

Solutions 1-11-92

Pre-Calculus Individual Test

d) 1. $y = f(-2x)$ - : a reflection in the y-axis
2: a horizontal "shrink"

d) 2. BESTSELER $\frac{{}^{10}P_{10}}{3!2!2!}$

b) 3. ${}_8C_3 \cdot {}_8C_5 = 3136$

c) 4. $\log_5 6 = \frac{\log_m 6}{\log_m 5} = \frac{\log_m 2 + \log_m 3}{\log_m 5}$

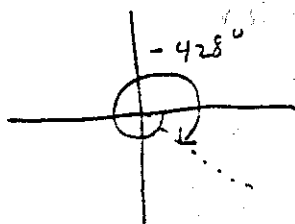
c) 5. a reflection in the line $y = x$

c) 6. $y = \frac{kx^2}{zw}$ $y' = \frac{k(4x)^2}{(2z)(2w)} = \frac{16kx^2}{4zw} = 4y$

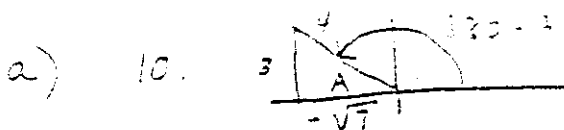
a) 7. $y = 2(x^2 + 3x + \frac{9}{4}) + 8 - \frac{9}{2}$

$y = 2(x + \frac{3}{2})^2 + \frac{7}{2}$ $V = (-\frac{3}{2}, \frac{7}{2})$

c) 8.



a) 9. $7.5\pi < 24 < 8\pi$

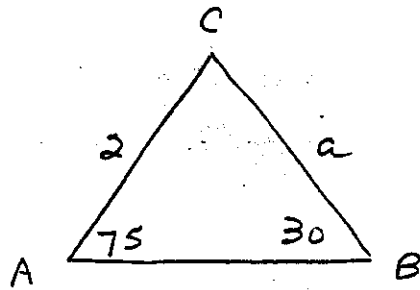


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Pre-Calculus Individual Test

c) 11.

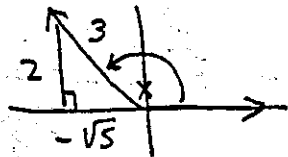


$$\frac{\sin 75}{a} = \frac{\sin 30}{2}$$

$$a = \frac{2 \sin 75}{\sin 30} = 4 \left(\frac{\sqrt{6} + \sqrt{2}}{4} \right)$$

$$\sin(75) = \sin(45+30) = \sin 45 \cdot \cos 30 + \cos 45 \cdot \sin 30$$

b) 12.



$$\cos(3x) = \cos(2x+x) =$$

$$\cos 2x \cdot \cos x - \sin 2x \cdot \sin x$$

$$(1 - 2 \sin^2 x) \cdot \cos x - (2 \sin x \cos x) \cdot \sin x$$

$$\left(1 - 2 \cdot \frac{4}{9}\right) \cdot \frac{-\sqrt{5}}{3} - \left(2 \cdot \frac{2}{3} \cdot \frac{-\sqrt{5}}{3}\right) \cdot \frac{2}{3}$$

$$-\frac{\sqrt{5}}{27} + \frac{8\sqrt{5}}{27} = \frac{7\sqrt{5}}{27}$$

c) 13. $y = \sec^{-1} x \equiv x = \sec y$

c) 14. $y = \sin 4 \left(x - \frac{1}{2}\right)$

c) 15. $-8 - 4 + 2 + 9 = -1$

c) 16. $3(x-2) + 12 = x(x+2)$

$$3x - 6 + 12 = x^2 + 2x$$

$$x^2 - x - 6 = 0$$

$$x = -2, 3 \text{ BUT } x \neq -2$$

a) 17. $\sqrt{a^2 + b^2} = \sqrt{3^2 + (-2)^2} = \sqrt{13}$

e) 18. a) false b) false \sqrt{x} may not be a real number
c) false for $x < 0$ d) false for $x = 0$ \therefore (e)

c) 19. $\bar{z}(a+b) + c = (a+b)\bar{z} + c$

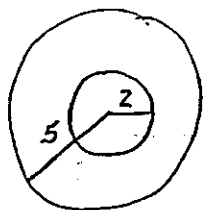
Calculus Individual Test 1-11-92
Regional

20. $A \cup B = \{1, 2, 3, 4, 5, 6, 8, 0\}$ $A \cap C = \{3\}$

(c) $(A \cup B) \cup (A \cap C) = A \cup B$

21.

