FORM III PROMOTION 2017

1) D **2) B** **3) C** **4) B** **5) D** **6) A** **7) B** **8) B** **9) A** **10) D**

11) $P = \$\ 160\ 000$, $R = 2.75\ \%$

(i) $\frac{2.75}{100} \times \$\ 160\ 000$ **[1]**

$= \$\ 4\ 400$ **[1]**

(ii) Value $= P\left(1 + \frac{R}{100}\right)^n$

$= 160\ 000\left(1 + \frac{2.75}{100}\right)^3$ **[1 + 1]**

$= \$\ 173\ 566.3275 / 33$ **cao [1]**

OR After 1 year $= \$\ 164\ 400$ **[1]**

After 2 years $= \$\ 164\ 400 \times 1.0275$

$= \$\ 168\ 921$ **[1]**

After 3 years $= \$\ 168\ 921 \times 1.0275$

$= \$\ 173\ 566.3275 / 33$ **[1] cao**

12) $\left(x^{\frac{1}{2}}\right)^3 \times \sqrt{x^9}$

$= x^{\frac{3}{2}} \times x^{\frac{9}{2}}$ **[1]**

$= x^{\frac{12}{2}}$ **[1]**

$= x^6$ **[1]**

13) (i) $r \alpha \sqrt[3]{s}$

$r = k \times \sqrt[3]{s}$ **[1]**

$10 = k \times \sqrt[3]{\frac{1}{8}}$ **[1]**

$10 = \frac{1}{2}k$

$20 = k$ **[1]**

(ii) $r = 20 \times \sqrt[3]{s}$

$12 = 20 \times \sqrt[3]{s}$ **[1]**

$\frac{12}{20} = \sqrt[3]{s}$ **[1]**

$\left(\frac{12}{20}\right)^3 = s$ **[1]**

$\frac{27}{125} = s$

14) (a) $\frac{y}{1} = \frac{p+x}{1-px}$

$y - ypx = p + x$ **[1]**

$y - p = ypx + x$ **[1]**

$y - p = x(py + 1)$ **[1]**

$\frac{y-p}{py+1} = x$ **[1]**

(b) (i) $w = x, l = x + 3$

$2[x + (x + 3)] \leq 126$ **[1]**

(ii) $2[2x + 3] \leq 126$

$4x + 6 \leq 126$ **[1]**

$4x \leq 120$ **[1]**

$x \leq 30$ **[1]**

Greatest length = 30 + 3 = 33 m **[1]**

15) $3p - 4q = 11$ $Eqn\ (1)$
$5p + 9q = -13$ $Eqn\ (2)$

$15p - 20q = 55$ **[1]**
$15p + 27q = -39$ **[1]**

$-47q = 94$

$q = -2$ **[1]**

$3p - 4(-2) = 11$ **[1]**

$p = 1$ **[1]**

OR

$3p - 4q = 11$ $Eqn\ (1)$
$5p + 9q = -13$ $Eqn\ (2)$

From Eqn (1) $p = \frac{4q+11}{3}$ **[1]**

Sub. Into Eqn (2)

$5(\frac{4q+11}{3}) + 9q = -13$ **[1]**

$5(4q + 11) + 9q = -39$ **[1]**

$20q + 55 + 27q = -39$

$q = -2, p = 1$ **[1+1]**

16) (i) Gradient of Line joining (– 2, 1) and (3, 4) is $\frac{4-1}{3--2}$

$= \frac{3}{5}$ **[1] CAO**

Equation is $\frac{y-1}{x--2} = \frac{3}{5}$ **[1] FT**

$5y - 5 = 3x + 6$

$5y = 3x + 11$ **[1] FT**

OR $y = \frac{3}{5}x + c$ **[1] FT**

$1 = \frac{3}{5}(-2) + c$

$\frac{11}{5} = c$

$y = \frac{3}{5}x + \frac{11}{5}$ **[1] FT**

(ii) Gradient of perpendicular is $-\frac{5}{3}$. **[1] FT**

Equation is $\frac{y-4}{x-3} = -\frac{5}{3}$ **[1] FT**

$3y - 12 = -5x + 15$

$3y + 5x = 27$ **[1] CAO**

OR $y = -\frac{5}{3}x + c$ **[1] FT**

$4 = -\frac{5}{3}(3) + c$

$9 = c$

$y = -\frac{5}{3}x + 9$ **[1] CAO**

(iii) $3y + 5x = 27$ meets the y-axis when $x = 0$.

