# CSSA General Mathematics 2004

1. $4a(a+3) = 4a^2 + 12a$

(B)

2. No. of ways $= 2^3 = 8$

(D)

3. ~~Value $= \$12200\,(0.85)^3$~~

(C) Depreciation $= \$12200 \times 0.15$ per year

$= \$1830$

Value $= \$12200 - 3 \times \$1830$

$= \$6710$

4.

(B) Next is (B)

5.

| | | | |
|---|---|---|---|
| A | 43 | $129^\circ$ | |
| B | 20 | $60^\circ$ | |
| O | 33 | $99^\circ$ | |
| L | 8 | $24^\circ$ | |
| S | 16 | $48^\circ$ | ✓ |
| | 120 | $360^\circ$ | |

(D)

6. No. of postcodes $= 1 \times 10 \times 10 \times 10$

(C) $= 10^3$

7. (C) Value $= \$3000 \times 5.4163$

$= \$16\,248.90$

8. Area $= (25\text{ cm})^2$

(A) $= (0.25\text{ m})^2$

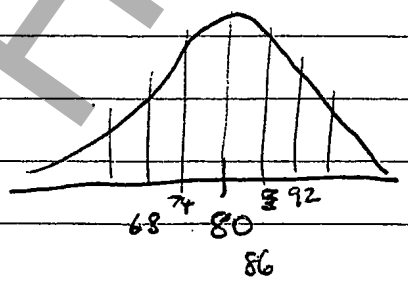
$= 0.0625\text{ m}^2$

$= 6.25 \times 10^{-2}\text{ m}^2$

$\therefore a = -2$

9.

(C)




$\bar{x} = 80$

$\sigma = 6$

10. 14 April – 20 May

(B) No. of days = 30 − 14 + 20

= 36

Interest = $240 × 0.0005 × 36

= $4.32

Total paid = $240 + $4.32

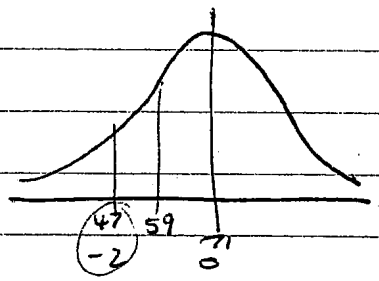
= $244.32

11. $\frac{100\,000}{1.2 \times 10^{10}} \times 100\% = 0.000\,83\%$

(B)

12.

(A)




13. $C = 800 + 25h$

(B)

14. Correlation = −0.8

(A)

15. $V = Ah$

(C) $= (\pi a b)h$

$= \pi \times 10 \times 5.5 \times 33$

$= 5702\ cm^3$

16.

(A) $A = \frac{20}{3}\left(0 + 4 \times 60 + 80\right) + \frac{20}{3}\left(80 + 4 \times 60 + 0\right)$ ✓

$= \frac{40}{3}\left(0 + 4 \times 60 + 80\right)$

$= \frac{40}{3} \times 320$

=

17. Female 179 80%

(D) Male 46 20%

225

18. (D) $(51°N, 21°E)$ — Warsaw

$(45°N, 21°E)$ — Belgrade

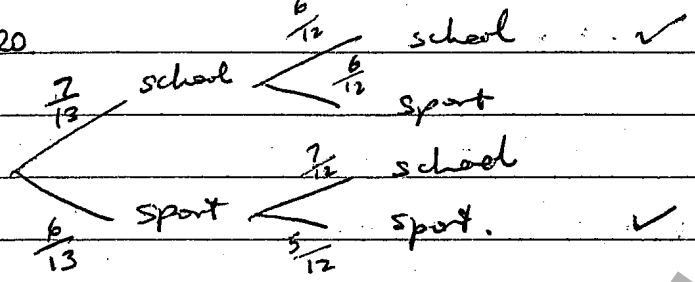
420 nm

19. Interest comps. monthly @ 12% p.a. Best.

(D)

20

(A)




$$P = \frac{7}{13} \times \frac{6}{12} + \frac{6}{13} \times \frac{5}{12}$$

21.

