

Individual Solutions .

1. B
2. A
3. B
4. B
5. C
6. B
7. D
8. C
9. A
10. A
11. B
12. D
13. A
14. C
15. C
16. C
17. D
18. B
19. B
20. D
21. C
22. C
23. C
24. A
25. B
26. C
27. C
28. A
29. C
30. D

Team Solutions.

1. $252\sqrt{21}$

2. $\frac{\pi}{2}$

3. 14

4. 88

5. 10

6. $\frac{\pi}{6}$

7. 5

8. 3

9. 1.25

10. $\frac{1}{2}(u+v+w)$

11. -70

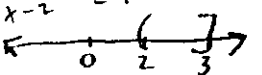
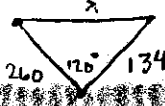
12. $-\frac{2}{13}$

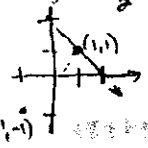
13. $\sqrt{3}x$

14. $(-2, 1 \pm \sqrt{3})$

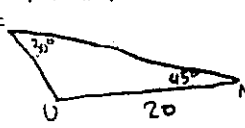
15. 23.1

Solutions - Ind. Jan Reg. Pre-Calc

- $m = -\frac{A}{B} = -\frac{3}{2}$; $\perp m = \frac{2}{3}$ $3x - 2y = -2$ [B]
- I, III, IV; $f(-x) = f(x)$ [A]
- $\cos(\alpha + \beta) = 2\cos^2\alpha - 1 = \cos 2\alpha$
 $\alpha + \beta = 2\alpha$ $x = \frac{\alpha + \beta}{2}$ [B]
- $a_n = a_1 r^{n-1}$ $a_n = 8(\frac{1}{2})^{n-1}$ $a_n = \frac{1}{2^{n-2}}$ [B]
- $\lim_{x \rightarrow 1} \frac{(x^2+1)(x+1)(x-1)}{(x-1)(x^2+x+1)} = \lim_{x \rightarrow 1} \frac{(x^2+1)(x+1)}{(x^2+x+1)} = \frac{4}{3}$ [C]
- $m = -\frac{2}{k} = -\frac{8}{3} = -\frac{6}{8k} = -\frac{6}{8k}$ $k = -3/4$ [D]
- $\frac{2x-5}{x-2} \leq 1$ $\frac{2x-5}{x-2} - 1 \leq 0$ $\frac{2x-5-(x-2)}{x-2} \leq 0$
 $\frac{x-3}{x-2} \leq 0$ $(2, 3]$ [D]
-  $c^2 = a^2 + b^2 - 2ab \cos C$
 $c^2 = 260^2 + 134^2 - 2(260)(134)\cos 120^\circ$
 $c^2 = 120596$ $c = 347.0$ [C]

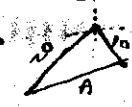
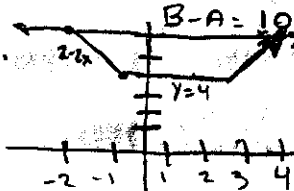
- $e = \frac{c}{a} = \frac{1.5}{1} = 1.5$ [A]
- $\cos \theta = \frac{\text{adj}}{\text{hyp}} = \frac{3}{5} = \frac{3}{5}$ $\theta = \arccos(\frac{3}{5})$ [A]
-  $x+y=2$ $F(-1, -1)$ [B]

- I, II, III Definition of continuous function [D]
- $(1-i)^{12}$ $r = \sqrt{2}$ $\theta = \tan^{-1}(-1) = \frac{3\pi}{4}$
 $(1-i)^{12} = (\sqrt{2})^{12} [\cos(12 \cdot \frac{3\pi}{4}) + i \sin(12 \cdot \frac{3\pi}{4})]$
 $= 64(-1+0i) = -64$ [A]
- $f(x) = x^2 + 2x + 1$ $g(f(x)) = |x+1|$ [C]
- $\sin(C+A) = \sin C \cos A + \cos C \sin A$
 $= (\frac{4}{5})(\frac{12}{13}) + (\frac{3}{5})(\frac{5}{13}) = \frac{32}{65}$ [C]
- Domain $f(x) \cap g(x) = f \cap g$ $\therefore 0 \leq x \leq 1$ [C]

-  $\frac{\sin 30^\circ}{20} = \frac{\sin 105^\circ}{x}$
 $x = 38.6$ [D]
- $\frac{y^2}{4} - \frac{(x-3)^2}{1} = 1$ asymptotes $y = \pm \frac{b}{a}x - \frac{3}{4}$
 $y = \pm \frac{2}{1}x - \frac{3}{4}$ [B]
- $u(0) = -5$ $v(-5) = 25$ $f(25) = \frac{1}{25}$ [B]
- $\begin{vmatrix} i & j & k \\ 4 & 3 & 4 \\ 5 & -2 & 8 \end{vmatrix} = 24i + 20j - 8k - 15k + 8i - 32j = 32i - 12j - 23k$ [D]

