mine the *latent heat of fusion of ice.* Illustrate by a numerical example.

8. Describe two distinct experiments to show that the radiating power of a heated body depends upon the nature of the surface of this body.

FORM III., 1898.

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8. (*a*) Noticing that $3\sqrt{2}-2\sqrt{5}=(3-\sqrt{6})\sqrt{2}$ we have

$$\frac{3\sqrt{2}+3}{3-\sqrt{6}}-\frac{2\sqrt{3}+6}{3\sqrt{2}-2\sqrt{3}}=\frac{\sqrt{2}(3\sqrt{2}+3)-(2\sqrt{3}+6)}{3\sqrt{2}-2\sqrt{3}}=1.$$

(*b*) $$\left(\frac{a^x+a^{-x}}{2}\right)^2+\left(\frac{a^x-a^{-x}}{2\sqrt{-1}}\right)^2=\frac{a^{2x}+a^{-x}+2}{4}+\frac{a^{2x}+a^{-2x}-2}{-4}=1.$$

9. This question admits of a neater solution by arithmetic than by algebra, For an algebraical solution :

(*a*) Let x = time elapsed when going in the same direction. A goes 1 more lap than B. $\therefore \frac{x}{12}-\frac{x}{14\frac{2}{5}}=1$, from which $x=72'$.

(*b*) In going in opposite directions they go together 1 lap.

$\therefore \frac{x}{12}+\frac{x}{14\frac{2}{5}}=1$, or $x=6\frac{6}{11}'$.

10. Book-work.

11. $x^2-2(a+y)x+ay$ is a complete square if $x^2-2(a+y)x+ay=0$ has equal roots; that is, if $\{-2(a+y)\}^2=4.1.\ ay$, and $y^2+ay+a^2=0$.

Solving for y, $y=\frac{a}{2}\left\{\frac{-1\pm\sqrt{-3}}{2}\right\}$

12. Let x = one side. Let d = difference of sides. Let e = diagonal.

$\therefore x^2+(x+d)^2=e^2$. $2x^2+2dx+d^2=e^2$.

Solving for x we have $x=\frac{-d\pm\sqrt{2e^2-d^2}}{2}$ $\therefore$ $x+d=\frac{d\pm\sqrt{2e^2-d^2}}{2}$.

13. $x^4+x^2y^2+y^4=741$ (1) $\quad x^2+xy+y^2=39$ (2)

(1)÷(2) gives $x^2-xy+y^2=19$ (3) $\quad$ (2)−(3) gives $xy=10$

(4) (2)+(4) gives $x+y=\pm 7$ $\quad$ (3)−(4) gives $x-y=\pm 3$

From which $\left.\begin{array}{l} x=\pm 5 \text{ or } \pm 2 \\ y=\pm 2 \text{ or } \pm 5 \end{array}\right\}$