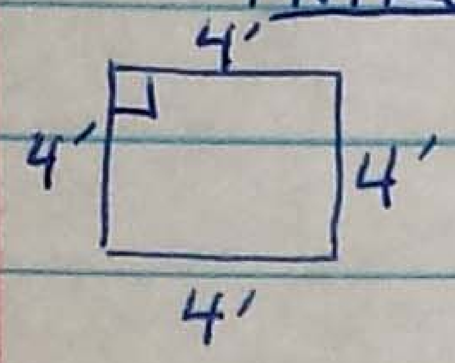
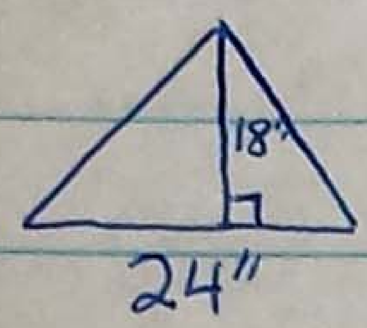
Introduction to Area Problems

I

① 

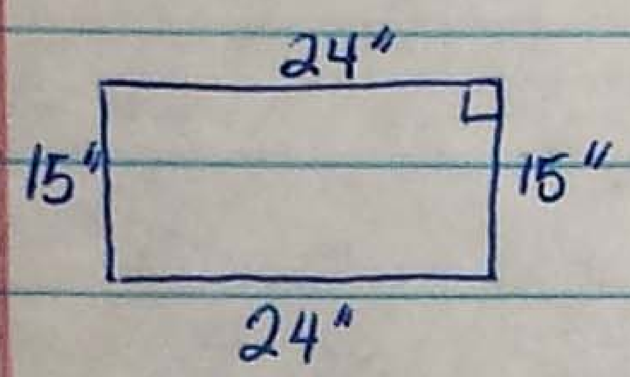
$A = (4)^2$

$\boxed{= 16'^2}$

② 

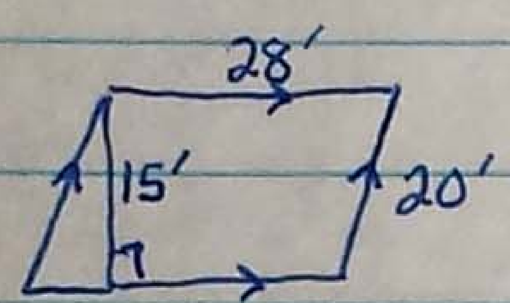
$A = \frac{1}{2}(18)(24)$

$\boxed{= 216 \text{ in}^2}$

③ 

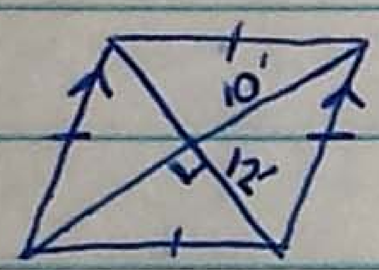
$A = (15)(24)$

$\boxed{= 360 \text{ in}^2}$

④ 

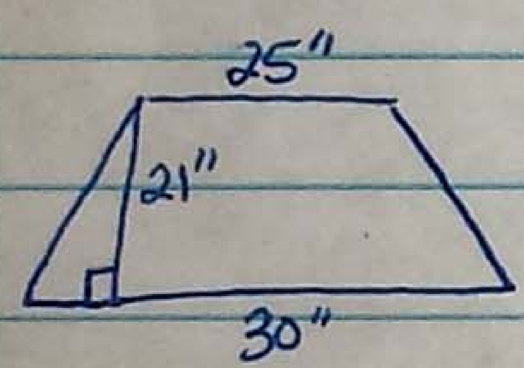
$A = (15)(28)$

$\boxed{= 420 \text{ ft}^2}$

⑤ 

$A = \frac{1}{2}(10)(12)$

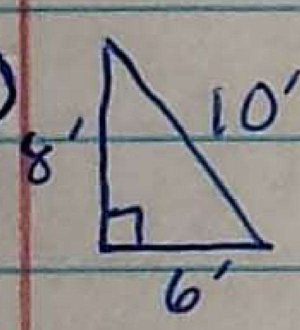
$\boxed{= 60 \text{ ft}^2}$

⑥ 

$A = \frac{(25+30)(21)}{2}$

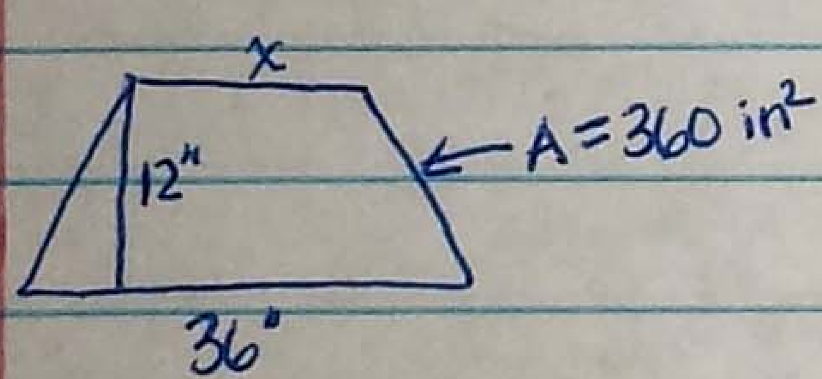
$\boxed{= 577.5 \text{ in}^2}$

II

① 

$A = \frac{1}{2}(6)(8)$

$\boxed{= 24 \text{ ft}^2}$

