**F.4 Mathematics**
**MC Exercise**
**4B9 More About Equations**

**1.** If $\begin{cases} y = x^2 + 4x \\ y = -6x - 25 \end{cases}$, then $x =$

A. $-5$.
B. $5$.
C. $0$ or $-5$.
D. $0$ or $5$.

**2.** If $\begin{cases} x^2 + 2x + 3y = 11 \\ 3x + 2y = 8 \end{cases}$, then $x =$

A. $2$.
B. $-2$.
C. $\frac{1}{2}$ or $2$.
D. $-\frac{1}{2}$ or $-2$.

**3.** If $x + 2y = 2y + x(x+2) = 4$, then $x =$

A. $0$.
B. $-1$ or $0$.
C. $0$ or $2$.
D. $-1$ or $2$.

**4.** How many sets of real solutions do the simultaneous equations $\begin{cases} y = x^2 - 2x + 10 \\ y = -6x - 26 \end{cases}$ have?

A. 0
B. 1
C. 2
D. 4

**5.** Let $a$ and $b$ be constants. If $\begin{cases} x = 2 \\ y = 1 \end{cases}$ is a solution of the simultaneous equations $\begin{cases} y = 2x^2 + ax + b \\ y = 3x + a \end{cases}$, then $b =$

A. $-5$.
B. $-1$.
C. $1$.
D. $3$.

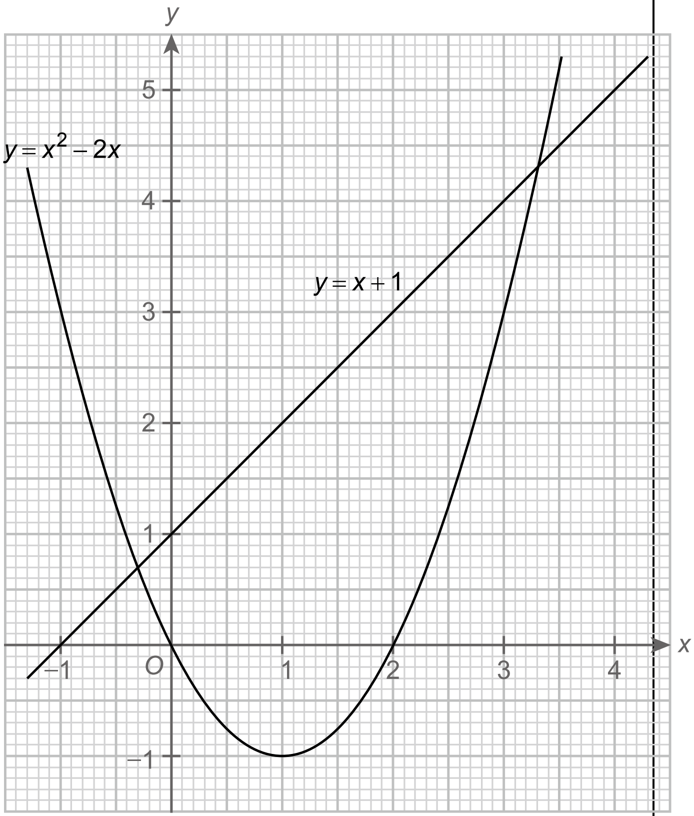
**6.** Let $k$ be a constant. If the simultaneous equations $\begin{cases} y = x^2 - x + 3 \\ y = kx - 1 \end{cases}$ have only one set of real solution, find the values of $k$.

A. $1$ or $-3$
B. $-1$ or $3$
C. $-3$ or $5$
D. $3$ or $-5$

**7.** Let $k$ be a constant. If the simultaneous equations $\begin{cases} x^2 + y^2 = k \\ y = 2x + 5 \end{cases}$ have real solutions, find the range of values of $k$.

A. $k > 5$
B. $k \geq 5$
C. $k < 5$
D. $k \leq 5$

**8.** The figure shows the graphs of $y = x^2 - 2x$ and $y = x + 1$. Solve the simultaneous equations $\begin{cases} y = x^2 - 2x \\ y = x + 1 \end{cases}$ graphically.



