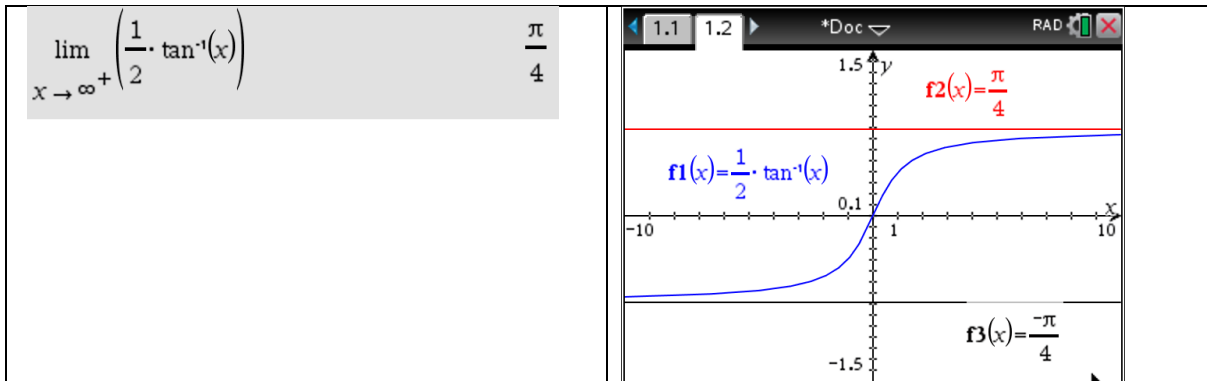


VCE SPECIALIST MATHEMATICS EXAM 2 NOV 2018 SUGGESTED SOLUTIONS

MC SECTION

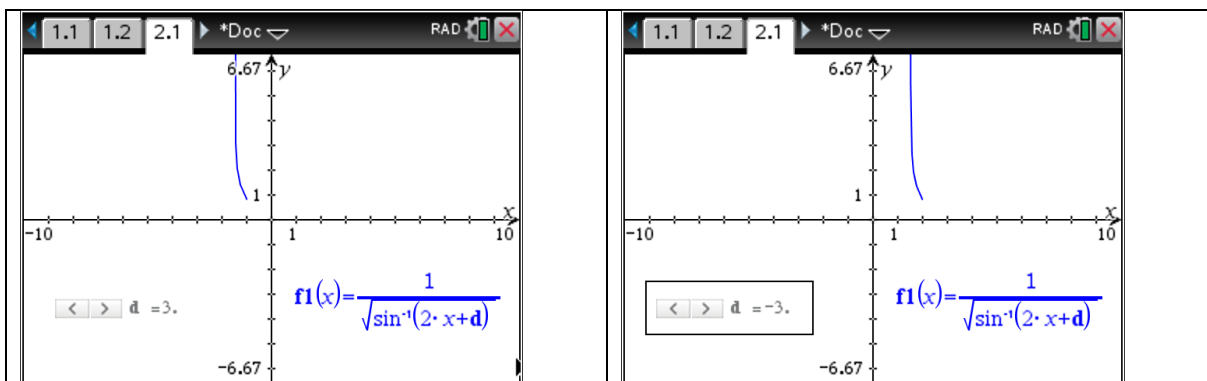
Q1



Answer: E

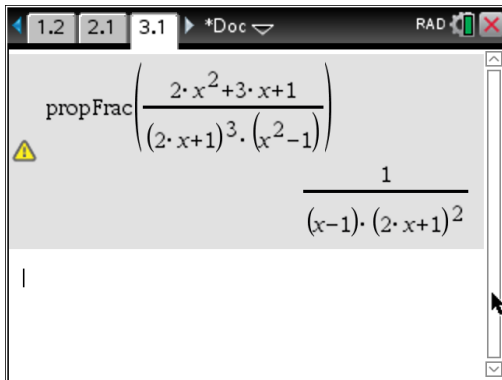
Q2

$$cx + d \neq 0 \rightarrow x \neq -\frac{d}{c}$$



Answer: B

Q3



Answer: D

Q4

x is in the 3rd quadrant

$$\begin{aligned} \frac{1}{\sin(-x)} &= -\frac{1}{\sin(x)} \\ &= -\frac{1}{-\frac{a}{b}} \\ &= \frac{b}{a} \end{aligned}$$

Answer: A

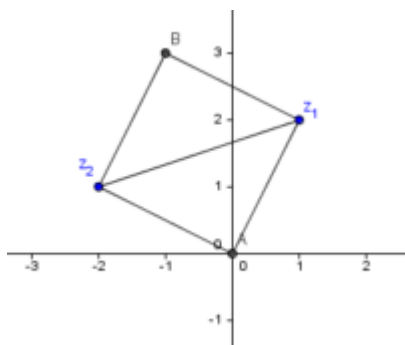
Q5

$$\begin{aligned} z &:= a + b \cdot i & a + b \cdot i \\ \frac{1}{z} &= \frac{a}{a^2 + b^2} + a + \left(b - \frac{b}{a^2 + b^2} \right) \cdot i \\ \text{comDenom} \left(b - \frac{b}{a^2 + b^2} \right) &= \frac{a^2 \cdot b + b^3 - b}{a^2 + b^2} \\ \frac{a^2 \cdot b + b^3 - b}{a^2 + b^2} &= \frac{a^2 + b^2 - 1}{a^2 + b^2} \end{aligned}$$

