VCE SPECIALIST MATHEMATICS EXAM 2 NOV 2018 SUGGESTED SOLUTIONS

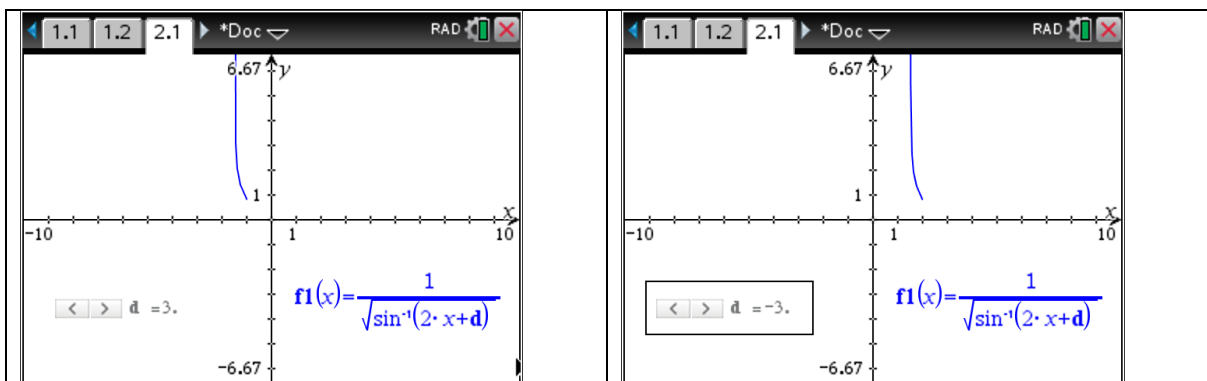**MC SECTION**

Q1

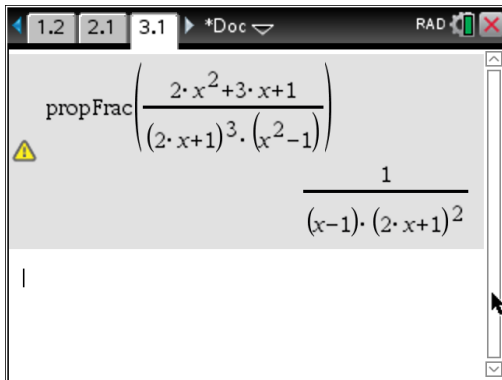$$\lim_{x \to \infty^+} \left(\frac{1}{2} \cdot \tan^{-1}(x) \right) \qquad \frac{\pi}{4}$$
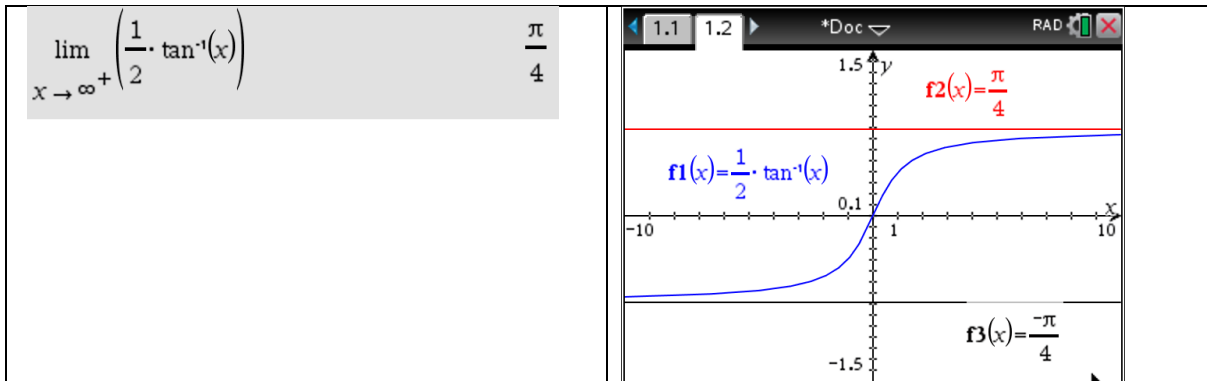
Answer: E

Q2

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

Answer: B

1

propFrac$\left(\dfrac{2 \cdot x^2 + 3 \cdot x + 1}{(2 \cdot x + 1)^3 \cdot \left(x^2 - 1\right)}\right)$

$$\dfrac{1}{(x-1) \cdot (2 \cdot x + 1)^2}$$

Answer: D

Q4

x is in the 3rd quadrant

$$\dfrac{1}{\sin(-x)} = -\dfrac{1}{\sin(x)}$$

$$= -\dfrac{1}{-\dfrac{a}{b}}$$

$$= \dfrac{b}{a}$$

Answer: A

Q5

$z := a + b \cdot i \qquad\qquad a + b \cdot i$

$z + \dfrac{1}{z} \qquad \dfrac{a}{a^2 + b^2} + a + \left(b - \dfrac{b}{a^2 + b^2}\right) \cdot i$

comDenom$\left(b - \dfrac{b}{a^2 + b^2}\right) \qquad \dfrac{a^2 \cdot b + b^3 - b}{a^2 + b^2}$

