## SECTION I

**CIRCLE** the **LETTER** that matches your response for Questions **1)** to **14)**.

**1)** The number 374.438 written correct to 1 decimal place is

**A)** 374.0 **B)** 374.4 **C)** 374.5 **D)** 375.4

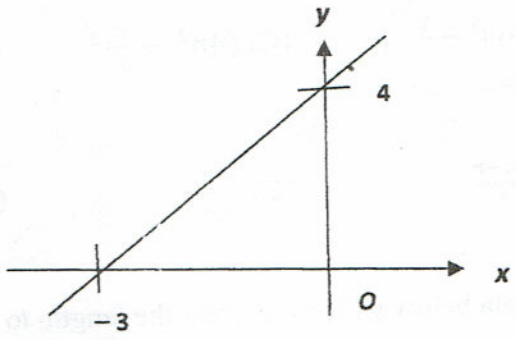
**2)** The value of $\frac{(4a)^3}{6a^2-2a^2}$

**A)** 16a **B)** $2a^2$ **C)** $4a$ **D)** $a^3$

**3)** If $x * y$ is defined to be $x \div \frac{2}{y}$, then $-2 * p$

**(A)** $p$ **(B)** $-\frac{p}{4}$ **(C)** $-\frac{4}{p}$ **(D)** $-p$

**4)**




The diagram above, not drawn to scale, illustrates the graph of

**(A)** $y = -3x + 4$ **(B)** $y = 4x - 3$ **(C)** $y = \frac{4}{3}x + 4$ **(D)** $y = \frac{3}{4}x - 4$

**5)** The gradient of the line perpendicular to $3x - 2y = 1$ is

**(A)** $\frac{2}{3}$ **(B)** $\frac{3}{2}$ **(C)** $-\frac{3}{2}$ **(D)** $-\frac{2}{3}$

**6)** The equation of the line which passes through the point (1, 2) and is parallel to the line with equation $y = 3x + 2$ is

**A)** $y = 3x - 1$ **B)** $y = 3x + 2$ **C)** $y = \frac{1}{3}x + 2$ **D)** $y = \frac{1}{3}x - 1$

**7)** Three times the difference of two numbers, $a$ and $b$, may be written as

**A)** $3a - b$ **B)** $3a - 3b$ **C)** $3a + 3b$ **D)** $3a \times 3b$

**8)** If $4(1-x)-2x=3$, then $x=$

A) $\frac{3}{4}$ B) $-\frac{7}{6}$ C) $\frac{1}{2}$ D) $\frac{1}{6}$

**9)** $\frac{1-3x}{2}-\frac{x+1}{4}$ simplifies to

A) $\frac{1-7x}{4}$ B) $\frac{3-5x}{4}$ C) $\frac{2-3x}{4}$ D) $6-14x$

**10)** If $\frac{2}{a-b}=\frac{1}{4}$, then the value of $\frac{3a-3b}{2}$ is

(A) $\frac{8}{3}$ (B) $\frac{3}{2}$ (C) 8 (D) 12

**11)** A number, $4n$, is squared, then decrease by $\frac{1}{3}$, algebraically, this may be represented as

(A) $4n^2-\frac{1}{3}$ (B) $16n^2-\frac{1}{3}$ (C) $(4n^2-\frac{1}{3})^2$ (D) $16n^2+\frac{1}{3}$

**12)** If $\frac{3}{p}-\frac{2}{q}=r$, then $p$ equals

(A) $\frac{3q}{2+qr}$ (B) $\frac{3q-r}{2}$ (C) $\frac{3}{2+r}$ (D) $3q-2r$

Questions **13)** and **14)** refer to the data below which represent the length, to the nearest cm, of a sample of rulers.

| 25, 20, 15, 42, 25, 25, 30, 42 |
|---|

**13)** The modal length of the rulers is

(A) 42 (B) 30 (C) 25 (D) 15

**14)** The median length of the rulers is

(A) 20 (B) 25 (C) 30 (D) 42

[14]

## SECTION II

**ALL WORKING MUST BE CLEARLY SHOWN FOR QUESTIONS 15 to 20 IN THE SPACE PROVIDED AFTER EACH QUESTION**

**a)** Number your responses **carefully** and **identically** (including any associated parts) as they appear in this section of the question paper.

b) If a numerical answer cannot be given **exactly**, and the accuracy required is not specified in the question, then in the case of an angle it **must** be given correct to **one (1)** decimal place, in other cases it **must** be given correct to **three (3) significant figures**.

**15)** Simplify fully $\left(c^{-\frac{2}{5}}\right)^3 \times \frac{1}{c^2}$ [3]

$= c^{-\frac{6}{5}} \times c^{-2}$ ① + ①

$= c^{-\frac{16}{5}}$

$= \frac{1}{c^{\frac{16}{5}}}$

$= \frac{1}{\sqrt[5]{c^{16}}}$

① CAO

**16)** $m$ is directly proportional to the square root of $n$ cubed.

(i) Write an equation involving $m$ and $n$. [3]

(ii) Given that $m = 6$ when $n = 4$, calculate the value of $m$ when $n = 9$. [4]