(B) $\frac{1}{2}, 1, 2, 4, 8, 16, 32$ (×)

A ✓

B ×

C ✓

D ✓

22. (D) $r = 12\%$ p.a. $= 3\%$ per quarter

$n = 10$ years $= 40$ quarters.

$$N = M\left\{\frac{(1+r)^n - 1}{r(1+r)^n}\right\}$$

$$N = 4000\left\{\frac{(1.03)^{40} - 1}{0.03(1.03)^{40}}\right\}$$

$$= \$92459.09$$

Section II

23. a) i) No. of chocolates in box = 8+4+5+6

= 23

ii) Soft-centred = 8+5

= 13

iii) P (soft-centred) = $\frac{13}{23}$ $\frac{8}{23}$

23 b) Tossing a coin gives the equally likely outcomes of heads or tails.

23c) i) annual interest rate = ~~0.078~~ $\frac{7.8}{100}$ = 0.078

monthly interest rate = $\frac{0.078}{12}$

= 0.0065

ii) A = \$49 448.21 × 0.0065

= \$321.41

B = \$49 448.21 + \$321.41

= \$49769.62

23d) i) Depreciation = 16% × \$80 000

= \$12 800

23d ii) Try n = 6

$S = 80000 (1 - 0.16)^6$

= 28103.84

Getting close

23d iii) Try n = 7

$S = 80000 (1-0.16)^7$

= 23607.23

Try n = 8

$S = 80000 (1-0.16)^8$

= 19830.07

∴ During the 8th year, the value of the tractor falls below \$20 000.

23e) $\frac{(x-2)}{3} - 4 = 5x$

$x - 2 - 12 = 15x$

$x - 14 = 15x$

$-14 = 14x$

$x = -1$

24a) i) Area of $\Delta ADC = \frac{1}{2} \times 110 \times 38 = 2090$ ~~2280~~

Area of $\Delta ABC = \frac{1}{2} \times 110 \times 45 = 2475$ ~~2700~~

Total area $4565\ m^2$ ~~$4980\ m^2$~~

ii) No. of trees $= \frac{4565}{15}$ ~~$\frac{4980}{15}$~~

$= 304$ ~~332~~

iii) length of AC on scale diagram = ~~110 mm~~ 120 mm

= ~~11 cm~~ 12 cm

24b) i) 20 bottles of Cola

ii) 5 bottles of Mineral water

iii) Cola (greatest area) had the greatest sales.

c) i) Mean = 22

S.D. = 9.56 (to 2 dec. pl.)

24c) ii) Interquartile range = 42 − 14

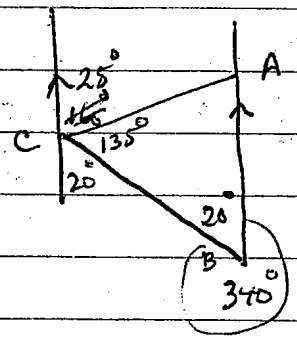
= 28

24c) iii) The mean of the home scores is greater than the mean of the away scores, but the home away scores occur within a narrower range than the home scores. Both sets of scores are positively skewed.

25. a) i) Mavis Rentals: $C = \frac{1}{2}d + 40$

(ii) No matter how many kilometres you travel in a car from Fudyet, the cost remains the same, namely $100.

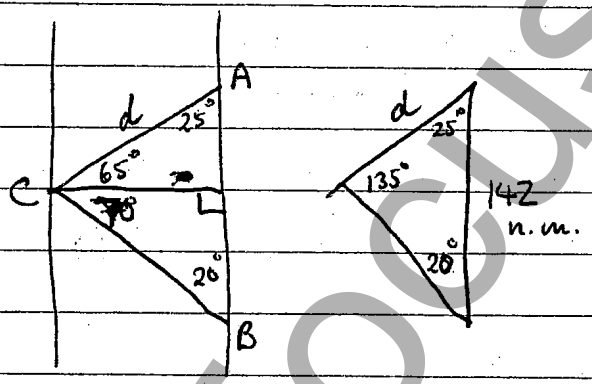
25b) i)




$\angle ACB = 180° - (360° - 340°) - 25°$

$= 135°$

ii)




$\frac{d}{\sin 20°} = \frac{142}{\sin 135°}$

$d = \frac{142 \sin 20°}{\sin 135°}$

$= 69$ n.m.

(nearest n.m.)

25c) i) Deposit (A) = 15% × $22000

= $3300

ii) Amount owing = $22000 − $3300

= $18700

36 payments = 36 × $770

= $27720

Interest = 27720 − 18700

= $9020

iii) Flat rate of interest = $\frac{9020}{3} \times \frac{100}{18700}$ %

= 16.078...