- $12x + 8y - 4z = 8$ $6x + 4y - 2z = 4$
 $12x - 4y - 3z = 38$ $6x + 11y - 3z = 24$
 $12x - z = -30$ $-11y + z = 29$
 $12y - z = -30$ $-24 - z = -30$
 $-11y + z = 28$ $z = 6$
 $3x - 4 - 6 = 2$ $19(4 + 2 + 6) = 152$
 $y = -2$ $z = 6$ [C]

- $2x + 4y = 6$ $2x - 5y = -1$ point of intersection (1,1). $m = \frac{4-1}{-6-1} = -\frac{3}{7}$
 $7y = 7$ $3x + 7y = 10$ [C]
- $\vec{AB} = i + j + 3k$ $\vec{AC} = i + 2j + 2k$ $A = \frac{1}{2} \begin{vmatrix} i & j & k \\ 1 & 1 & 3 \\ 1 & 2 & 2 \end{vmatrix} = \frac{1}{2} (2i + 3j + 2k - k - 6i - 2j) = -A = \frac{\sqrt{18}}{2} = \frac{3\sqrt{2}}{2}$ [C]
- $g(5) = 80$ $f(5) = 15$ $f(4) = 19$ $f(95) = 383$
 $g(19) = 1102$
 $g(f(4)) - f(g(5)) + f(5) = 1102 - 383 = 719$ [A]
- $r = \sin \theta$ $x^2 + y^2 - y = 0$ $C = (0, \frac{1}{2})$ [B]
- $\lim_{x \rightarrow 0} \frac{f(x) + g(x) - f(x)}{f(x)g(x)} = \frac{(4+16)}{(4)(16)} = \frac{1}{4}$ [C]
- $(y-k)^2 = 4p(x-h)$ $(y+3)^2 = 4(x-2)$ [C]
- $\log_a \frac{35}{6} = \log_a 35 - \log_a 6 = \log_a 7 + \log_a 5 - \log_a 2 - \log_a 3 = x + y - z$ [A]
- $\frac{1(1) + 1(0) + 1(0)}{\sqrt{3}} = \frac{\sqrt{3}}{3}$ [C]
- [D] Ex. of a hyperbola.

- $A = -20 \cdot 48 = 288$ $B = \begin{vmatrix} i & j & k \\ -5 & 8 & -6 \\ 1 & 2 & 5 \end{vmatrix} = 58i - 29j - 12k$ $36i + 19j - 18k = 9\sqrt{21}$
 $AB = 28(9\sqrt{21}) = 252\sqrt{21}$ $A = \pi ab$ $A = (\frac{1}{2})(1)(\pi) = \frac{\pi}{2}$
- $4(x^2 + 6x + 9) + y^2 - 8y + 16 = -5 + 16 + 36$
 $\frac{(x+3)^2}{16} + \frac{(y-4)^2}{1} = 1$ $A = \pi ab$ $A = (\frac{1}{2})(1)(\pi) = \frac{\pi}{2}$
- $A = 4(-2)^5 + 9(2)^4 - (-2)^3 + 2(-2)^2 + 3(-2) - 8 = 18$
 $B = f(-x) = x^4 + 5x^3 + 4x^2 - 3x - 24 = 1$ negative real root
 $C = 5 = -4$ $\frac{A}{a} + C = 18 + -4 = 14$
-  $A^2 = (20)^2 + (10)^2 - 2(20)(10)\cos 61.95^\circ$
 $A = 17.6$
 $B = \frac{17.6 \text{ miles}}{10 \text{ miles/hr}} = 1.76 \text{ hr}$
 $B - A = 105.6 - 17.6 = 88$
-  $A = \frac{(b_1 + b_2)h}{2}$
 $A = \frac{(2+6) \cdot 4}{2} = 16$

- $\sin(\frac{1}{\cos A}) \frac{1}{\cos B} \cdot \frac{\cos B}{\sin B} \cdot \sin B \cdot \frac{\sin B}{\cos B} = \frac{\sqrt{3}}{3}$
 $1 - \frac{1}{\cos A} \cdot \frac{1}{\cos B} \cdot \sin A \cdot \sin B = \frac{\sqrt{3}}{3}$
 $\frac{\tan A + \tan B}{1 - \tan A \tan B} = \frac{\sqrt{3}}{2}$
 $\tan(A+B) = \frac{\sqrt{3}}{3}$
 $A+B = \frac{\pi}{6}$
- $I_6 x = \sqrt{1 + \sqrt{3}x}$
 $x^2 = 1 + \sqrt{3}x$
 $x^2 - 1 = \sqrt{3}x$
 $x^4 - 2x^2 - x - 2 = 0$
 $x^4 - 2x^2 - x + 3 = 0$