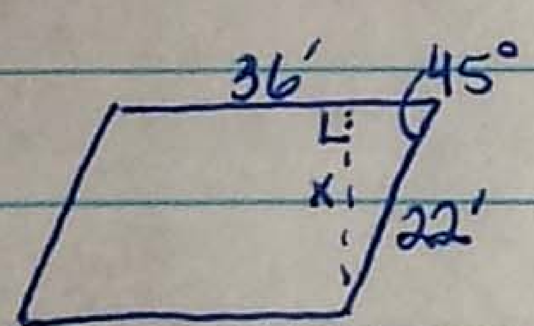
② 

$360 = \frac{(x+36)(12)}{2}$

$720 = (x+36)(12)$

$60 = (x+36)$

$\boxed{24'' = x}$

③ 

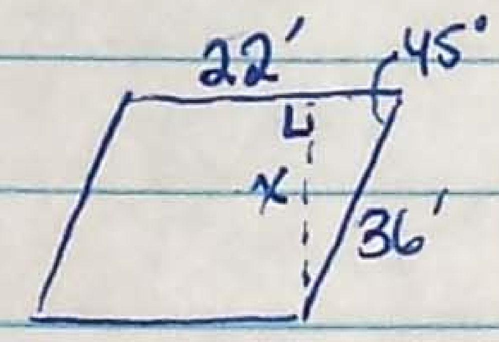
$22 = x\sqrt{2}$

$11\sqrt{2} = x$

$A = (11\sqrt{2})(36)$

$\boxed{= 396\sqrt{2} \text{ ft}^2}$

$\boxed{(\text{or } 560.03)}$



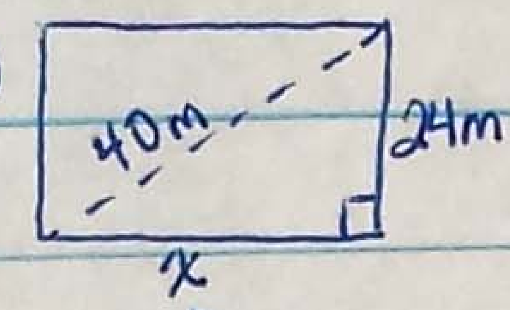
$36 = x\sqrt{2}$

$18\sqrt{2} = x$

$A = (18\sqrt{2})(22)$

$\boxed{= 396\sqrt{2} \text{ ft}^2}$

$\boxed{\approx 560.03 \text{ ft}^2}$

④ 

$24^2 + x^2 = 40^2$

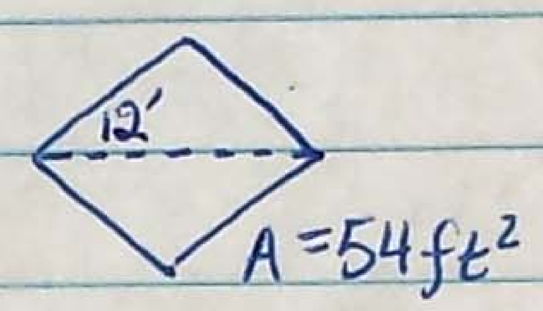
$576 + x^2 = 1600$

$x^2 = 1024$

$x = 32$

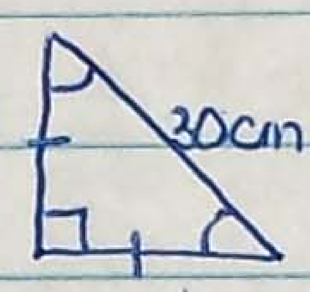
$A = (24)(32)$

$\boxed{= 768 \text{ m}^2}$

⑤ 

$54 = \frac{1}{2}(12)(x)$

$\boxed{x = 9 \text{ ft}}$

