1. The expression $pq + 5r - 5q - pr$ is equal to

(A) $(p-5)(q-r)$
(B) $(p+5)(r-q)$
(C) $(p+5)(q-r)$
(D) $(p-5)(q+r)$

2. When $x^3 - 7x^2 + 2x - 1$ is divided by $x + 2$, the quotient is

(A) -17
(B) -39
(C) $x^2 - 5x - 8$
(D) $x^2 - 9x + 20$

3. If $x^2 - 8x + 19 = a(x + h)^2 + k$, then

(A) $a = 1 \quad h = 3 \quad k = 4$
(B) $a = 1 \quad h = -3 \quad k = 4$
(C) $a = 1 \quad h = -4 \quad k = 3$
(D) $a = -1 \quad h = 4 \quad k = 3$

4. The values of x for which $(x + 15)^2 = 64x$ are

(A) 3 and 5
(B) 9 and 5
(C) 3 and 25
(D) 9 and 25

5. The roots of the equation $3x^2 - 6x - 5 = 0$ are

(A) equal
(B) real and distinct
(C) distinct and not real
(D) real and not distinct

6. A quadratic equation is such that the sum of its roots is $-\frac{2}{3}$ and the product of its roots is $\frac{3}{4}$. The quadratic equation is

(A) $12x^2 + 8x + 9 = 0$
(B) $12x^2 - 8x - 9 = 0$
(C) $12x^2 - 8x + 9 = 0$
(D) $12x^2 + 8x - 9 = 0$

7. The set of values of x for which $\frac{5x-2}{2-3x} \geq 0$, $x \neq \frac{2}{3}$, is given by

(A) $\left\{x : x \geq \frac{2}{5} \cup x > \frac{2}{3}\right\}$
(B) $\left\{x : x \leq \frac{2}{5} \cup x > \frac{2}{3}\right\}$
(C) $\left\{x : \frac{2}{5} \leq x < \frac{2}{3}\right\}$
(D) $\left\{x : \frac{2}{3} < x \leq \frac{2}{5}\right\}$

8. The range of values for which $x^2 - 7x + 10 < 0$ is

(A) $2 > x > 5$
(B) $2 < x < 5$
(C) $x < 2$ and $x > 5$
(D) $x < -5$ and $x > -5$

9. $(8+\sqrt{5})(2-\sqrt{5})$ can be expressed as

(A) $11-6\sqrt{5}$

(B) $21-6\sqrt{5}$

(C) $11+6\sqrt{5}$

(D) $10+10\sqrt{5}$

10. $\dfrac{5^{-1}}{125^{\frac{1}{3}}}$ simplifies to

(A) $\dfrac{1}{5}$

(B) $\dfrac{1}{25}$

(C) $\sqrt{5}$

(D) $\dfrac{1}{\sqrt{5}}$

11. Given that $3 \times 27^{2x} = 9^{x}$, the value of x is

(A) -1

(B) $-\dfrac{1}{4}$

(C) $\dfrac{1}{4}$

(D) 1

12. The value of x such that $\log_2 (5x + 1) - \log_2 (3x - 5) = 2$ is

(A) 11
(B) 5
(C) 3
(D) 2

13. For the arithmetic progression $-12, -7, -2, 3, 8 \ldots$ the n^{th} term is given by

(A) $5n + 17$
(B) $5n - 12$
(C) $5n - 17$
(D) $-12 - 5n$

14. The sum of $\sum_{k=1}^{3} \dfrac{1}{k}$ is

(A) $\dfrac{1}{3}$

(B) $\dfrac{1}{2}$

(C) $\dfrac{3}{5}$

(D) $\dfrac{11}{6}$

15. The series $-2 + \dfrac{4}{3} - \dfrac{8}{9} + \ldots$ converges to the limit

(A) 6

(B) $\dfrac{6}{5}$

(C) $-\dfrac{6}{5}$

(D) -6

16. A line, **L**, passes through the point $(6, 5)$ and is perpendicular to a line whose equation is $3x + 4y - 7 = 0$. The equation of **L** is

(A) $4x - 3y - 9 = 0$
(B) $4x + 3y - 7 = 0$
(C) $3x + 4y - 11 = 0$
(D) $3x - 4y - 30 = 0$

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17. The lines $7x - 4y + 25 = 0$ and $3x - y - 5 = 0$ intersect at the point **P**. The coordinates of **P** are

