1. (a) $\boxed{2}$
   (b) $\boxed{4}$
2. $\boxed{\frac{3}{5}}$
3. Rewrite as a common fraction: $\sqrt{5\frac{4}{9}} = \sqrt{\frac{5 \times 9 + 4}{9}} = \sqrt{\frac{49}{9}} = \sqrt{\frac{7^2}{3^2}} = \boxed{\frac{7}{3}}$
4. $\boxed{2}$
5. $\boxed{7.5}$
6. $\boxed{2^5 = 32}$
7. This problem looks complicated, but all we have to do is plug in the given values and solve. Our formula is $L = \frac{25T^2}{H^2}$ and we know $T = 4$ and $H = 8$. So plug these numbers in: $L = \frac{25 \times 4^2}{8^2}$. Rather than multiplying it all out, let us try to simplify our calculations: $L = \frac{25 \times (2^2)^2}{(2^3)^2} = \frac{25 \times 2^4}{2^6} = \frac{25}{2^2} = \boxed{6.25}$
8. To understand these problems, let's write out the prime factorizations:
   (a) $\frac{3^2 \cdot 5^4 \cdot 7^2}{2^2 \cdot 3 \cdot 5^5 \cdot 7} = \frac{3 \cdot 3 \cdot 5 \cdot 5 \cdot 5 \cdot 5 \cdot 7 \cdot 7}{2 \cdot 2 \cdot 3 \cdot 5 \cdot 5 \cdot 5 \cdot 7}$. Now cancel the terms that appear both on top and on bottom and we are left with: $\frac{3 \cdot 7}{2 \cdot 2 \cdot 5} = \boxed{\frac{21}{20}}$
   (b) $\frac{168}{210} = \frac{2^3 \cdot 3 \cdot 7}{2 \cdot 3 \cdot 5 \cdot 7} = \frac{2^4}{5} = \boxed{\frac{4}{5}}$
9. $\boxed{1.5}$
10. $\frac{2}{\left(\frac{2}{1+2}\right)} = \frac{2}{\left(\frac{2}{3}\right)}$. Remember that if we divide by a fraction, we multiply by the reciprocal. Or: $\frac{\frac{a}{b}}{\frac{c}{d}} = \frac{a}{b} \div \frac{c}{d} = \frac{a}{b} \times \frac{d}{c} = \frac{ad}{bc}$. So we take $\frac{2}{\left(\frac{2}{3}\right)} = 2 \times \frac{3}{2} = \boxed{3}$