

Complex Numbers

$i^2 = -1$ can also help to simplify powers of i .

$$i^{24}$$

$$i^{38}$$

$$i^{63}$$

$$i^{25}$$

$$i^{64} = (i^2)^{32} = -1^{32} = 1$$

$$i^{90} = (i^2)^{45} = -1^{45} = -1$$

$$i^{55} = i^{54} \cdot i = (i^2)^{27} \cdot i = -1^{27} \cdot i = -1 \cdot i = -i$$

$$i^{16} = (i^2)^8 = -1^4 = 1$$

1. What is the coefficient of x^2 when $6x^2 - \frac{2}{5}x + 1$ is multiplied by $10x + \frac{1}{3}$?

a) -4

b) -2

c) 2

d) 4

Complex Numbers

Operations with Complex Numbers

$$(5-2i) + (6-i)$$

$$11 - 3i$$

$$(4-3i) - (2-5i)$$

$$2 + 2i$$

$$(6-2i)(1+i)$$

$$6 + 6i - 2i - 2i^2$$

$$+2$$

$$8 + 4i$$

$$(3-2i)(3+2i)$$

$$9 + 6i - 6i - 4i^2$$

$$+4$$

$$13$$

$$(7-4i) - (3+i)$$

$$4 - 5i$$

$$(12+3i) - (13+3i)$$

$$-1$$

$$(2-i)(3-4i)$$

$$6 - 8i - 3i + 4i^2$$

$$2 - 11i$$

$$(3-6i)(-4+2i)$$

$$-12 + 6i + 24i - 12i^2$$

$$30i + 12(-1)$$

$$0$$

$$i^2 = i^1 \cdot i^1$$

$$(i^2) \cdot i$$

$$-1 \cdot i$$

$$-i$$

Complex Numbers

Solving Equations with Complex Numbers

$$\sqrt{-16} = 4i$$

$$3x^2 + 27 = 0$$

$$3x^2 = -27$$

$$\sqrt{x} = \pm \sqrt{-9}$$

$$x = \pm 3i$$

$$-3x^2 - 9 = 0$$

$$-3x^2 = 9$$

$$\sqrt{x} = \pm \sqrt{-3}$$

$$x = \pm i\sqrt{3}$$

$$5x^2 + 5 = 0$$

$$-2x^2 - 80 = 0$$

$$-2x^2 = 80$$

$$\sqrt{x} = \pm \sqrt{40}$$

$$x = \pm \sqrt{-40}$$

$$x = \pm 2i\sqrt{10}$$

$$\begin{matrix} \sqrt{40} \\ \sqrt{4}\sqrt{10} \\ 2\sqrt{10} \end{matrix}$$

$$4x^2 = -24$$

$$5x^2 = -10$$