(A) (5, 10)
(B) (–1, 8)
(C) (9, 22)
(D) (–9, –32)

18. The points of intersection of the line with equation $y - x - 3 = 0$ and the circle with equation $x^2 + y^2 = 17$ are

(A) (4, 1) and (–1, –4)
(B) (4, –1) and (1, –4)
(C) (–4, –1) and (–1, –4)
(D) (–4, –1) and (1, 4)

19. Given that $\boldsymbol{OA} = \begin{pmatrix} -17 \\ 25 \end{pmatrix}$ and $\boldsymbol{OB} = \begin{pmatrix} 4 \\ 5 \end{pmatrix}$, then the vector $\boldsymbol{AB}$ =

(A) $\begin{pmatrix} -13 \\ 30 \end{pmatrix}$

(B) $\begin{pmatrix} -13 \\ -20 \end{pmatrix}$

(C) $\begin{pmatrix} -21 \\ 20 \end{pmatrix}$

(D) $\begin{pmatrix} 21 \\ -20 \end{pmatrix}$

20. The vector a is given as $8\mathbf{i} + 15\mathbf{j}$. A unit vector parallel to a is

(A) $16\mathbf{i} + 30\mathbf{j}$

(B) $184\mathbf{i} + 345\mathbf{j}$

(C) $\frac{1}{17}(8\mathbf{i} + 15\mathbf{j})$

(D) $\frac{7}{17}(8\mathbf{i} + 15\mathbf{j})$

21. The position vectors of A and B relative to an origin O are $\begin{pmatrix} 2 \\ 5 \end{pmatrix}$ and $\begin{pmatrix} 3 \\ -1 \end{pmatrix}$ respectively. The acute angle $A\hat{O}B$ is given by

(A) $\cos^{-1}\left(\frac{1}{\sqrt{290}}\right)$

(B) $\cos^{-1}\left(\frac{11}{\sqrt{290}}\right)$

(C) $\cos^{-1}\left(\frac{\sqrt{11}}{\sqrt{290}}\right)$

(D) $\cos^{-1}\left(\frac{-1}{\sqrt{290}}\right)$

22. The exact value of $\cos\left(\frac{5\pi}{12}\right)$ =

(A) $\frac{1}{4}\left(\sqrt{6} - \sqrt{2}\right)$

(B) $\frac{1}{4}\left(\sqrt{6} + \sqrt{2}\right)$

(C) $\frac{1}{2}\left(\sqrt{6} + \sqrt{2}\right)$

(D) $\frac{1}{2}\left(\sqrt{6} - \sqrt{2}\right)$

23. The exact value of $\frac{\sin 150^\circ}{\cos 150^\circ}$ is given as

(A) $-\sqrt{3}$

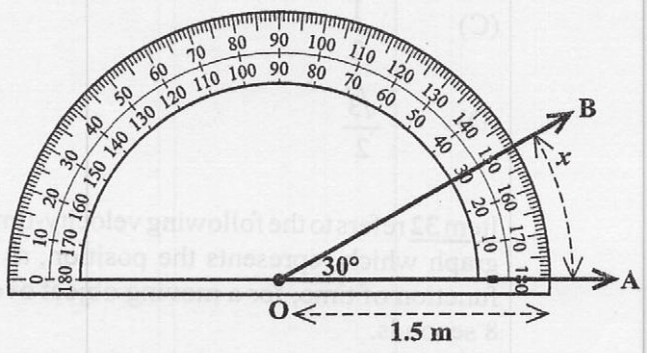
(B) $-\frac{1}{\sqrt{3}}$

(C) $\frac{1}{\sqrt{3}}$

(D) $\sqrt{3}$

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Item **24** refers to the following protractor which represents half of a circle. The protractor has a radius of 1.5 metres and the angle AOB measures 30°.