Circle radius 1 as $b \neq 0$ so $|z| = 1$

Answer: D

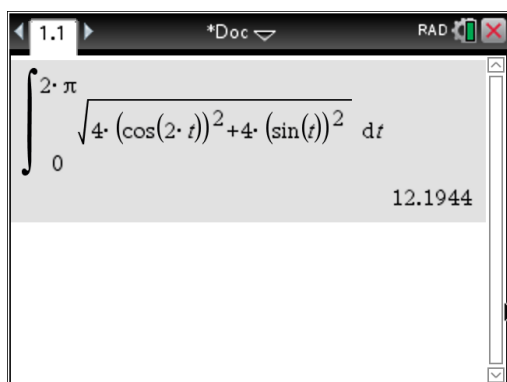
Q6



$$\text{Area} = \frac{1}{2}|z_1| \times |z_2| \times \sin(90) = \frac{|z_1|^2}{2}$$

Answer: C

Q7



Answer: C

Q8

$$u = \tan(x)$$

$$\frac{du}{dx} = \sec^2(x)$$

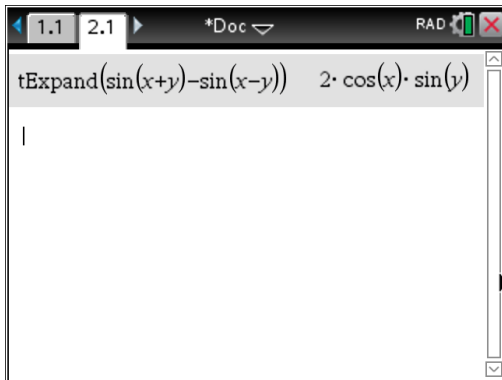
$$\text{limits : } x = 0, \quad u = 0$$

$$x = \frac{\pi}{6}, \quad u = \frac{1}{\sqrt{3}}$$

$$\int_0^{\frac{1}{\sqrt{3}}} u^2 du$$

Answer: E

Q9



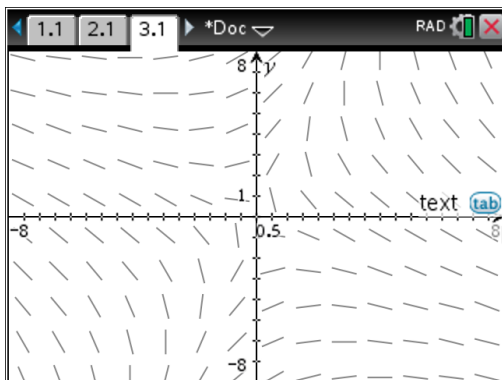
$$\frac{dy}{dx} = \frac{2}{2 \cos(x) \sin(y)}$$

