Test yourself – are you ready for Calculus and Probability Online Course?

No notes or calculators are allowed in this 90 minute test. Treat it as a test and do not use any extra equipment or notes. Then check the answers. If you haven't done well then you may not be ready to do the Calculus and Probability Course. This test does not cover every topic in Maths Methods 1/2 but should be a good indication if you remember the basics, especially if you haven't studied maths in a while.

Section 1: Multiple Choice:

Circle the correct response for these multiple choice problems. There is space at the bottom half of each page that you can use for your rough working. All material must be submitted at the end of the test.

Question 1: The expansion of $(3x-2)^2$ is:

A $9x^2-4$ B $3x^2-6x+4$ C $9x^2-12x+4$

D $9x^2+12x+4$ E $9x^2-12x-4$

Question 2: The solution to the inequation $\frac{2(5-a)}{3} \geq -6$ is:

A $a \leq 14$ B $a \geq 4$ C $a \leq 4$

D $a \geq -14$ E $a \geq 14$

Question 3: The solution(s) of the equation $6x^2 - x - 15 = 0$ are:

A $x = -\frac{5}{3}, x = \frac{3}{2}$ B $x = \frac{5}{3}, x = -\frac{3}{2}$ C $x = 1, x = -\frac{5}{2}$

D $x = 15, x = 0$ E $x = 5, x = -3$

Question 4: Transposing (or re-arranging) the equation $2x + 5y = 15$ to make *y* the subject gives:

A $y = 3 - \frac{2}{5}x$ B $y = \frac{5}{2}x + 7.5$ C $y = 15 - 2x$

D $y = \frac{2}{5}x + 3$ E $y = 5(15 - 2x)$

Question 5: The solution of the equation $2x = \frac{3x}{2} - 4$ is:

A 4 B - 2 C - 8

D 1 E 2

Question 6: The value of h in the expression $A = \frac{1}{2}h(a+b)$ when A = 40, a = 3 and b = 7 is

A	5	B	4	C	2
D	200	E	8		

Question 7: The remainder when $y = 3x^2 + 6x + 13$ is divided by $(x - 2)$ is:-

A	2	B	37	C	13
D	61	E	22		

Question 8: If $(x - 3)$ is a factor of $x^3 + \boldsymbol{a}x^2 - x - 6$ then $\boldsymbol{a}$ is equal to:-

A	2	B	-2	C	1
D	-1	E	-6		

Question 9: The point of inflexion of the graph $y = 3(x+2)^3 - 5$ is:

A (-2,5) B (-2,-5) C (-2, 5)

D (2, -5) E (-5, 2)

Question 10: The graph shown could have the equation:

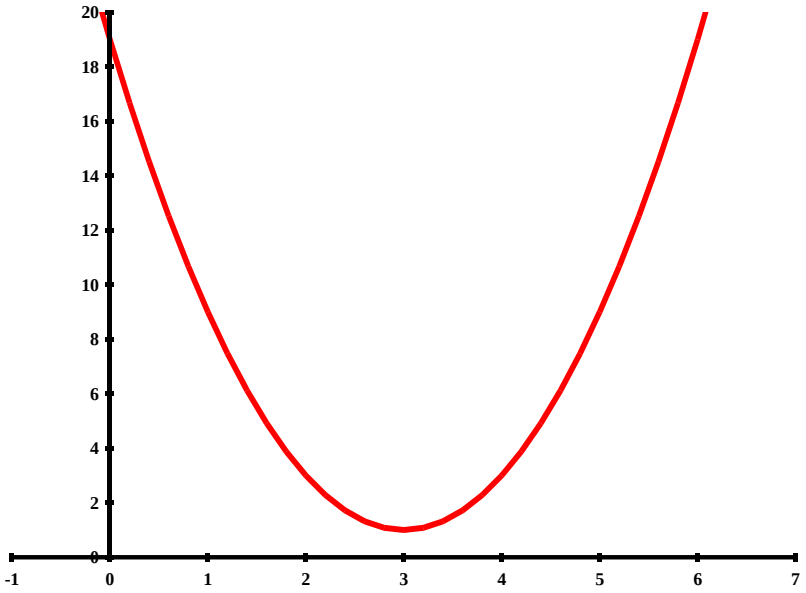
A $y = (x-1)^2 + 1$

B $y = (x-3)^2 + 1$

C $y = 2(x-3)^2 + 1$

D $y = 3(x-3)^2 + 1$

E $y = 2(x+3)^2 + 1$



Question 11: The result when you simplify $\frac{(3ab)^4}{ab^{-2}}$ is:

A $\frac{81a^4b^2}{a}$ B $\frac{3a^3}{b^2}$ C $3a^3b^6$

D $\frac{81a^3}{b^2}$ E $81a^3b^6$

Question 12: The simplification of $\sqrt{72}+\sqrt{75}-\sqrt{18}$ is:

A $3\sqrt{2}+3\sqrt{5}$ B $\sqrt{129}$ C $2\sqrt{6}+3\sqrt{5}-2\sqrt{3}$

D $3\sqrt{2}+5\sqrt{3}$ E $9\sqrt{2}+5\sqrt{3}$

Question 13: The simplification of $64^{-\frac{2}{3}}$ is:

A -16 B $\frac{1}{4}$ C $\frac{1}{8}$

D $\frac{1}{16}$ E 8

Question 14: If $\frac{x}{x+1}-\frac{5}{x-2}=1$, then x is equal to:-

A 2 B $-\frac{1}{2}$ C $\frac{1}{2}$

D -2 E 1

Question 15: The gradient of the line joining the points (-4, 7) and (3 , 8) is:-

A 7 B $\frac{1}{7}$ C -1

D $-\frac{1}{7}$ E 1

Question 16: The graph of $y = \log_{10}(2x)$ has an *x* intercept of:-

A (1,0) B (0,2) C (0.5,0)

D (0,0) E (2,0)

Question 17: The solution to the pair of simultaneous equations shown is:

$$\left.\begin{aligned} 4x+5y&=14 \\ 6x-2y&=-17 \end{aligned}\right\}$$

A $x=-1.5, y=4$ B $x=1, y=2$ C $x=5, y=7$

D $x=\frac{2}{3}, y=5$ E $x=6, y=-2$

Question 18: The amplitude of the graph of $y=-\frac{1}{2}\cos(2\theta)$ is:

A 2 B $-\frac{1}{2}$ C $\frac{1}{2}$

D π E 2π

Question 19: The **exact** value for $\cos\left(\frac{5\pi}{6}\right)$ is :

A $\frac{5}{6}$ B $-\frac{1}{2}$ C $\frac{1}{2}$

D $\frac{\sqrt{3}}{2}$ E $-\frac{\sqrt{3}}{2}$

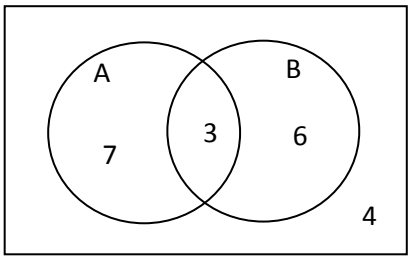
Question 20: For a well shuffled pack of 52 playing cards, the probability of selecting either a red card or an ace is

A $\frac{15}{26}$ B $\frac{29}{52}$ C $\frac{6}{13}$

D $\frac{7}{13}$ E $\frac{1}{2}$

Question 21: For the Venn Diagram shown $n(A \cap B') =$

A 3
B 7
C 6
D 4
E 11



Question 22: In the school swimming team, 16 students were freestyle swimmers and 15 were backstroke competitors. If the total number of freestyle and backstroke competitors is 25, then the number of competitors who swim **only** freestyle is

A 31 B 6 C 9

D 1 E 10

Question 23: What is the derivative $\left(\frac{dy}{dx}\right)$ of $y = 2x^3 - \sqrt{x} + \frac{3}{x^4}$ **?**

A $6x^2 - \frac{1}{2\sqrt{x}} - \frac{12}{x^3}$ B $2x^3 - x^{\frac{1}{2}} + 3x^{-4}$ C $6x^2 - \frac{1}{2\sqrt{x}} - \frac{12}{x^5}$

D $6x^2 - 2x^{-\frac{1}{2}} - 12x^{-5}$ E $6x^2 - \frac{1}{2\sqrt{x}} + \frac{12}{x^5}$

Question 24: The turning point of the function $f(x) = 2x^2 - 8x + 5$ is**:**

A a maximum at (2,-3) B a maximum at (2,0) C a minimum at (0,0)

D a minimum at (2,-3) E a minimum at (2,0)