24. What is the arc length, x, in metres, along the outer edge of the protractor?

(A) $\frac{\pi}{4}$

(B) $\frac{3\pi}{8}$

(C) $\frac{3\pi}{4}$

(D) $\frac{\pi}{6}$

25. If $\tan\theta = \frac{5}{12}$ and θ is **reflex**, then $\sin\theta =$

(A) $\frac{12}{13}$

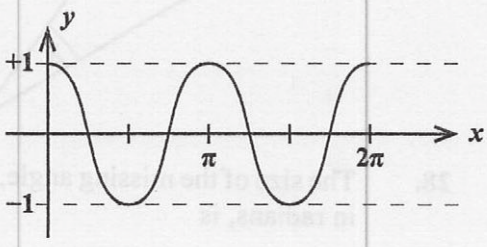
(B) $\frac{5}{12}$

(C) $-\frac{5}{13}$

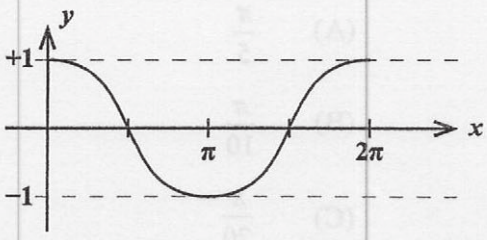
(D) $-\frac{12}{13}$

26. Which of the following graphs represents $y = \cos x$?

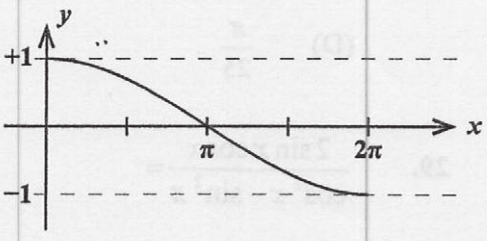
(A)



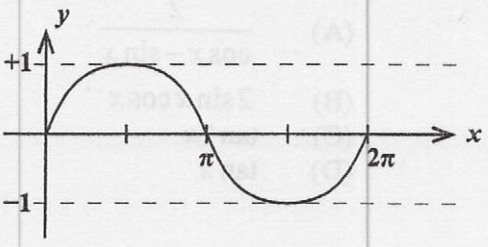
(B)



(C)



(D)



27. Given that $\cos x = \frac{3}{5}$ and x is acute, then the value of $\sin 2x$ is

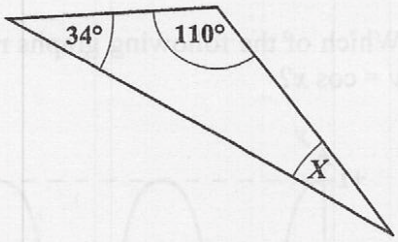
(A) $\frac{3}{5}$

(B) $\frac{4}{5}$

(C) $\frac{12}{25}$

(D) $\frac{24}{25}$

Item 28 refers to the following triangle (**not drawn to scale**).



28. The size of the missing angle, X, measured in radians, is

(A) $\frac{\pi}{5}$

(B) $\frac{\pi}{10}$

(C) $\frac{\pi}{20}$

(D) $\frac{\pi}{25}$

29. $\frac{2\sin x\cos x}{\cos^2 x-\sin^2 x}=$

(A) $\frac{2}{\cos x-\sin x}$

(B) $2\sin x\cos x$

(C) $\tan 2x$

(D) $\tan x$

30. For $0^\circ < x < 360^\circ$, the equation $3\sin^2 x = 8\cos x$ has only one real solution given by

(A) $\sin x = -\frac{1}{3}$

(B) $\cos x = \frac{1}{3}$

(C) $\sin x = \frac{1}{3}$

(D) $\cos x = -\frac{1}{3}$

31. The gradient at $x=\frac{\pi}{6}$ on the curve $y=\cos x$ is

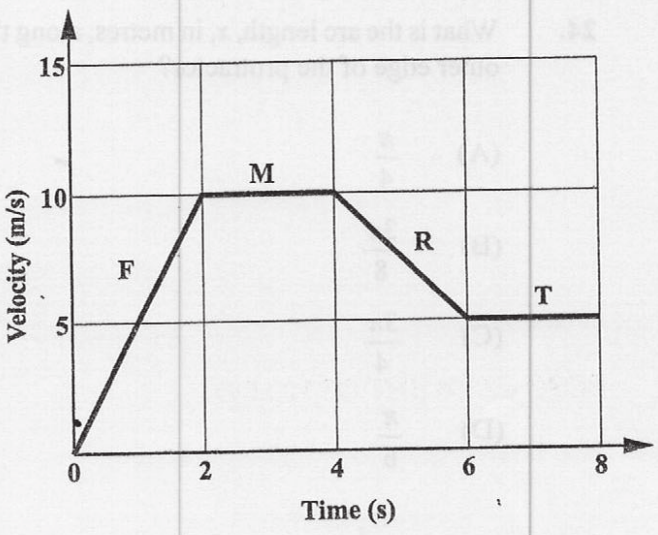
(A) $-\frac{\sqrt{3}}{2}$

(B) $-\frac{1}{2}$

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

(D) $\frac{\sqrt{3}}{2}$

Item 32 refers to the following velocity-time graph which represents the position, as a function of time, for a moving object over 8 seconds.



