

Solutions and Marking Key – Third Form Mathematics Examination 2014 – 2015

- 1) (D) ✓ 2) (B) ✓ 3) (C) ✓ * 4) (A) ✓ 5) (B) ✓
 ✓ 6) (D) ✓ 7) (C) ✓ 8) (A) ✓ 9) (D) ✓ 10) (C) [10]

11) $CP = \$50\,000, R = 2.25\%$

(i) $\frac{2.25}{100} \times \$50\,000$ [1] ✓
 $= \$1125$ [1] ✓ ** Give 1 mark only for \$5125 **

(ii) Value = $P(1 + \frac{R}{100})^n$ OR After 1 year = \$51 125.00 [1] ✓

$= 50\,000(1 + \frac{2.25}{100})^3$ [1+1] ✓ After 2 years = $\$51\,125.00 \times 1.0225$
 $= \$53\,451.50703$ [1] cao ✓ = \$52 275.3125 [1] ✓

accept \$53 451.51 or \$53 451.50 or \$53 500.00 After 3 years = $\$52\,275.3125 \times 1.0225$
 $= \$53\,451.50703$ [1] cao ✓

* 12) (i) $y \propto \sqrt{x} \rightarrow y = k\sqrt{x}$ [1] ✓

$x = 9, y = 10 \rightarrow 10 = k\sqrt{9}$ [1] ✓

$10 = 3k$

$\frac{10}{3} = k$ cao [1] ✓

accept \$53 451.51 or \$53 451.50
 or \$53 500.00

* (ii) $y = \frac{10}{3}\sqrt{x}$ [1] ✓

$x = 4: y = \frac{10}{3}\sqrt{4}$

$y = \frac{20}{3}$ [1] cao OR $6\frac{2}{3}$

13) (i) $\frac{1}{4} - t < \frac{2}{3}(t - 1)$

$\frac{1}{4} - t < \frac{2}{3}t - \frac{2}{3}$ [1] ✓

$\frac{1}{4} + \frac{2}{3} < \frac{2}{3}t + t$ [1+1] ✓

$\frac{11}{12} < \frac{5}{3}t$ [1] ✓
 $33 < 60t$

$11 < 20t$

$\frac{11}{20} < t$ [1] cao ✓
 OR $0.55 < t$

OR $\frac{1}{4} - t < \frac{2}{3}(t - 1)$

$3 - 12t < 8(t - 1)$ [1+1] ✓

$3 - 12t < 8t - 8$ [1] ✓

$11 < 20t$ [1] ✓

$\frac{11}{20} < t$ [1] cao ✓

OR $0.55 < t$

* (ii) $t > \frac{11}{20}, t \in W$

$\therefore t = 1$ [1] cao ✓ FT

14) $3y = 7 + 5x$ Eqn (1)
 $5x - 2y = 6$ Eqn (2)

OR

$3y = 7 + 5x$ Eqn (1)
 $5x - 2y = 6$ Eqn (2) ↓ space
 ↓ $-5x + 3y = 7$ [1] (from Eqn 1)
 $5x - 2y = 6$

From (1) $y = \frac{7+5x}{3}$ [1] ✓

$y = 13$ [1] cao ✓

Sub. into Eqn (2): $5x - 2(\frac{7+5x}{3}) = 6$ [1] ✓

Sub. into Eqn (1)

$15x - 2(7 + 5x) = 18$ ✓

$3(13) = 7 + 5x$ [1] ✓

$15x - 14 - 10x = 18$ ✓

$32 = 5x$ [1] ✓

$5x = 32$ ✓

$x = \frac{32}{5}$ [1] cao ✓

$\frac{32}{5} = x$ [1] cao or FT correct

Sub. into $y = \frac{7+5x}{3}$

$6.4 = x$

$= \frac{7+5(\frac{32}{5})}{3}$ [1] ✓

$= 13$ [1] cao or FT correct

15) (i) Total Tax-Free Allowance = \$ 1 200 [1] ✓

+ \$ 1 400 [1] ✓

+ \$ (500 × 2) [1] ✓

\$ 3 600 [1] cao ✓

* (ii) Taxable Income = \$ 28 750 - \$ 3 600 [1] ✓

= \$ 25 150 [1] cao or FT correct

(iii) Income Tax Paid

$= (\frac{2.5}{100} \times \$3\,000) + (\frac{4}{100} \times \$4\,000) + (\frac{7.5}{100} \times \$10\,000) - (\frac{10}{100} \times \$8\,150)$ [1 + 1 + 1 + 1]