$$\int \sin(y) dy = \int \frac{dx}{\cos(x)}$$

$$\int \sin(y) dy = \int \sec(x) dx$$

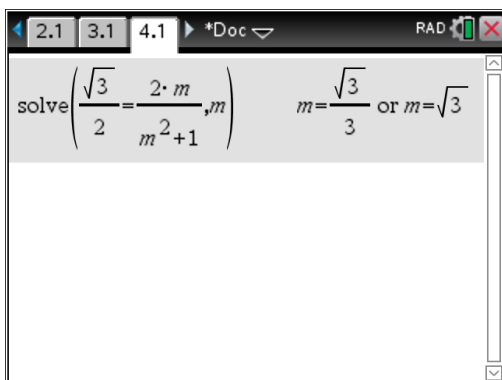
Answer: D

Q10



Answer: A

Q11

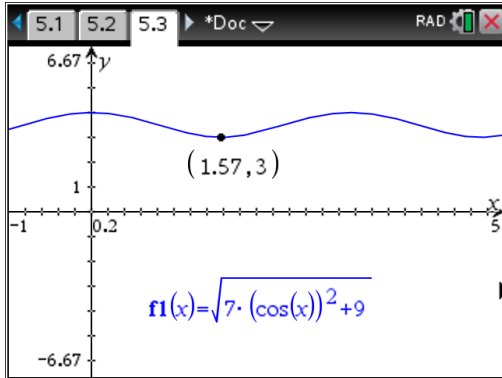


Answer: C

Q12

Answer: A

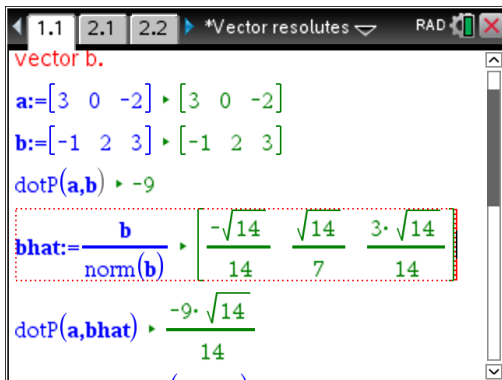
Q13



Answer: B

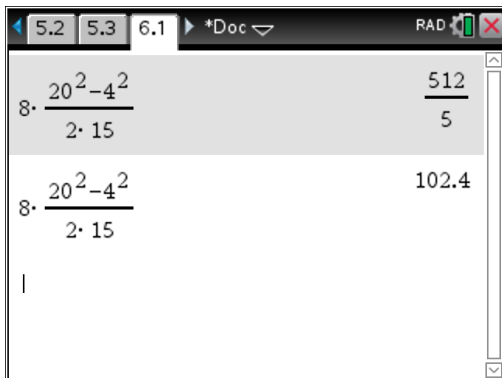
Q14

Notes pages



Answer: C

Q15



Answer: E

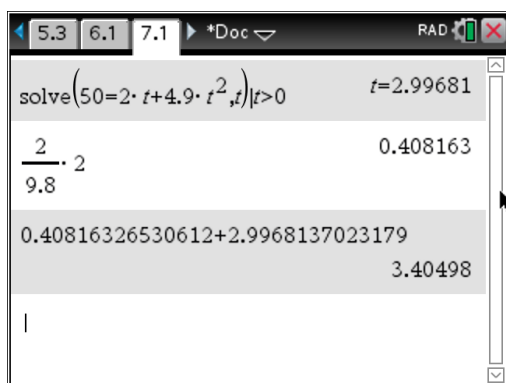
Q16

$$4 + 1.5 = F_2 \times \frac{1}{\sqrt{2}}$$

$$F_2 = \frac{11\sqrt{2}}{2}$$

Answer: B

Q17

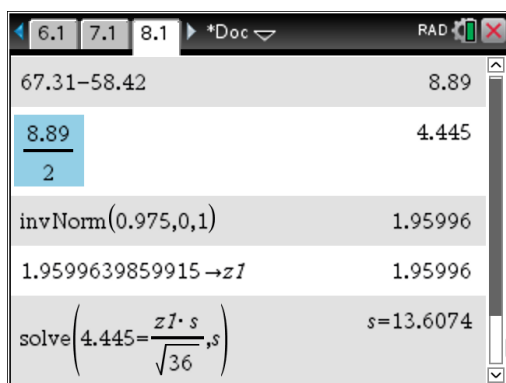


A screenshot of a TI-84 Plus calculator interface. The top of the screen shows the menu with options 5.3, 6.1, and 7.1, and a document icon labeled '*Doc'. The mode is set to 'RAD'. The main display area shows the following sequence of operations and results:

| | |
|---|------------------------|
| <code>solve(50=2*t+4.9*t^2,t) t>0</code> | <code>t=2.99681</code> |
| <code>$\frac{2}{9.8} \cdot 2$</code> | <code>0.408163</code> |
| <code>0.40816326530612+2.9968137023179</code> | <code>3.40498</code> |

Answer: E

Q18



A screenshot of a TI-84 Plus calculator interface. The top of the screen shows the menu with options 6.1, 7.1, and 8.1, and a document icon labeled '*Doc'. The mode is set to 'RAD'. The main display area shows the following sequence of operations and results:

| | |
|--|------------------------|
| <code>67.31-58.42</code> | <code>8.89</code> |
| <code>$\frac{8.89}{2}$</code> | <code>4.445</code> |
| <code>invNorm(0.975,0,1)</code> | <code>1.95996</code> |
| <code>1.9599639859915 → z1</code> | <code>1.95996</code> |
| <code>solve($4.445 = \frac{z1 \cdot s}{\sqrt{36}}$, s)</code> | <code>s=13.6074</code> |

Answer: D

Q19

$$\text{normCdf}\left(5.65, \infty, 5.66, \sqrt{\frac{5 \cdot 16}{9}}\right) \quad 0.953234$$

Answer: E

Q20

$$\Pr(M > S) = \Pr(M - S > 0)$$

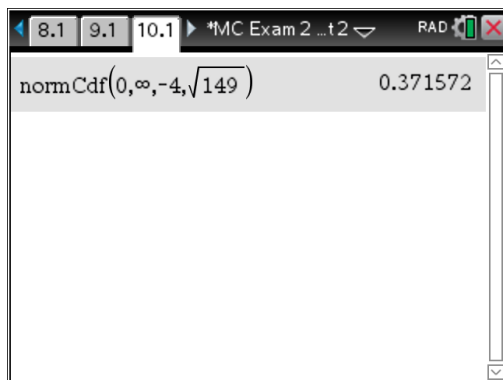
$$M \sim N(71, 10^2)$$

$$S \sim N(75, 7^2)$$

$$E(M - S) = -4$$

$$\text{Var}(M - S) = 1 \times 10^2 + 1 \times 7^2 = 149$$

$$\text{SD}(M - S) = \sqrt{149}$$



8.1 9.1 10.1 *MC Exam 2 ...t2 RAD

$$\text{normCdf}(0, \infty, -4, \sqrt{149}) \quad 0.371572$$

Answer: B