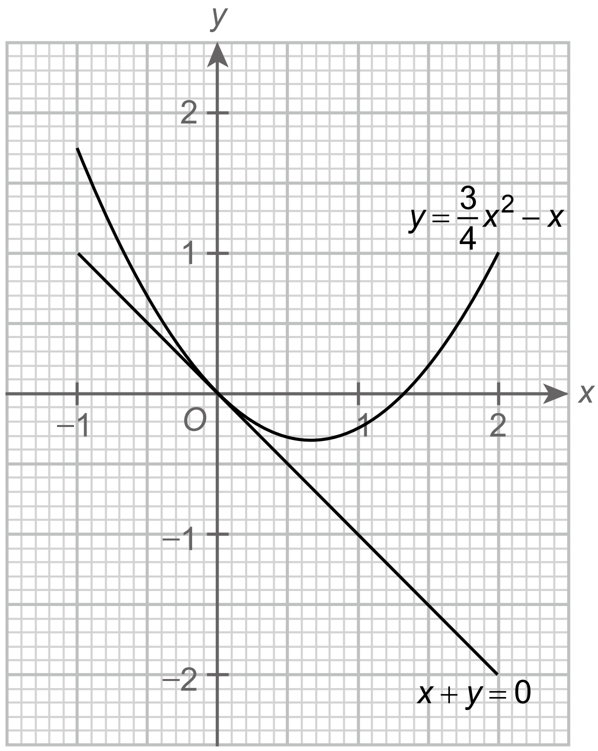

A. $x = 0.0$, $y = 0.0$ and $x = 2.0$, $y = 0.0$ (corr. to 1 d.p.)

B. $x = -0.3$, $y = 0.7$ and $x = 3.3$, $y = 4.3$ (corr. to 1 d.p.)

C. $x = -1.0$, $y = 0.0$ and $x = 3.3$, $y = 4.3$ (corr. to 1 d.p.)

D. $x = 0.0$, $y = 0.0$ and $x = 0.0$, $y = 1.0$ (corr. to 1 d.p.)

**9.** The figure shows the graphs of $y = \frac{3}{4}x^2 - x$ and $x + y = 0$, where $-1 \le x \le 2$. Solve the simultaneous equations $\begin{cases} y = \frac{3}{4}x^2 - x \\ x + y = 0 \end{cases}$ graphically.



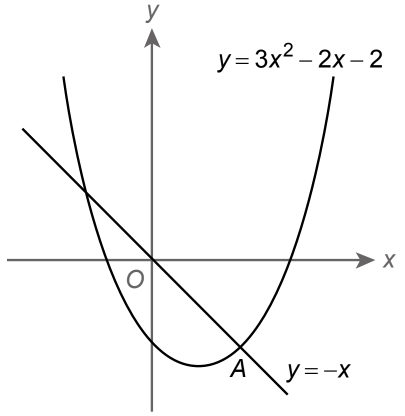

A. $x = 0.0$, $y = 0.0$ (corr. to 1 d.p.)

B. $x = 0.0$, $y = 0.0$ and $x = 1.3$, $y = 0.0$ (corr. to 1 d.p.)

C. $x = 1.0$, $y = -0.3$ and $x = 1.0$, $y = -1.0$ (corr. to 1 d.p.)

D. There are no real solutions.

**10.** In the figure, find the coordinates of $A$.



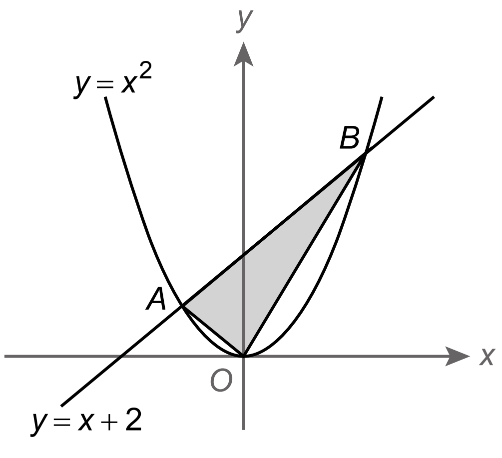

A. $\left(-\frac{2}{3}, \frac{2}{3}\right)$

B. $\left(\frac{1}{3}, -\frac{1}{3}\right)$

C. $(1, -1)$

D. $\left(\frac{3}{2}, -\frac{3}{2}\right)$

**11.** In the figure, the graphs of $y = x^2$ and $y = x + 2$ intersect at $A$ and $B$. Find the area of $\Delta OAB$.



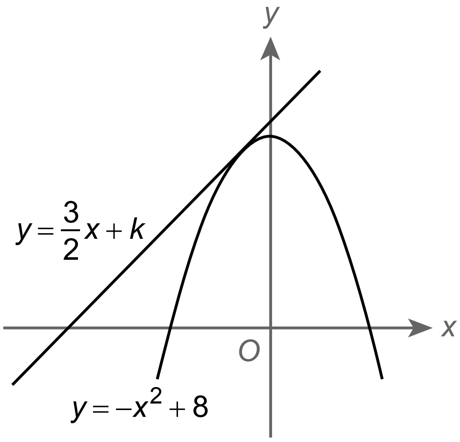

A. 3 square units

B. 3.75 square units

C. 6 square units

D. 7.5 square units

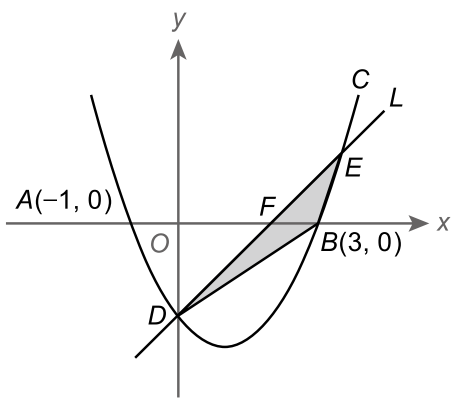
**12.** In the figure, the curve $y = -x^2 + 8$ and the straight line $y = \frac{3}{2}x + k$ touch at only one point. Find the value of $k$.