= \$ 75 + \$ 160 + \$ 750 + \$ 815 ✓

= \$ 1 800

[1] cao or FT correct

* (iv) Net Income = \$ 28 750 - \$ 1 800 [1] ✓

= \$ 26 950 [1] cao or FT correct

16) (i) The modal class is (25 - 29) cm [1] ✓

Length (cm)	Number of tubers, <i>f</i>	Mid-Interval Value
15 - 19	18	$\frac{14.5 + 19.5}{2} = 17$
20 - 24	11	$\frac{19.5 + 24.5}{2} = 22$
25 - 29	30	$\frac{24.5 + 29.5}{2} = 27$
30 - 34	27	$\frac{29.5 + 34.5}{2} = 32$
35 - 39	4	$\frac{34.5 + 39.5}{2} = 37$

(ii) The mean length = $\frac{(18 \times 17 \text{ cm}) + (11 \times 22 \text{ cm}) + (30 \times 27 \text{ cm}) + (27 \times 32 \text{ cm}) + (4 \times 37 \text{ cm})}{(18 + 11 + 30 + 27 + 4)}$ [1+1+1+1+1]

$= \frac{2370}{90}$

$= 26 \frac{1}{3} \text{ cm}$ [1] ✓

accepts 26.3 cm

C.A.O

(iii) Prob. (x is at most 29.45 cm) = $\frac{18+11+30}{90}$ [1] ✓

= $\frac{59}{90}$ [1] ✓

Accept 0.656

✓ 17) (a) radius = 0.75 m C.A.O [1] ✓

✗ (b) (i) Area of cross-section POQR = $\frac{1}{2} \times \pi r^2$

Give 1 mark for ignoring $\frac{1}{2}$

= $\frac{1}{2} \times 3.142 \times (0.75m)^2$ [1] ✓

= $0.88 m^2$ C.A.O [1] ✓

✗ (ii) Outer Curved Surface Area = $\frac{1}{2} \times 2\pi rh$

Give 1 mark for 16.5 m² ie ignoring $\frac{1}{2}$

= $\frac{1}{2} \times 2 \times 3.142 \times 0.75m \times 3.5m$ [1] ✓

= $8.25 m^2$ C.A.O [1] ✓

✗ (iii) Total Surface Area = $(0.88 \times 2) + 8.25 m^2$ [1 + 1]

= $10.01 m^2$ C.A.O [1]

✓ (c) Capacity = $\frac{1}{2} \times \pi r^2 h$

Give 1 mark for ignoring $\frac{1}{2}$

= $\frac{1}{2} \times 3.142 \times (0.75m)^2 \times 3.5m$ [1] ✓

= $3.09 m^3$ [1] ✓

✓ (d) $3.09 m^3 = 3090$ litres [1] FT

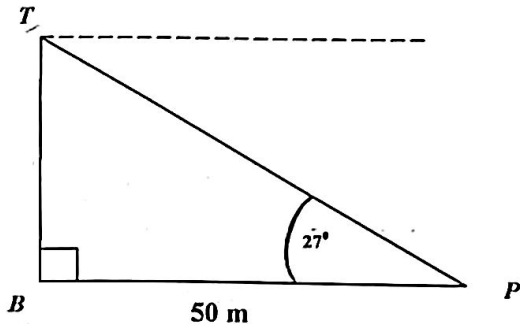
30 litres in 1 minute

3090 litres in $\frac{1}{30} \times 3090$ [1] FT

= 103 minutes [1] FT

Relax
D.P.
15 June

✓ 18) (i)



[1] mark for each correct label x5

(ii) $\cos 27^\circ = \frac{50 m}{PT}$ [1] FT

$\cos 27^\circ \times PT = 50 m$

$PT = \frac{50 m}{\cos 27^\circ}$ [1] FT

= $56.1 m$ C.A.O [1]

$$19) \text{ (i) } 6^3 = \underline{(4 \times 7^2)} + \underline{(3 \times 6)} + \underline{2} = \underline{216}$$

[1+1+1]

/ C-a-o

$$\text{ (ii) } 10^3 = \underline{(8 \times 11^2)} + \underline{(3 \times 10)} + \underline{2} = \underline{1000}$$

[1+1+1]

/ C-a-o

$$\text{ (iii) } n^3 = \underline{[(n-2) \times \underline{(n+1)^2}]} + \underline{(3 \times n)} + \underline{2} = \underline{n^3}$$

[1+1]

/

C-a-o