$3y = 27$

$y = 9$

Point (0, 9) **[1] FT**

Distance between (– 2, 1) and (0, 9) $= \sqrt{(0--2)^2 + (9-1)^2}$ **[1]**

$= \sqrt{4 + 64}$

$= \sqrt{68}$ **[1]**

17) (i) $C = 35$ cm

$2\pi r = 35$ cm **[1]**

$r = \dfrac{35}{2\pi}$ **[1]**

(ii) **TSA** $= \mathbf{2\pi r^2 + 2\pi rh}$ **[1]**

$= \mathbf{2\pi r\,(r + h)}$

$= 2\pi \times \dfrac{35}{2\pi}\left(\dfrac{35}{2\pi} + 14\right)$ **[1]**

$= 35\left(\dfrac{35}{2\pi} + 14\right)\text{cm}^2$ **[1]**

(iii) $V = \pi r^2 h$

$= \pi \times \left(\dfrac{35}{2\pi} \times \dfrac{35}{2\pi}\right) \times 14$ **[1 + 1 + 1]**

$= \pi \times \left(\dfrac{1225}{4\pi^2}\right) \times 14$ **[1]**

$= \left(\dfrac{8575}{2\pi}\right)\text{cm}^3$ **[1]**

18) (i) $PN = 12$ cm **[1]**

Triangle LPN is isosceles **[1]**

(ii) $(LM)^2 = 12^2 + 5^2$ **[1]**

$= 169$

$LM = 13$ **[1]**

(iii) $\tan \angle LMP = \dfrac{12}{5}$ **[1] CAO**

$LMP = \tan^{-1}(\dfrac{12}{5})$

$= 67.4^0$ **[1] CAO**

19) (a) Arc $ACB = \frac{100}{360} \times 2 \times 3.14 \times 9$ **[1]**

$= 15.7\ cm$ **[1]**

(b) (i) Area of sector $OABC = \frac{100}{360} \times 3.14 \times (9\ cm)^2$ **[1]**

$= 70.65\ cm^2$ **[1]**

(ii) $s = \frac{a+b+c}{2} = \frac{9+9+13.8}{2}$ **[1]**

$= 15.9$ **[1]**

Area of triangle $OAB = \sqrt{15.9(15.9-9)(15.9-9)(15.9-13.8)}$ **[1]**

$= 39.9\ cm^2$ **[1]**

ALTERNATIVELY

$\cos 50^0 = \frac{h}{9cm}$ **[1]** OR $\sin 40^0 = \frac{h}{9cm}$ **[1]**

$\cos 50^0 \times 9\ cm = h$ OR $\sin 40^0 \times 9\ cm = h$

$5.79\ cm = h$ **[1]** OR $5.79\ cm = h$ **[1]**

So, Area of triangle $OAB = \frac{1}{2} \times 13.8\ cm \times 5.79\ cm$ **[1]**

$= 39.951\ cm^2$ **[1]**

(iii) Area of shaded segment $ABC = 70.65\ cm^2 - 39.9\ cm^2$ **[1]**

$= 30.75\ cm^2$ **[1]**

20)

(i)	a	$\frac{a}{2} + \left(\frac{1}{3} \times 2\right)$	$\frac{3a+4}{6}$
(ii)	ab	$\frac{ab}{2} + \left(\frac{b}{3} \times 2\right)$	$\frac{3ab+4b}{6}$ **[1+1+1 marks]**
(iii)	abc	$\frac{abc}{2} + \left(\frac{bc}{3} \times 2\right)$ **[1+1 marks]**	$\frac{3abc+4bc}{6}$