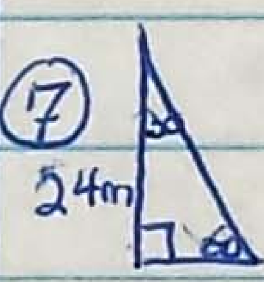
⑥ 

$30 = x\sqrt{2}$

$15\sqrt{2} = x$

$A = \frac{1}{2}(15\sqrt{2})(15\sqrt{2})$

$\boxed{= 225 \text{ cm}^2}$

⑦ 

$24 = x\sqrt{3}$

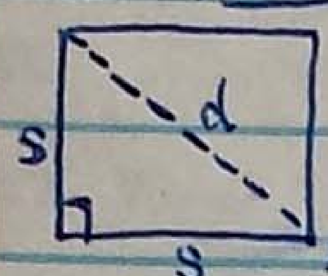
$8\sqrt{3} = x$

$A = \frac{1}{2}(8\sqrt{3})(24)$

$\boxed{= 96\sqrt{3} \text{ m}^2}$

$\boxed{\approx 166.28 \text{ m}^2}$

Additional Area Problems

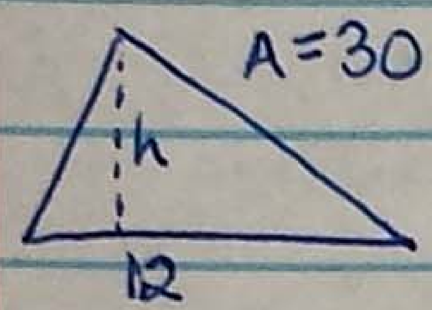
① 

$225 = s^2$

$15 = s$

$\boxed{d = 15\sqrt{2} \text{ in.}}$

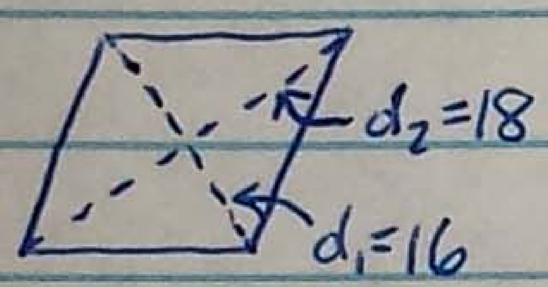
$\boxed{d \approx 21.21 \text{ in.}}$

② 

$30 = \frac{1}{2}(12)(h)$

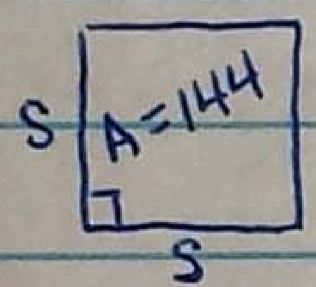
$\boxed{5'' = h}$

~~③~~ ______

④ 

$A = \frac{1}{2}(18)(16)$

$= 144$

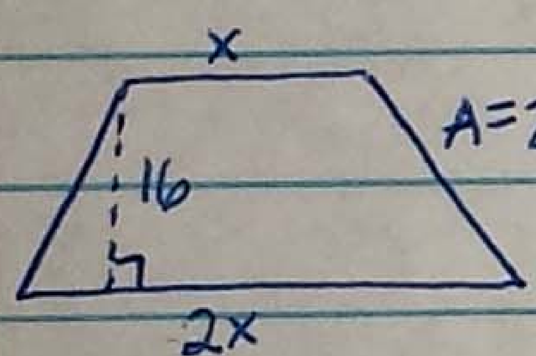