= 16.1% (to 1 dec. pl.)

25c) iv) Deposit(B) = $2300

Amount owing = $23 000 − $2300

= $20700

~~Flat rate of interest~~ =

36 payments = 36 × $786

= $28 296

Interest = $28296 − $20700

= $7596

Flat rate of interest = $\frac{7596}{3} \times \frac{100}{20700}$ %

= 12.2 % (to 1 dec. pl.)

∴ Company B provides the best buy since less interest is paid.

26.a) i) Median = 64

∴ A = 4

ii) B = 0

iii) The mean and standard deviation will both be lowered.

26 b) i) $F = \frac{k}{S}$

$12 = \frac{k}{20}$

$k = 240$

$\therefore F = \frac{240}{S}$ where F is fuel consumption in L/100 km and S = km/h

ii) $F = \frac{240}{50}$

= 4.8 L/100 km

26c) i) As the height above ground increases, the air temperature decreases.

ii) Expect an air pressure of 780 hPa.

iii) $A = 1013 - \frac{100h}{3000}$

$A = 1013 - \frac{h}{30}$

$A = 1013 - \frac{12000}{30}$, when $h = 12000$ ft

$= 613$ hPa

iv) $T = 18 - \frac{2h}{1000}$

$T = 18 - \frac{h}{500}$

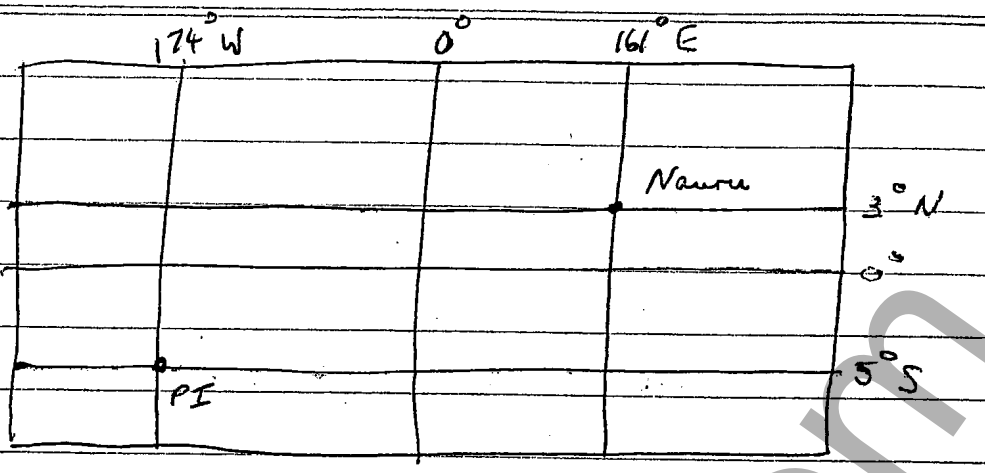
v) $T = 10 - \frac{h}{500}$

$T = 10 - \frac{10000}{500}$, where $h = 10000$ ft

$= 10 - 20$

$= -10\ ^\circ C$

27. a) i)




6 cm Mon

Degree difference = 335° = 174° + 161° ✓

Time difference $\frac{24 \times 335}{360}$ = 22 h 20 min.

Time in P.I. is 22h 20 min earlier.

= 7:40 am Sunday.

ii) Difference in latitude = 17 − 5 = 12°

Distance = 12 × 60

= 720 nautical miles

27b) i) To take say every hundredth box until 60 boxes were checked. (i.e. systematic sampling)

ii) Max = 53.5

Upper quartile = 50.8

Median = 49.3

Lower quartile = 48.4

Min = 46.5

iii) Expected no = $\frac{75}{100} \times 500$

= 375 boxes.