(i) $m \propto \sqrt{n^3}$ ① + ①

$m = k\sqrt{n^3}$ ①

(ii) $6 = k\sqrt{4^3}$ ①

$6 = k(8)$

$\frac{3}{4} = k$ ①

$m = \frac{3}{4}\sqrt{n^3}$ ①

$= \frac{3}{4}\cdot\sqrt{9^3}$

$= \frac{3}{4}\cdot 27$

$= \frac{81}{4}$ ① CAO

**17)** Solve for $x$ and $y$, the simultaneous equations: $3x - \frac{1}{2}y = 5$, $2x + 3y = 20$ [4]

$3x - \frac{1}{2}y = 5$ eq$^n$ ①

$2x + 3y = 20$ eq$^n$ ②

i.e. $6x - y = 10$ ①

$6x + 9y = 60$ ①

$-10y = -50$

$y = 5$ ① CAO

sub. into eq$^n$ ②

$2x + 3(5) = 20$

$2x + 15 = 20$

$2x = 5$

$x = \frac{5}{2}$ ① CAO

OR

$3x - \frac{1}{2}y = 5$ eq$^n$ ①

$2x + 3y = 20$ eq$^n$ ②

From eq$^n$ ① $6x - y = 10$

$6x - 10 = y$ sub. into eq$^n$ ② ①

$2x + 3(6x - 10) = 20$ ①

$2x + 18x - 30 = 20$

$20x = 50$

$x = \frac{5}{2}$ ① sub into $6x - 10 = y$

CAO

$6(\frac{5}{2}) - 10 = y$

$15 - 10 = y$

$5 = y$ ①

CAO

18) $ 10 000 in savings bonds are invested for 3 years at an initial rate of 2 % per annum.

(i) Calculate the value of the investment after one year. [2]

For the next 2 years the bonds are not cashed in, and an additional 1% interest is added annually

(ii) Calculate the amount of interest received at the end of the investment period. [5]

(i) $\frac{102}{100} \times \$10\,000$ (1) OR $\frac{2}{100} \times \$10\,000$

$= \$10\,200$ (1) CAO $= \$200$ (1)

$A = \$10\,000 + \$200$

$= \$10\,200$ (1) CAO

(ii) Amount at End of Year 2 OR $\frac{3}{100} \times \$10\,200$ (1)

$= \frac{103}{100} \times \$10\,200$ (1) $= \$306$ (1) CAO

$= \$10\,506$ (1) CAO

Amount at End of Year 3 OR $\frac{4}{100} \times [\$10\,200 + \$306]$ (1)

$= \frac{104}{100} \times \$10\,506$ (1) $= \$420.24$ (1) CAO

$= \$10\,926.24$ (1) CAO

TOTAL INTEREST

$= \$10\,926.24 - \$10\,000.00$

$= \$926.24$ (1) FT

TOTAL INTEREST

$= \$200 + \$306 + \$420.24$

$= \$926.24$ (1) FT

**19)** The table below shows the time spent, to the nearest minute, by 25 students at the school canteen.

| Time spent at the canteen (minutes) | Frequency |
|---|---|
| 6 – 10 | 2 |
| 11 – 15 | 4 |
| 16 – 20 | 8 |
| 21 – 25 | (i) 6 |
| 26 – 30 | 4 |
| 31 – 35 | 1 |

(1)

(i) Complete the row numbered **(i)** [1]
(ii) State the modal class [1]
(iii) Calculate the mean time spent at the canteen [8]
(iv) Determine the probability that a student chosen at random spent no more than 20 minutes at the canteen. [1]

(ii) Modal class, 16 – 20 (1)

(iii) $\bar{x} = \dfrac{(2\times8)+(4\times13)+(8\times18)+(6\times23)+(4\times28)+(1\times33)}{25}$ (6) (1)

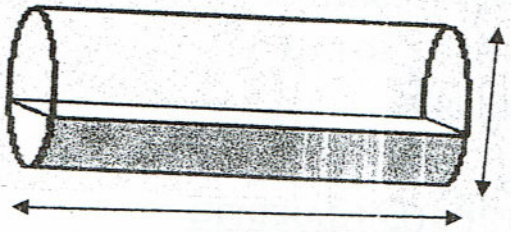
$= \dfrac{495}{25}$

$= 19.8$ (1) CAO

(iv) $P(X \leq 20) = \dfrac{8+4+2}{25}$

$= \dfrac{14}{25}$ (1) CAO

**20)** The figure below, not drawn to scale, shows a cylinder one-third filled with liquid. The diameter of the cylinder is 14 cm and its length is 35 cm.




Using $\pi = \frac{22}{7}$, calculate the **EXACT** value of

(i) the remaining capacity of the cylinder [2]
(ii) the amount of liquid that must be removed so that the cylinder is.one-quarter filled [5]
(iii) the total surface area of the cylinder [3]

(i) $\frac{2}{3}\pi r^2 h = \frac{2}{3} \times \frac{22}{7} \times \frac{7}{1} \times \frac{7}{1} \times \frac{35}{1}$ (1)

$= \frac{10,780\ cm^3}{3}$

$= 3,593\frac{1}{3}\ cm^3$ (1) CAO

(ii) $\frac{2}{3} \equiv \frac{10,780}{3}\ cm^3$

$\frac{1}{3} \equiv \frac{10,780 cm^3}{6} = 1,796\frac{2}{3}\ cm^3$ (1) SOI

NOTE: $\frac{1}{4} \equiv \frac{3}{4} \times \frac{1}{3} = \frac{3}{4} \times \frac{10,780 cm^3}{6} = \frac{2695}{2} = 1347.5 cm^3$ (1) (1)

Liquid to be Removed

$= \frac{10,780 cm^3}{6} - \frac{2695 cm^3}{2}$

$= \frac{(10,780 - 8085) cm^3}{6}$ (1)

$= \frac{2695 cm^3}{6}$

$= 449\frac{1}{6}\ cm^3$ (1) CAO

**End of Assessment**



P.T.O

**EXTRA PAGE FOR WORKING**

20) (iii) $TSA = 2\pi r^2 + 2\pi rh$
$= 2\pi r(r+h)$ } ①

$= \frac{2}{1} \times \frac{22}{7} \times \frac{7}{1}(7+35)$
$= 2 \times 22 \times (42)$ } ①

$= 1848\ cm^2$ ① ecf