$144 = s^2$

$12 = s$

$P = 4(12)$

$\boxed{= 48 \text{ in}}$

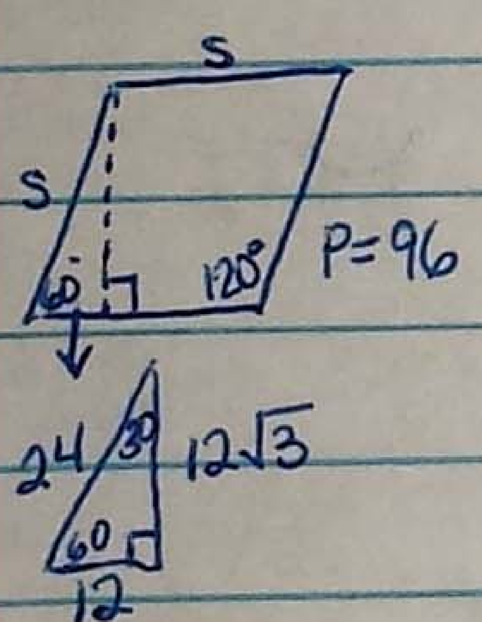
⑤ 

$288 = \frac{(2x+x)(16)}{2}$

$288 = 16x + 8x$

$288 = 24x$

$\boxed{12 = x,\ 24 = 2x}$

⑥ 

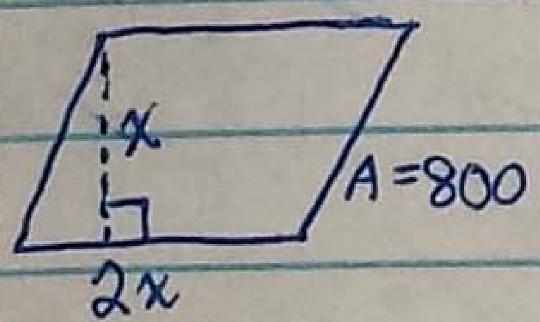
$96 = 4s$

$24 = s$

$A = 24(12\sqrt{3})$

$\boxed{= 288\sqrt{3} \text{ m}^2}$

$\boxed{\approx 498.83 \text{ m}^2}$

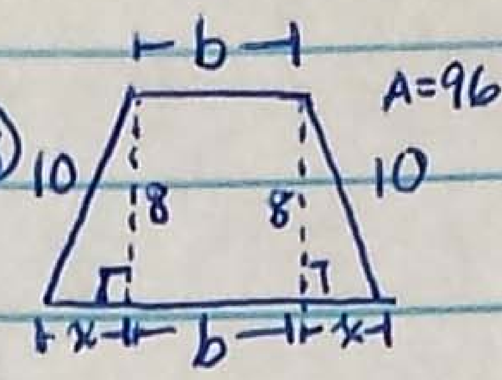
⑦ 

$800 = (x)(2x)$

$800 = 2x^2$

$400 = x^2$

$\boxed{20 \text{ ft} = x}$

⑧ 

$x^2 + 8^2 = 10^2$

$x^2 = 36$

$x = 6$

$96 = \frac{(6+6+b+b)(8)}{2}$

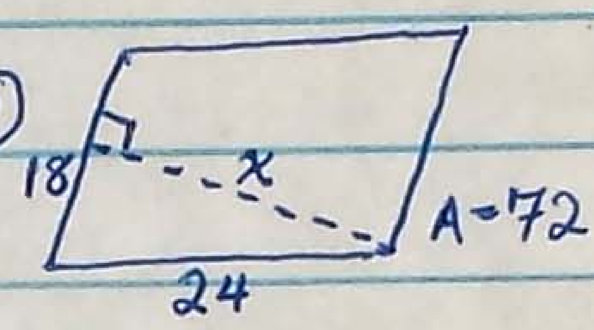
$96 = (12+2b)(4)$

$96 = 48 + 8b$

$48 = 8b$

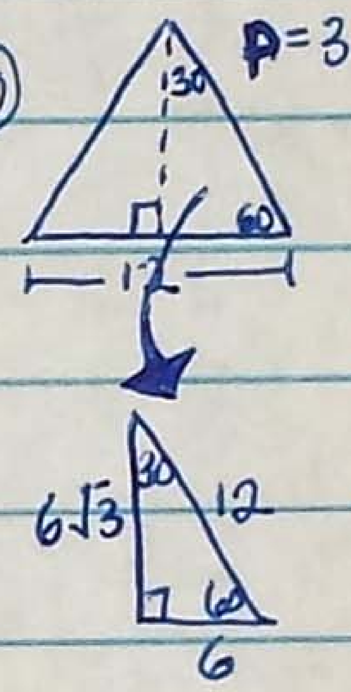
$6 = b$ other base: $x+b+x \to 6+6+6 \to 18$

