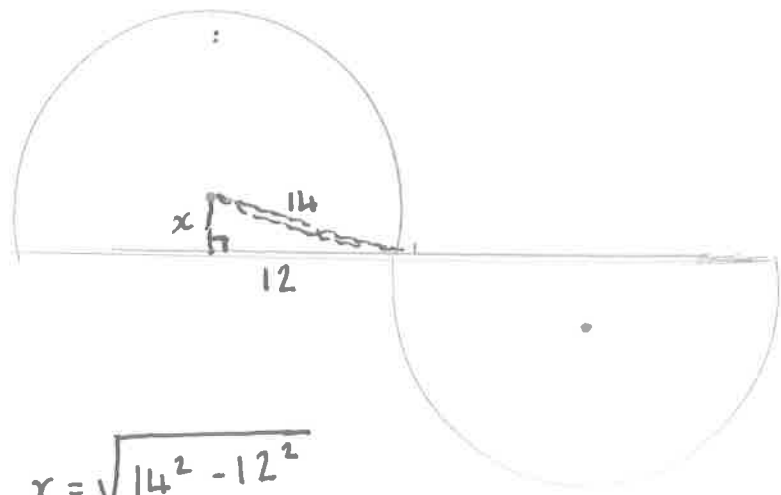
$$m = \underline{\underline{\frac{3}{5}}}$$

12.

$$\frac{1}{\sqrt[3]{x}}$$

$$= \frac{1}{x^{1/3}}$$

$$= \underline{\underline{x^{-1/3}}}$$



$$x = \sqrt{14^2 - 12^2}$$

$$= 7.211 \dots$$

$$= 7.2$$

$$\text{height} = 2(\text{radius}) + 2(x)$$

$$= 2(14) + 2(7.2)$$

$$= \underline{\underline{42.4 \text{ cm}}}$$

14. Arc Length = $\frac{x}{360} \pi d$

$$31.5 = \frac{x}{360} \pi (12.8)$$

$$31.5 \times 360 = x \pi (12.8)$$

$$31.5 \times 360 = x$$

$$12.8 \pi$$

$$x = 282.002 \dots$$

$$x = \underline{\underline{282^\circ}}$$

15 a) $H = 40 + 23 \cos x^\circ$

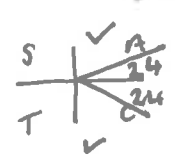
$$H = 40 + 23 \cos 60^\circ$$

$$= \underline{\underline{51.5 \text{ m}}}$$

b) $\pm 23 - \text{max/min} \dots - 23 + 40$
 $+ 40$
 $= \underline{\underline{17 \text{ m}}}$

c) $23 \cos x + 40 = 61$
 $23 \cos x = 21$
 $\cos x = \frac{21}{23}$

$$\cos^{-1}\left(\frac{21}{23}\right) = 24^\circ$$



$$x = 24^\circ, 336^\circ$$