Name _____   Date _____

1. Find the area of the following rectangles. Draw an area model if it helps you.

a. $\frac{8}{3}$ cm $\times \frac{24}{4}$ cm

$$= \frac{\cancel{8}^{2} \times \cancel{24}^{8}}{\cancel{3}_{1} \times \cancel{4}_{1}} = \frac{16}{1}$$

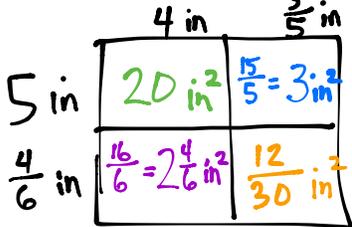$$= 16 \text{ cm}^2$$

b. $\frac{32}{5}$ ft $\times 3\frac{3}{8}$ ft

$$= \frac{32}{5} \times \frac{27}{8}$$

$$= \frac{^{4}\cancel{32} \times 27}{5 \times \cancel{8}_{1}} = \frac{108}{5}$$

$$= 21\frac{3}{5} \text{ ft}^2$$

$$\begin{array}{r} 21\frac{3}{5} \\ 5\overline{\smash{)}108} \\ -10 \\ \hline 08 \\ -5 \\ \hline 3 \end{array}$$

c. $5\frac{4}{6}$ in $\times 4\frac{3}{5}$ in

4 in $\frac{3}{5}$ in

20 in^2	$\frac{15}{5}=3\text{ in}^2$
$\frac{16}{6}=2\frac{4}{6}\text{ in}^2$	$\frac{12}{30}\text{ in}^2$

5 in $\frac{4}{6}$ in

$$= 20 + 3 + 2\frac{4}{6} + \frac{12}{30}$$
$$= 25 + \frac{20}{30} + \frac{12}{30}$$
$$= 25 + \frac{32}{30}$$
$$= 25 + 1\frac{2}{30}$$
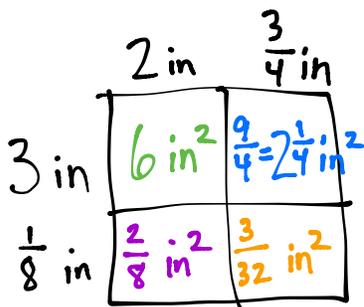$$= 26\frac{2}{30} = 26\frac{1}{15}\text{ in}^2$$

d. $\frac{5}{7}$ m $\times 6\frac{3}{5}$ m

$$= \frac{5}{7} \times \frac{33}{5}$$

$$= \frac{^{1}\cancel{5} \times 33}{7 \times \cancel{5}_{1}} = \frac{33}{7}$$

$$= 4\frac{5}{7}\text{ m}^2$$

2. Chris is making a table top from some leftover tiles. He has 9 tiles that measure $3\frac{1}{8}$ inches long and $2\frac{3}{4}$ inches wide. What is the area he can cover with these tiles?

2 in $\frac{3}{4}$ in

6 in^2	$\frac{9}{4}=2\frac{1}{4}\text{ in}^2$
$\frac{2}{8}\text{ in}^2$	$\frac{3}{32}\text{ in}^2$

3 in $\frac{1}{8}$ in

$$3\frac{1}{8} \times 2\frac{3}{4}$$
$$= 6 + 2\frac{1}{4} + \frac{2}{8} + \frac{3}{32}$$
$$= 8 + \frac{1}{4} + \frac{1}{4} + \frac{3}{32}$$
$$= 8 + \frac{1\times16}{2\times16} + \frac{3}{32}$$
$$= 8\frac{19}{32}\text{ in}^2$$
(for 1 tile)

$$9 \times 8\frac{19}{32}$$
$$= (9\times8) + \left(9\times\frac{19}{32}\right)$$
$$= 72 + \frac{171}{32}$$
$$= 72 + 5\frac{11}{32}$$
$$= 77\frac{11}{32}\text{ in}^2$$

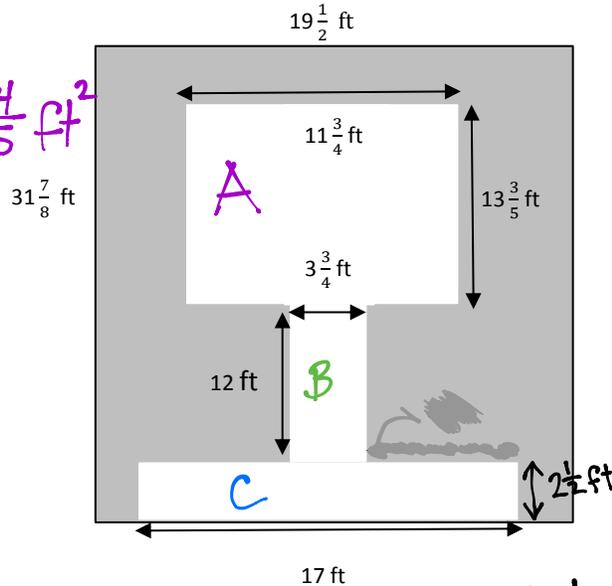$$\begin{array}{r} 5 \\ 32\overline{\smash{)}171} \\ -160 \\ \hline 11 \end{array}$$

He can cover $77\frac{11}{32}$ in².

3. A hotel is recarpeting a section of the lobby. Carpet covers the part of the floor as shown below in grey.
    How many square feet of carpeting will be needed?

Area of large rectangle $= 31\frac{7}{8}$ ft $\times 19\frac{1}{2}$ ft

$= \frac{255}{8} \times \frac{39}{2} = \frac{9945}{16} = 621\frac{9}{16}$ ft^2

$$16\overline{)9945} \quad 621\frac{9}{16}$$
$$\underline{-9936}$$
$$9$$

Area$_A = 11\frac{3}{4} \times 13\frac{3}{5}$

$= \frac{47}{4} \times \frac{68\,17}{5} = \frac{799}{5} = 159\frac{4}{5}$ ft^2

Area$_B = 12 \times 3\frac{3}{4}$

$= (12 \times 3) + (12 \times \frac{3}{4})$

$= 36 + 9$

$= 45$ ft^2

Area$_C = 17 \times 2\frac{1}{2}$

$= (17 \times 2) + (17 \times \frac{1}{2})$

$= 34 + \frac{17}{2}$

$= 34 + 8\frac{1}{2}$

$= 42\frac{1}{2}$ ft^2

Area$_A$ + Area$_B$ + Area$_C =$

$= 159\frac{4}{5} + 45 + 42\frac{1}{2}$

$= 246 + \frac{4 \times 2}{5 \times 2} + \frac{1 \times 5}{2 \times 5}$

$= 246 + \frac{8}{10} + \frac{5}{10}$

$= 246 + 1\frac{3}{10}$

$= 247\frac{3}{10}$

Total − Uncarpeted

$= 621\frac{9}{16} - 247\frac{3}{10}$

$= 374\frac{9 \times 5}{16 \times 5} - \frac{3 \times 8}{10 \times 8}$

$= 374\frac{45}{80} - \frac{24}{80}$

$= 374\frac{21}{80}$ ft^2

Diagram (grey shaded floor):
- 19½ ft (top width)
- 11¾ ft (region A width)
- 13⅗ ft (right height)
- 31⅞ ft (left height)
- 3¾ ft
- 12 ft (region B height)
- 2½ ft
- 17 ft (bottom width)
- Regions labeled A, B, C

We will need $374\frac{21}{80}$ ft^2 of carpeting.