$\boxed{\text{Bases: } 6 \text{ in and } 18 \text{ in}}$

⑨ 

$72 = 18x$

$\boxed{4 \text{ cm} = x}$

⑩ 

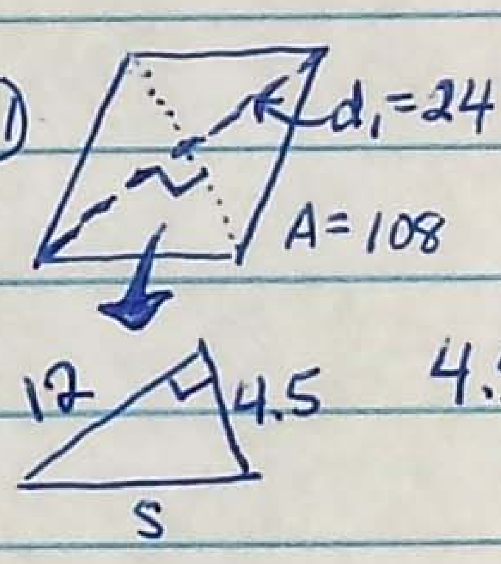
$36 = 3s$

$12 = s$

$A = \frac{1}{2}(12)(6\sqrt{3})$

$\boxed{= 36\sqrt{3} \text{ ft}^2}$

$\boxed{\approx 62.35 \text{ ft}^2}$

⑪ 

$108 = \frac{1}{2}(24)(d_2)$

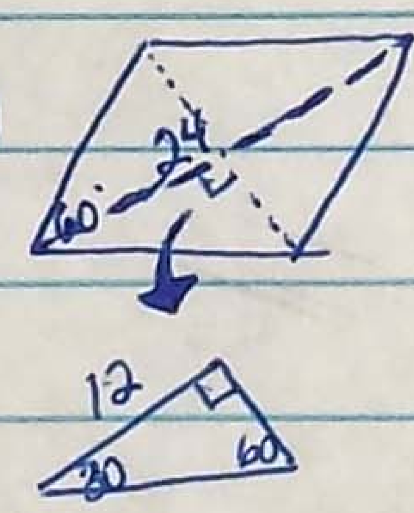
$9 = d_2$

$4.5^2 + 12^2 = s^2$

$12.82 \approx s$

$P = (4)(12.82)$

$\boxed{= 51.24 \text{ in}}$

⑫ 

$12 = x\sqrt{3}$

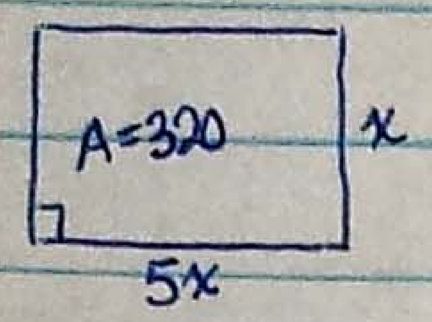
$4\sqrt{3} = x$

$8\sqrt{3} = 2x$ ← side length and length of second diagonal