$\dfrac{\dfrac{a^2 \cdot b + b^3 - b}{a^2 + b^2}}{b} \qquad\qquad \dfrac{a^2 + b^2 - 1}{a^2 + b^2}$

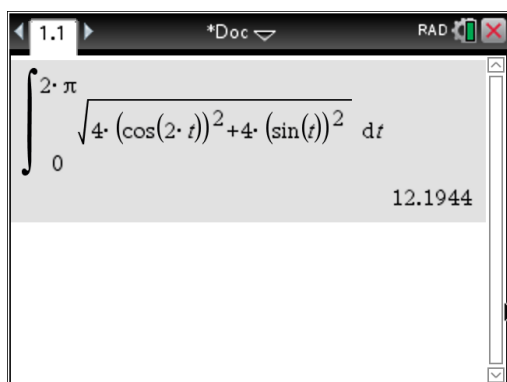Circle radius 1 as $b \neq 0$ so $|z| = 1$

Answer: D

Q6
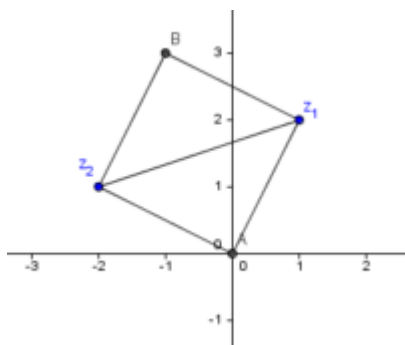
$$\text{Area} = \frac{1}{2}|z| \times |z| \times \sin(90) = \frac{|z|^2}{2}$$

Answer: C

Q7

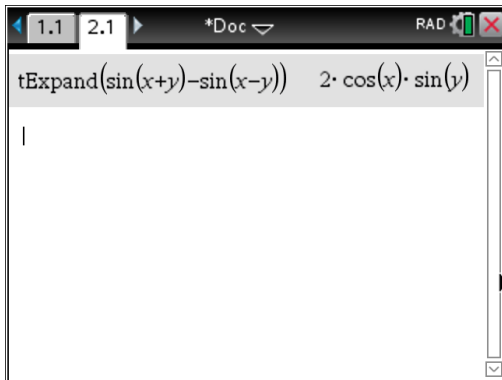Answer: C

Q8

$$u = \tan(x)$$

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

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

$$x = \frac{\pi}{6}, \quad u = \frac{1}{\sqrt{3}}$$
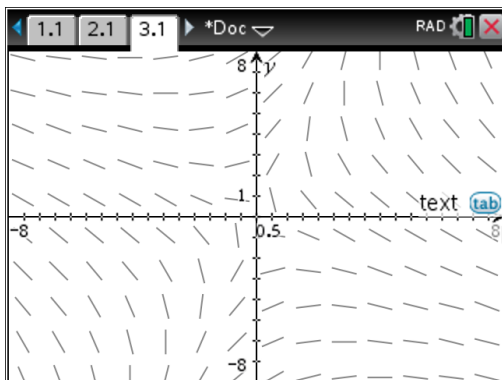
$$\int_{0}^{\frac{1}{\sqrt{3}}} u^2 \, du$$

Answer: E

Q9

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

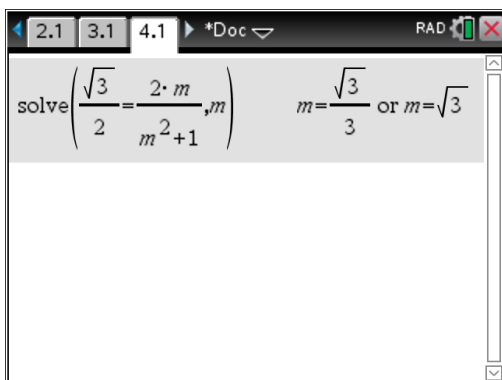$$\int \sin(y)\,dy = \int \frac{dx}{\cos(x)}$$