(b)



$$\pi R^2 - \pi r^2$$

$$25\pi - 4\pi$$

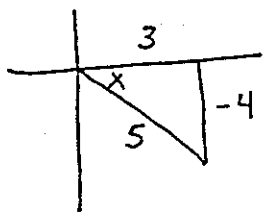
$$21\pi$$

22. Descartes Rule of Signs - c has one sign change
(c) the others have none.

23. $(3, -150^\circ)$ would have terminal side in "3rd quadrant"
(d)

24.

(d)

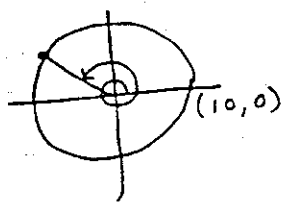


$$\tan^{-1}\left(-\frac{4}{3}\right) = x$$

$$\cos x = \frac{3}{5}$$

25.

(b)



$$\theta = \omega t = \frac{\pi}{3} \cdot 8 = \frac{8\pi}{3}$$

$$(x, y) = (r \cos \theta, r \sin \theta)$$

$$\left(10 \cdot -\frac{1}{2}, 10 \cdot \frac{\sqrt{3}}{2}\right) = (-5, 5\sqrt{3})$$

26.

(b)

$$\log 20^3 - (\log [\sqrt{8} \cdot 38])$$

$$3 \log 20 - (\log \sqrt{8} + \log 38) =$$

$$3 \log 20 - \frac{1}{2} \log 8 - \log 38$$

27.

(d)

$$a = \sqrt{x}$$

$$a^2 - 13a + 36 = 0$$

$$(a-4)(a-9) = 0$$

$$a = 4 \quad a = 9$$

$$\sqrt{x} = 4$$

$$\sqrt{x} = 9$$

$$x = 16, 81$$

$$97$$

(3)

Solutions 1-11-92

Precalculus Written Test

d) 28. $(\sqrt[3]{64})^{-2} = (4)^{-2} = \frac{1}{16}$

b) 29.
$$\begin{array}{r} 1 \ 6 \ -8 \ 3 \\ \underline{1 \ 1 \ 7} \\ 1 \ 7 \ -1 \end{array} \quad \begin{array}{r} 1 \ 6 \ -8 \ 3 \\ \underline{1 \ 2 \ 16 \ 16} \\ 1 \ 8 \ 8 \ 19 \end{array}$$

c) 30. $2(-3)^{3-1} = 2 \cdot 9$

PRE-CALCULUS TEAM QUESTIONS

#17 $a = \frac{1}{x} \quad b = \frac{1}{y} \quad c = \frac{1}{z}$

$2a + b + 7c = 0 \quad M=2 \quad m=5$
 $3a + 2b + 6c = 1$
 $5a + 5b + c = 4$

$$\begin{array}{r} -4a - 2b - 14c = 0 \\ 3a + 2b + 6c = 1 \\ \hline -a - 8c = 1 \end{array}$$

$-a + \frac{8}{6} = 1$

$+a = +\frac{1}{3}$

$\therefore x = 3$

$$\begin{array}{r} -10a - 5b - 35c = 0 \\ 5a + 5b + c = 4 \\ \hline -5a - 34c = 4 \end{array}$$

$-5a - 34c = 4$

$5a + 40c = -5$

$6c = -1$

$c = -\frac{1}{6} \quad \therefore z = -6$

$\frac{2}{3} + b - \frac{7}{6} = 0$

$-\frac{3}{6} + b = 0$

$b = \frac{1}{2} \quad \therefore y = 2$

$(3, 2, -6)$