$A = \frac{1}{2}(24)(8\sqrt{3})$

$\boxed{= 96\sqrt{3} \text{ ft}^2}$

$\boxed{\approx 166.28 \text{ ft}^2}$

⑬


$320=(x)(5x)$

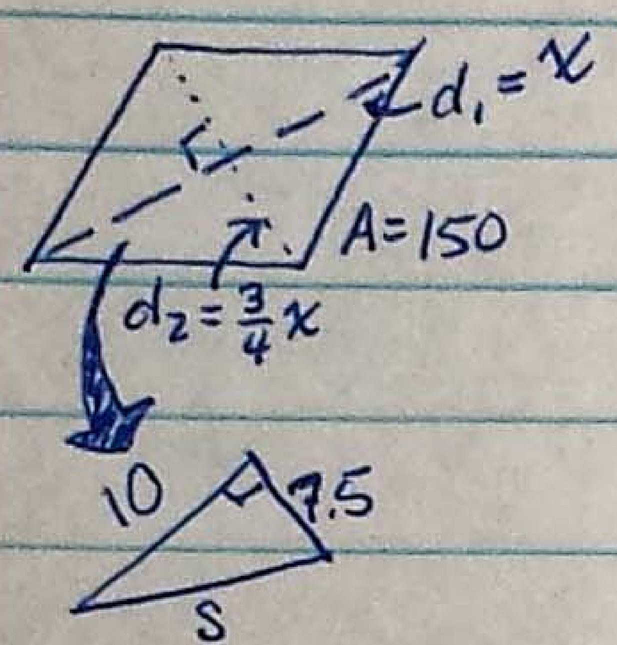
$320=5x^2$

$64=x^2$

$8=x$

$P=8+5(8)+8+5(8)$

$\boxed{=96\text{ ft.}}$

⑭


$150=\frac{1}{2}\left(\frac{3}{4}x\right)(x)$

$150=\frac{3}{8}x^2$

$400=x^2$

$20=x, \quad 15=\frac{3}{4}x$

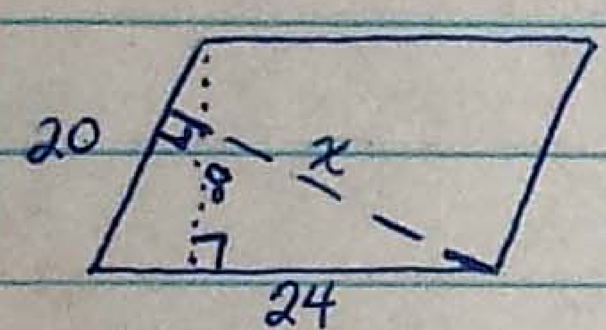
$(7.5)^2+10^2=s^2$

$156.25=s^2$

$12.5=s$

$P=(4)(12.5)$

$\boxed{=50\text{ yd}}$

⑮


$A=24(8)$

$=192$

$192=20(x)$

$\boxed{9.6\text{in}=x}$