32. Which of the following statements about the object's motion is true?

(A) The object covers the same distance during M and R.

(B) The object moves with uniform velocity during F.

(C) The object does not accelerate during T.

(D) The object is at rest during M.

33. $\frac{d}{dx} x \sin 2x =$

(A) $\sin 2x + 2x \cos 2x$
(B) $-\cos 2x - 2 \sin 2x$
(C) $\sin 2x - 2x \cos 2x$
(D) $x \cos 2x + \sin 2x$

34. At the point (7, 4) on the curve $y = f(x)$, $\frac{dy}{dx} = 0$ and $\frac{d^2y}{dx^2} = -5$. The point (7, 4) is

(A) an optimum point
(B) a point of inflexion
(C) a minimum turning point
(D) a maximum turning point

35. If $f(x) = \sin 4x - \cos 3x$, then $f''(x) =$

(A) $4 \cos 4x + 3 \sin 3x$
(B) $16 \sin 4x - 9 \cos 4x$
(C) $16 \sin 4x + 9 \cos 4x$
(D) $-16 \sin 4x + 9 \cos 3x$

36. $\int (3x - 5)^4 \, dx =$

(A) $(3x-5)^5 + k$
(B) $\frac{(3x-5)^5}{3} + k$
(C) $\frac{(3x-5)^5}{15} + k$
(D) $\frac{(3x-5)^3}{15} + k$

37. If $y = 3x^2 + \cos x$, then $\int y \, dx =$

(A) $x^3 - \sin x + c$
(B) $x^3 + \sin x + c$
(C) $3x^3 - \sin x + c$
(D) $6x - \sin x + c$

38. $\int_1^2 (1 + x + x^2) dx =$

(A) 2
(B) 4
(C) $4\frac{5}{6}$
(D) $8\frac{1}{2}$

39. The gradient of the tangent to the curve **C** at (x, y) is given by $\frac{dy}{dx} = 9x^2 - 4$. The equation of the curve that passes through the point $(-1, 2)$ is

(A) $y = 3x^3 - 4x + 1$
(B) $y = 3x^3 - 4x - 1$
(C) $y = 18x^2 + 4x - 1$
(D) $y = 18x^2 - 4x + 1$

40. The region **R** is enclosed by the x-axis, the curve $y = -x^2 + 2$ and the lines $x = 0$ and $x = 1$. The area of **R** is

(A) 1
(B) $\frac{5}{3}$
(C) 2
(D) $\frac{7}{3}$

Item 41 refers to the following probability table which shows the probability of a biased spinner landing on 3 of the 5 possible prizes.

Prize	Car	Cruise vacation	Television	Jewellery	Blender
Probability			0.15	0.25	0.5

41. If the odds of winning the car and winning the cruise vacation are equally likely, what is the probability of winning the car?

(A) 1
(B) 0.9
(C) 0.1
(D) 0.05

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42. Which of the following is an advantage of a stem and leaf diagram over a box and whisker plot?

(A) It easily handles large amount of data.
(B) The median and quartiles are immediately visible.
(C) Several data sets can be compared on the same plot.
(D) It immediately shows any gaps that might exist in the data.

43. The 50th percentile is defined as the

(A) mean
(B) mode
(C) median
(D) standard deviation

Item 44 refers to the following table which shows the outcome of the semifinals of the Caribbean Cricket Championship.

Team	Wins	Losses	Total
Parrot Catchers Club	4	6	10
Hibiscus Gold	7	3	10
Sky Rocket Wicketers	2	8	10
Total	13	17	30

44. If a team loses a match, what is the probability that the team is NOT Parrot Catchers Club?

(A) $\frac{6}{30}$

(B) $\frac{11}{20}$

(C) $\frac{17}{30}$

(D) $\frac{11}{17}$

45. A bag contains 15 balls numbered 1 through 15. What is the probability of selecting a ball that has an odd number and is divisible by 5?

(A) $\frac{2}{15}$

(B) $\frac{1}{5}$

(C) $\frac{7}{15}$

(D) $\frac{8}{15}$

END OF TEST

IF YOU FINISH BEFORE TIME IS CALLED, CHECK YOUR WORK ON THIS TEST.