A. $\frac{9}{4}$ B. $8$

C. $\frac{67}{8}$ D. $\frac{137}{16}$

**13.** In the figure, the curve $C$: $y = x^2 - 2x - 3$ cuts the $x$-axis at $A(-1, 0)$ and $B(3, 0)$. The straight line $L$: $y = \frac{3}{2}x - 3$ cuts the $x$-axis at $F$, and it cuts $C$ at $D$ and $E$ where $D$ lies on the $y$-axis. Find the area of $\Delta DEB$.



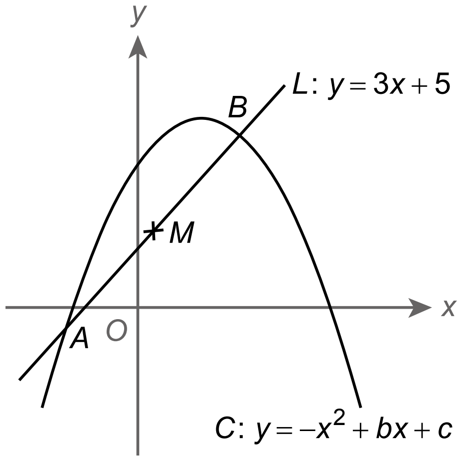

A. $\frac{9}{8}$ square units

B. $\frac{3}{2}$ square units

C. $\frac{21}{8}$ square units

D. $\frac{21}{4}$ square units

**14.** In the figure, a straight line $L$: $y = 3x + 5$ and a curve $C$: $y = -x^2 + bx + c$ intersect at $A$ and $B$. $M$ is the mid-point of $AB$. Find the coordinates of $M$.




A. $\left(-\dfrac{3}{2}, \dfrac{1}{2}\right)$

B. $\left(-\dfrac{b}{2}, \dfrac{10-3b}{2}\right)$

C. $\left(\dfrac{3-b}{2}, \dfrac{19-3b}{2}\right)$

D. $\left(\dfrac{b-3}{2}, \dfrac{3b+1}{2}\right)$

**15.** Solve $x - \sqrt{x} = \sqrt{x} - 1$.

A. $x = 0$

B. $x = 1$

C. $x = \pm 1$

D. No real solutions

**16.** If $\dfrac{1}{2x+3} + x = \dfrac{3}{4}$, then $x =$

A. $\dfrac{1}{2}$.

B. $\dfrac{9}{2}$.

C. $\dfrac{1}{2}$ or $-\dfrac{5}{4}$.

D. $-\dfrac{1}{2}$ or $\dfrac{5}{4}$.

**17.** If $\sqrt{x} + 1 - \sqrt{\sqrt{x} + 1} = 0$, then $x =$

A. 0.

B. 1.

C. 0 or 1.

D. 0 or $\pm 1$.

**18.** How many distinct real roots does the equation $x^6 - 5x^4 + 4x^2 = 0$ have?

A. 3

B. 4

C. 5

D. 6

**19.** If $36^x + 6^{x+1} - 72 = 0$, then $x =$

A. 0.

B. 1.

C. $-1$ or 1.

D. 6 or $-12$.

**20.** If $\log_3(x-1) = 1 - \log_3(3x-11)$, then $x =$

A. 4.

B. $\dfrac{13}{4}$.

C. $\dfrac{2}{3}$ or 4.

D. $\dfrac{2}{3}$ or $\dfrac{13}{4}$.

**21.** If $(\log x^2)^2 = 2\log x^2$, then $x =$

A. 0 or 2.

B. 0, 1 or 10.

C. 1 or 10.

D. $\pm 1$ or $\pm 10$.

**22.** If $x^4 + \log y^3 = x^2 + \log \dfrac{1}{y} = 1$, then $x =$

A. 0.

B. 1.

C. $\pm 1$.

D. $\pm 1$ or $\pm 2$.

**23.** How many distinct real solutions does the equation $2^{2x}+5(2^x)-24=0$ have?

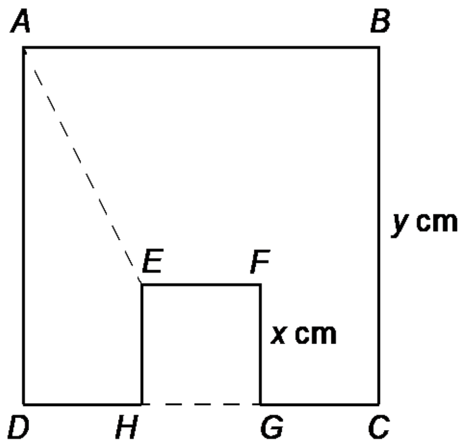
A. 0

B. 1

C. 2

D. 4

**24.** In the figure, *ABCD* and *EFGH* are two squares of sides $y$ cm and $x$ cm respectively. It is given that $DH=HE$ and the perimeter of *ABCGFEHD* is 22 cm.