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

Answer: D

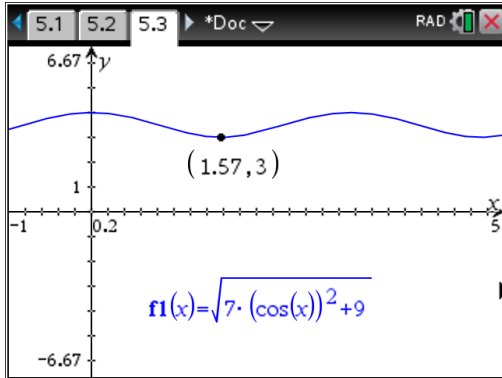## Q10

Answer: A

Q11

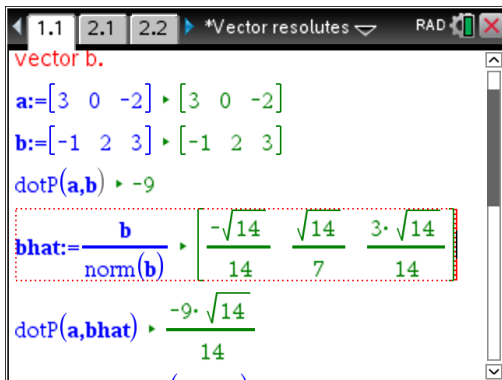
Answer: C

Q12

Answer: A

Q13

Answer: B
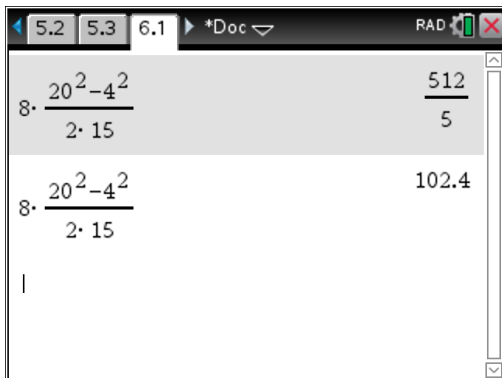
Q14

Notes pages

Answer: C

Q15

Answer: E
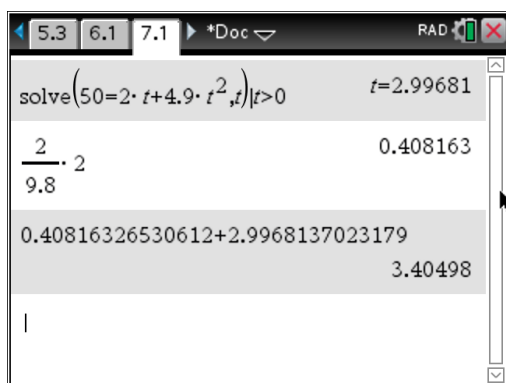
Q16

$$4 + 1.5 = F_2 \times \frac{1}{\sqrt{2}}$$
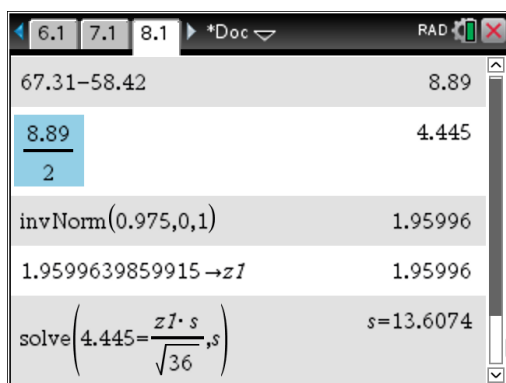
$$F_2 = \frac{11\sqrt{2}}{2}$$

Answer: B

Q17

Answer: E

Q18

Answer: D

$$\text{normCdf}\left(5 \cdot 65, \infty, 5 \cdot 66, \sqrt{\frac{5 \cdot 16}{9}}\right) \qquad 0.953234$$

Answer: E

Pr (M > S)=Pr (M-S > 0)
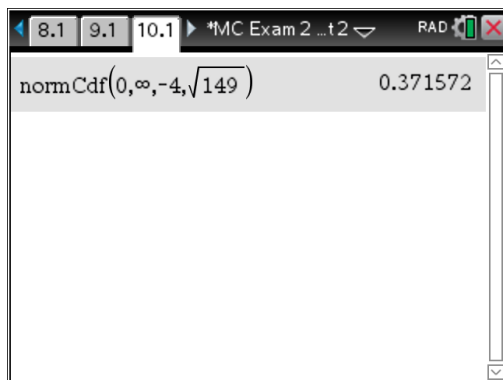
$$M \sim N(71, 10^2)$$
$$S \sim N(75, 7^2)$$
$$E(M - S) = -4$$
$$Var(M - S) = 1 \times 10^2 + 1 \times 7^2 = 149$$
$$SD(M - S) = \sqrt{149}$$

8.1	9.1	10.1	▶ *MC Exam 2 …t2	RAD

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

Answer: B