FORM 3 PROMOTION 2018

1) $x * y = 2x - 5y$

$3 * a = 2(3) - 5a$

$= 6 - 5a$ (A) (1)

2) $m = \frac{0-3}{3-0}$

$= -1$

y-intercept, $(0, 3)$

$y = -1x + 3$ (D) (1)

3) $2x - 3y = 1$

$2x - 1 = 3y$

$\frac{2}{3}x - \frac{1}{3} = y$

$m = 2/3$

perpendicular, $-3/2$ (C) (1)

4) $\frac{4}{x+5} = \frac{4}{1}$

$4 = 4x + 20$

$-16 = 4x$

$-4 = x$

$\frac{1}{x+6}$

$= \frac{1}{-4+6}$

$= \frac{1}{2}$ (D) (1)

5) $(2x-3)^2$ (B) (1)

6) $\frac{2}{p} + \frac{1}{q} = \frac{r}{1}$

$2q + p = pqr$

$\frac{p+2q}{pq} = r$ (C) (1)

7) 10, 20, 43, 30, 10, 10 (A) (1)

8) 10, 10, 10, 20, 30, 43

Median $= \frac{10+20}{2} = 15$ (B) (1)

9) $\bar{x} = \frac{(3 \times 10) + 20 + 30 + 43}{6}$

$= 20.5$ (B) (1)

10) $\cos 40^\circ = \frac{5}{AC}$

$AC \cos 40^\circ = 5$

$AC = \frac{5}{\cos 40^\circ}$ (B) (1)

11) $P = \$80\,000$

(i) $\frac{2}{100} \times \$80\,000$ (1)

$= \$1600$ (1)

(ii) Value $= \$80\,000 \times 0.98 \times 0.98 \times 0.98$ (2)

$= \$75\,295.36$ (1)

OR Value after Year 1 $= \$78\,400$ (1)

Depreciation after Year 1 $= \frac{2}{100} \times \$78\,400$

$= \$1,568$

Value after Year 2 $= \$76\,832$ (1)

Depreciation after Year 2 $= \frac{2}{100} \times \$76\,832$

$= \$1536.64$

Value after Year 3 $= \$75,295.36$ (1)

12) $(a^{\frac{1}{3}})^2 \times a^3$

$= a^{\frac{2}{3}} \times a^3$ (1)

$= a^{\frac{8}{3}}$ (1)

13) $b \propto +\sqrt{c}$

ie. $b = k\sqrt{c}$

(i) $b = 5$, when $c = 9$

$5 = k\sqrt{9}$ (1)

$5 = 3k$

$\frac{5}{3} = k$ (1)

(ii) $b = \frac{5}{3}\sqrt{c}$

when $c = \frac{1}{4}$

$b = \frac{5}{3}\sqrt{\frac{1}{4}}$ (1)

$b = \frac{5}{3} \cdot \frac{1}{2}$

$b = \frac{5}{6}$ (1)

14) $y = \frac{p}{1-p}$

$y(1-p) = p$ (1)

$y - py = p$ (1)

$y = p + py$

$y = p(1+y)$ (1)

$\frac{y}{(1+y)} = p$ (1)

15) $3x - 4y = 11$ (1)

$5x + 9y = -13$ (2)

$15x - 20y = 55$ (1)

$15x + 27y = -39$ (1)

$-47y = 94$

$y = -2$ (1)

sub. into (1)

$3x - 4(-2) = 11$ (1)

$3x + 8 = 11$

$3x = 3$

$x = 1$ (1)

16) (i) $m = \frac{-7-5}{4--2}$

$= \frac{-12}{6}$

$m = -2$ (1)

$y = -2x + c$

Using $(-2, 5)$

$5 = -2(-2) + c$

$5 = 4 + c$

$1 = c$ (1)

$y = -2x + 1$ (1)

(ii) $m = -2$ (1)

$y = -2x + c$

Using $(2, 6)$

$6 = -2(2) + c$

$10 = c$ (1)

$y = -2x + 10$ (1)

