

1.4 day 2

Friday, September 6, 2013 7:38 AM

Simplify:

$$\textcircled{1} \quad \frac{5}{1-\sqrt{-25}} = \frac{5}{1-5i} \cdot \frac{1+5i}{1+5i} = \frac{5+25i}{1+25}$$

$$= \frac{5+25i}{26}$$

$$\textcircled{2} \quad \frac{2+4i}{3i} \cdot \frac{i}{i} = \frac{2i+4i^2}{3i^2} = \frac{2i-4}{-3} = \frac{4-2i}{3}$$

③ Evaluate $y = 3x^2 - 4x + 7$ for $x = 5 - 2i$

$$= 3(5-2i)^2 - 4(5-2i) + 7$$

$$= 3(25 - 20i + 4i^2) - 20 + 8i + 7$$

$$= 75 - 60i + 12i^2 - 20 + 8i + 7$$

$$= 75 - 60i - 12 - 20 + 8i + 7$$

$$= 50 - 52i$$

④ Solve for x and y :

Aside:

$$\frac{(2-x) + (y+4)i}{3-i} = 5+6i$$

$$\frac{2-4z}{5} = 10$$

$$(2-x) + (y+4)i = (5+6i)(3-i)$$

$$(2-x) + (y+4)i = 15 - 5i + 18i - 6i^2$$

$$(2-x) + (y+4)i = 21 + 13i$$

$$2-x = 21$$

$$x = -19$$

$$y+4 = 13$$

$$y = 9$$

⑤ Solve for m:

$$(5-11i)m + (14-6i) = 20+7i$$

$$(5-11i)m = 6+13i$$

$$(10+3)(10+1)$$

$$= 100 + 10 + 30 + 3$$

$$= 143$$

$$m = \frac{6+13i}{5-11i} \cdot \frac{5+11i}{5+11i} = \frac{30 + 66i + 65i + 143i^2}{25+121}$$

$$= \frac{-113 + 131i}{146}$$

⑥ Solve for A:

$$(2-3i)A + (5+7i) = (6+5i)A - (3+5i)$$

$$10z + 2 = 5z - 8$$

$$(-4-8i)A = -8-12i$$

$$A = \frac{-8-12i}{-4-8i} = \frac{2+3i}{1+2i} \cdot \frac{1-2i}{1-2i}$$

$$= \frac{2 - i - 6i^2}{1 - 4i^2}$$

$$= \frac{8 - i}{5}$$

(7a.) Show that 2 and -2 are square roots of 4.
 $2 \cdot 2 = 4$ $(-2)(-2) = 4$

(7b.) Show that $4 - 3i$ and $-4 + 3i$ are square roots of $7 - 24i$.

$$\begin{aligned}(4 - 3i)(4 - 3i) &= 16 - 12i - 12i + 9i^2 \\ &= 16 - 24i - 9 \\ &= 7 - 24i\end{aligned}$$

$$\begin{aligned}(-4 + 3i)(-4 + 3i) &= 16 - 12i - 12i + 9i^2 \\ &= 7 - 24i\end{aligned}$$