Question 25: The integral $\int \left(x^2 - 2\right) dx$ is:

A $2x + c$ B $\frac{1}{3}x^3 - 2x + c$ C $x^3 - 2x + c$

D $\frac{1}{3}x^3 + c$ E $\frac{1}{2}x^3 - 2x + c$

Section 2: Short Answers

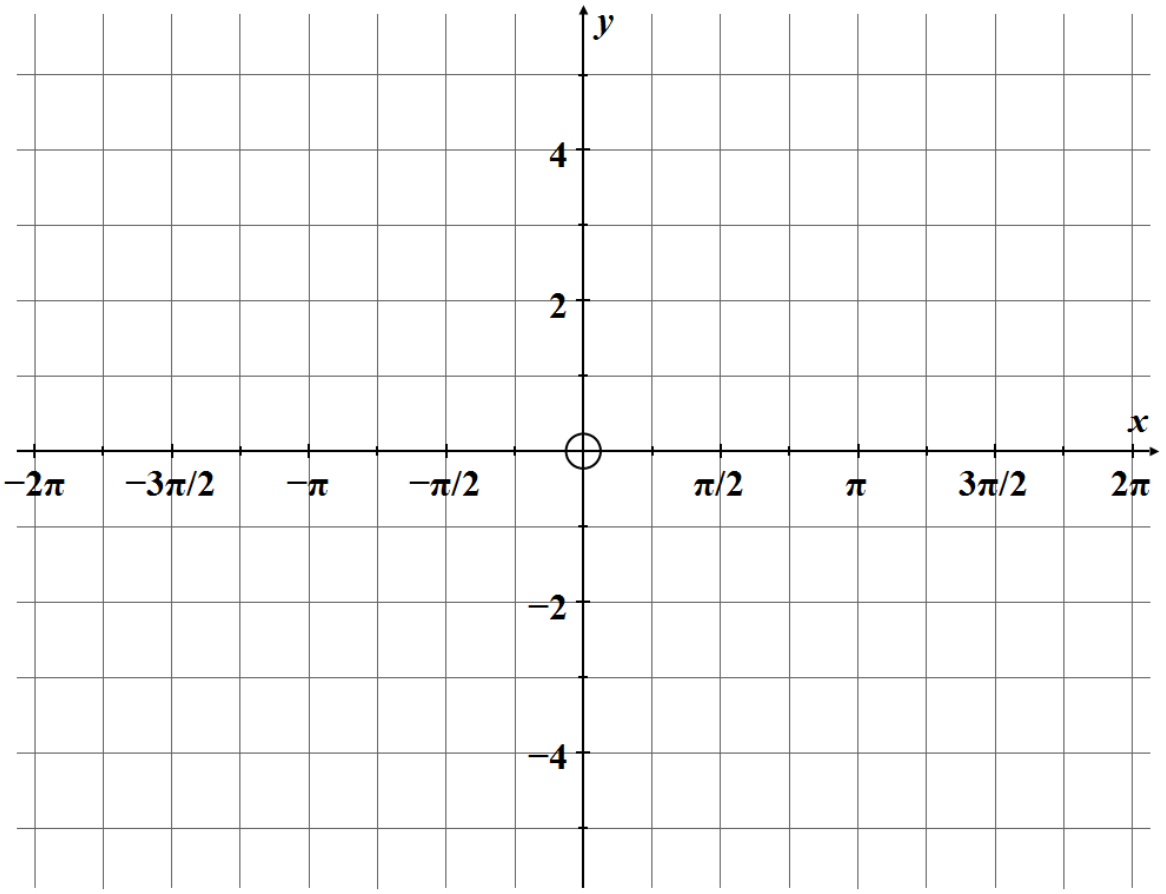
In this section show all your working out clearly.

Question 26: Solve $\frac{4(3x+2)}{5}+1>-7$

Question 27: Solve these simultaneous equations

$$\left.\begin{aligned} 3x+4y&=-5 \\ x-y&=3 \end{aligned}\right\}$$

Question 28: Sketch the graph of $y = 3\sin(2x)$ making sure you state the amplitude and period. You may use the following set of axes.



Calculus Formulas:

$$\frac{d}{dx}\left(x^n\right) = nx^{n-1}$$

$$\int x^n \, dx = \frac{1}{n+1} x^{n+1} + c$$

Anything other than this such as index laws, gradient of a straight line etc you would be expected to know.