17) (i) Total Tax-free Allowances

$= \$15000 + 2 \times \$500$ ① + ①

$= \$15\,000 + \$1000$

$= \$16\,000$ ①

(ii) Taxable Income

$= \$40\,000 - \$16\,000$ ①

$= \$24\,000$ ①

(iii) Income Tax paid

$= \left(\frac{4}{100} \times \$2000\right) + \left(\frac{6}{100} \times \$3000\right) + \left(\frac{8}{100} \times \$19\,000\right)$ ① + ① + ①

$= \$80 + \$180 + \$1520$

$= \$1780$ ①

iv) Net Income

$= \$40\,000 - \$1780$ ①

$= \$38\,220.00$ ①

18) (i) $P(\text{female}) = \frac{(25+5)}{(30+40+25+5)}$ ① ①

$= \frac{30}{100}$

$= \frac{3}{10}$ ①

(ii) $P(<30/M) = \frac{30}{30+40}$ ① ①

$= \frac{3}{7}$ ①

①

19) (i) Modal class = 130 – 134 (1)

(ii) Mean $= \frac{(2\times122)+(6\times127)+(17\times132)+(15\ 137)+(10\times142)}{2+6+17+15+10}$ (5) (1)

$= \frac{6,725}{50}$

$= 134.5$ cm (1)

(iii) $P(X \leq 134cm) = \frac{2+6+17}{50}$ (1)

$= \frac{1}{2}$ (1)

20) (i) $V = \frac{1}{3}\pi r^2 h$

$= \frac{1}{3}\times\frac{22}{7}\times 9^2 \times 49$ (1)

$= 4158\ cm^3$ (1) CAO

(ii) Remaining volume

$= 4158 - 258$

$= 3900\ cm^3$ (1)

Time Taken

$= \frac{3900\ cm^3}{20\ cm^3 s^{-1}}$ (1)

$= 195$ seconds

$= 3.25$ minutes (1)

21) (i) Area of $\Delta POM = \frac{1}{2}bh$

$= \frac{1}{2} \times 7 \times 7$ (1)

$= \frac{49}{2} cm^2$ (1) CAO

(ii) Shaded Area = Area of sector − Area of Δ

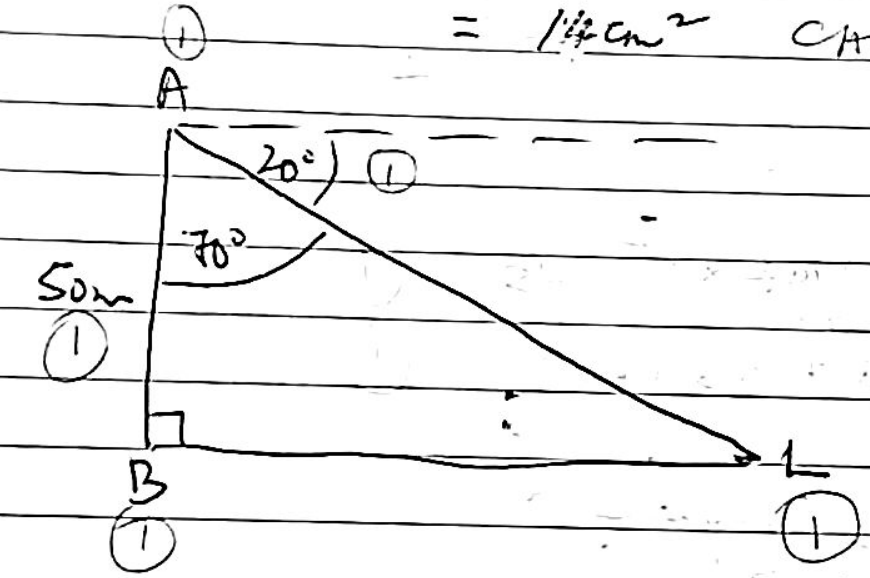
$= \frac{90^\circ}{360^\circ} \times \frac{22}{7} \times 7^2 - \frac{49}{2}$ (1)

$= \frac{1}{4} \times 22 \times 7 - \frac{49}{2}$

$= \frac{77}{2} - \frac{49}{2}$

$= 14 cm^2$ CAO (1)

22) (i)



(1) (1) (1) (1)

(ii) $\tan 70^\circ = \frac{LB}{50m}$ (1)

$\tan 70^\circ \times 50m = LB$ (1)

$137.37m = LB$ (1)

$137 m$ (3sf) $= LB$