

C) A ship is heading due south at 15 mph. The current is flowing northwest at 3 mph. Find the actual bearing and speed of the ship.

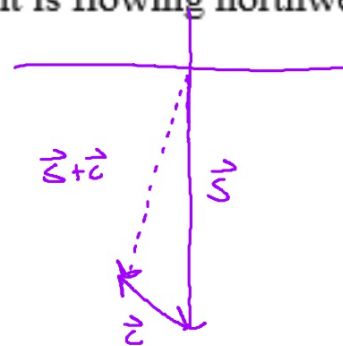
$$\vec{S} = \langle 15 \cos 270^\circ, 15 \sin 270^\circ \rangle \\ \langle 0, -15 \rangle$$

$$\vec{C} = \langle 3 \cos 135^\circ, 3 \sin 135^\circ \rangle \\ \left\langle -\frac{3\sqrt{2}}{2}, \frac{3\sqrt{2}}{2} \right\rangle$$

$$\vec{S} + \vec{C} = \left\langle 0 + \frac{-3\sqrt{2}}{2}, -15 + \frac{3\sqrt{2}}{2} \right\rangle \\ \langle -2.12, -12.88 \rangle$$

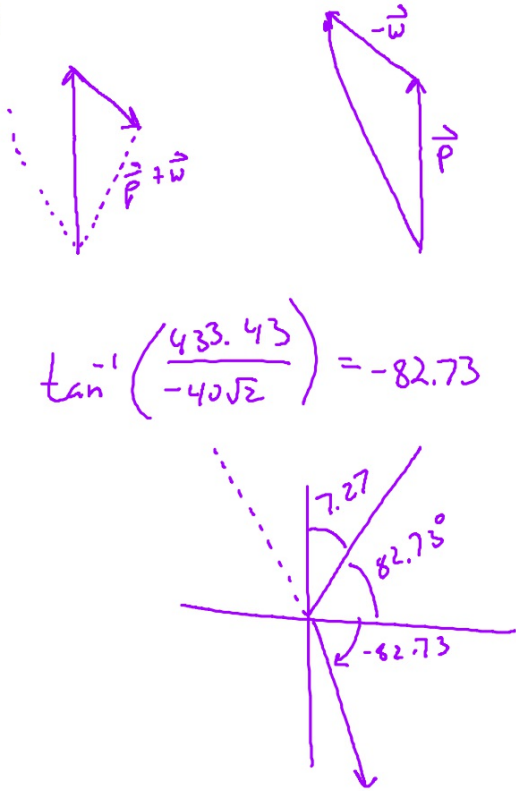
$$|\vec{S} + \vec{C}| = \sqrt{(-2.12)^2 + (-12.88)^2} \\ = 13.05 \text{ mph}$$

$$\theta = 260.65$$



$$\tan^{-1} \left( \frac{-12.88}{-2.12} \right) = 80.65^\circ$$

70. An airplane needs to head due north, but there is a wind blowing from the northwest at 80 km/hr. The plane flies with an airspeed of 500 km/hr. To end up flying due north, how many degrees west of north will the pilot need to fly the plane?



$$\vec{p} - \vec{w}$$

$$\vec{p} \langle 500 \cos 90, 500 \sin 90 \rangle$$

$$\langle 0, 500 \rangle$$

$$-\vec{w} \langle 80 \cos 135, 80 \sin 135 \rangle$$

$$\langle -40\sqrt{2}, 40\sqrt{2} \rangle$$

$$\vec{p} (-\vec{w}) = \langle -40\sqrt{2} \ 500 - 40\sqrt{2} \rangle$$

$$\langle -40\sqrt{2}, 433.43 \rangle$$

7.27 w of N

Section 9.4 Partial fractions

$$\frac{4}{x+3} + \frac{2}{x+5} = \frac{6x+26}{x^2+8x+15}$$

$$\#(e) \quad \frac{5x+16}{x^2+10x+24} = \frac{A(x+4)}{(x+6)(x+4)} + \frac{B(x+6)}{(x+4)(x+6)} \quad \frac{7}{x+6} - \frac{2}{x+4}$$

$$5x+16 = A(x+4) + B(x+6)$$

$$\text{Let } x = -4$$

$$5(-4) + 16 = A(-4+4) + B(-4+6)$$

$$-4 = 2B$$

$$B = -2$$

$$\text{Let } x = -6$$

$$5(-6) + 16 = A(-6+4) + B(-6+6)$$

$$-14 = -2A$$

$$A = 7$$

$$\#12) \frac{x+1}{x^2+7x+10} = \frac{(x+5)A}{(x+5)(x+2)} + \frac{B(x+2)}{(x+5)(x+2)}$$

$$x+1 = A(x+5) + B(x+2)$$

$$\text{Let } x = -5$$

$$-5+1 = A(-5+5) + B(-5+2)$$

$$-4 = -3B$$

$$B = \frac{4}{3}$$

$$\text{Let } x = -2$$

$$-2+1 = A(-2+5) + B(-2+2)$$

$$-1 = 3A$$

$$A = -\frac{1}{3}$$

$$\frac{-\frac{1}{3} \cdot \frac{1}{x+2}}{\frac{x+2}{1}}$$

$$\frac{-\frac{1}{3}}{x+2} + \frac{\frac{4}{3}}{x+5}$$

$$-\frac{1}{3(x+2)} + \frac{4}{3(x+5)}$$

$$\#13) \frac{5x}{x^2-9} = \frac{A}{x+3} + \frac{B}{x-3}$$

$$5x = A(x-3) + B(x+3)$$

$$\text{Let } x=3$$

$$5(3) = A(3-3) + B(3+3)$$

$$15 = 6B$$

$$B = \frac{5}{2}$$

7, 10, 15, 16

$$\frac{5}{2(x+3)} + \frac{5}{2(x-3)}$$

$$\text{Let } x=-3$$

$$5(-3) = A(-3-3) + B(-3+3)$$

$$-15 = -6A$$

$$A = \frac{5}{2}$$

$$\frac{5}{3x(x^2+2x+3)}$$