If the distance between $A$ and $E$ is $\sqrt{17}$ cm, which of the following simultaneous equations can be used to find the values of $x$ and $y$?

A. $\begin{cases} y+x=\dfrac{11}{2} \\ (y-x)^2+x^2=17 \end{cases}$

B. $\begin{cases} y+x=\dfrac{11}{2} \\ (y-2x)^2+x^2=17 \end{cases}$

C. $\begin{cases} 2y+x=11 \\ (y-x)^2+x^2=17 \end{cases}$

D. $\begin{cases} 2y+x=11 \\ (y-2x)^2+x^2=17 \end{cases}$

**25.** Judy spent \$720 on $x$ cups of puddings for Christmas party. If the price of each cup of pudding reduces by \$2, she can buy $(x+4)$ cups of puddings with the same amount of money. Which of the following equations can be used to find the value of $x$?

A. $\dfrac{720}{x}+2=\dfrac{720}{x+4}$

B. $\dfrac{720}{x}-2=\dfrac{720}{x+4}$

C. $\dfrac{720}{x}=\dfrac{720-2x}{x+4}$

D. $\dfrac{720}{x}=\dfrac{720-2x}{x-4}$

**26.** In a journey of 300 km long, if the driving speed of a car increases by 10 km/h, the travelling time will reduce by 1 hour. Which of the following equations can be used to find the original driving speed $x$ km/h of the car?

A. $\dfrac{300}{x}-\dfrac{300}{x+10}=1$

B. $\dfrac{300}{x-10}-\dfrac{300}{x}=1$

C. $\dfrac{300}{x}-\dfrac{300}{x+10}=60$

D. $\dfrac{300}{x-10}-\dfrac{300}{x}=60$

**27.** Kent bought $n$ pears for \$875 but 12 of them were rotten. He sold the rest of the pears at a price of \$1.5 more than the cost each. Finally, he made a profit of 36%. Which of the following equations can be used to find the value of $n$?

A. $1.5(n-12)=875\times 36\%$

B. $1.5n-\dfrac{875}{n}\times 12=875\times 36\%$

C. $\left(\dfrac{875}{n}+1.5\right)(n-12)=875(1+36\%)$

D. $\left(\dfrac{875}{n-12}+1.5\right)(n-12)=875(1+36\%)$

**28.** It is given that the sum of the reciprocals of two consecutive odd numbers is $\frac{16}{63}$. If $x$ is the smaller number, then $x =$

A. 5.
B. 7.
C. 9.
D. 11.

**29.** $(i^{51})^{86} =$

A. 1.
B. −1.
C. $i$.
D. $-i$.

**30.** $(8-11i)^2 - (73+i) =$

A. $112 - i$.
B. $-130 - i$.
C. $112 - 177i$.
D. $-130 - 177i$.

**31.** If $k$ is a real number, then $\frac{3+ki}{i} - i =$

A. $k + 2i$.
B. $k - 4i$.
C. $(k-1) - 3i$.
D. $(k-1) + 3i$.

**32.** The real part of $i - i^2 + i^3 - i^4 + i^5$ is

A. −1.
B. 0.
C. 1.
D. 3.

**33.** The imaginary part of $(3+2i)(1-2i) - 3i$ is

A. 3.
B. −3.
C. 7.
D. −7.

**34.** It is given that $z = i(3 - xi) - 4$, where $x$ is a real number. If $z$ is a purely imaginary number, then $x =$

A. −3.
B. 3.
C. −4.
D. 4.

**35.** If $\beta$ is a real number, then $\frac{\beta^2+1}{(\beta+i)^2} =$

A. 1.
B. $\frac{\beta^2+1}{\beta^2-1}$.
C. $\frac{\beta^2-1}{\beta^2+1}$.
D. $\frac{\beta^2-1}{\beta^2+1} - \frac{2\beta}{\beta^2+1}i$.

**36.** It is given that $(x+2i)(y+i) = 1+5i$, where $x$ and $y$ are real numbers. Find the value(s) of $y$.

A. $-\frac{2}{3}$
B. 1
C. $\frac{3}{2}$ or 1
D. $-\frac{3}{2}$ or −1