27c) i) 11898

11772 −

126

$\frac{\$126}{42c} = \$300$

Taxable income = $52300

| Check | Income | Tax |
|---|---|---|
| | 52000 | 11772 |
| | 300 | 126 |
| | | $11898 |

ii) Tax deductions = $65500 − $52300

= $13200

iii) Total tax to be paid = $ 11898

Medicare levy = 768 +

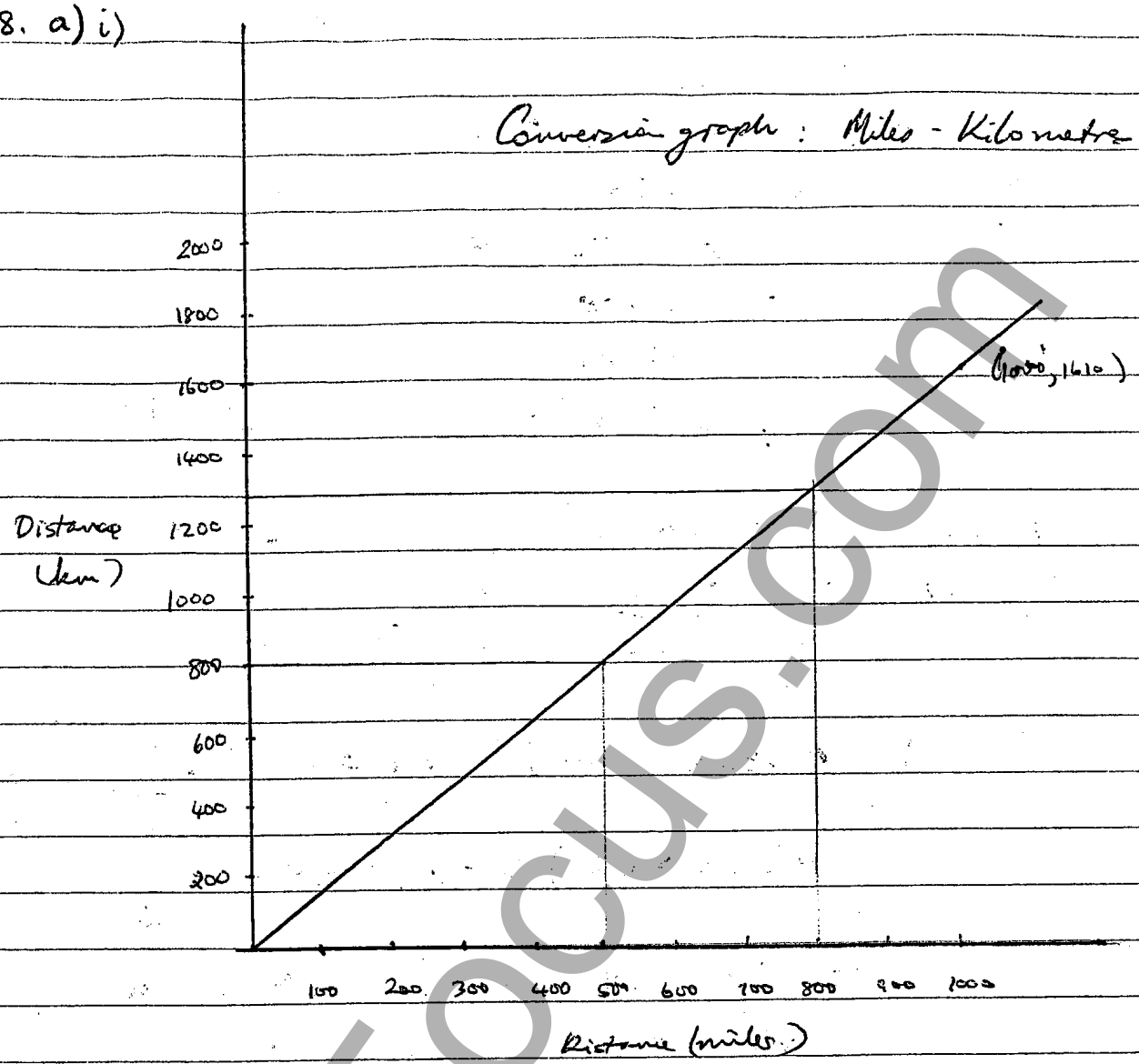
Total 12666

PAYG deductions 12200 −

∴ Additional tax to be paid = $466

28. a) i)

Conversion graph : Miles - Kilometre.




ii) 800 miles = 1290 km

28 b)

| Tagged | Untagged | Total |
|---|---|---|
| 13 | 29 | 42 |
| 56 | | x |

$$\frac{x}{42} = \frac{56}{13}$$

$$x = \frac{56 \times 42}{13}$$

$x = 181$ : estimated total pupil.
(nearest tens)