Math351

Practice Exam #02

1. Add or subtract as indicated. Reduce when possible.

a) $\frac{8}{6} + \frac{3}{6}$

b) $\frac{7}{6} - \frac{1}{2} + \frac{1}{3}$

c) $\frac{5a}{x} - \frac{8a}{x}$

2. Multiply or divide as indicated. Reduce when possible.

a) $\frac{18}{5} \div \frac{9}{2}$

b) $\frac{x}{4} \cdot \frac{5}{3} \div \frac{x}{3}$

c) $\frac{1}{2} \div \frac{1}{3} \div \frac{1}{4}$

3. Simplify as much as possible. Follow the order of operations.

a) $1-\frac{1}{5}\div\left(-\frac{1}{15}\right)$

b) $1+\frac{1}{9}\div\left(\frac{1}{3}\right)^3$

4. Find the value of each expression when $x=2$. Reduce when possible.

a) $3x^2-2x+1$

b) $\frac{x}{2}-\frac{1}{2x}$

5. Reduce the following fractions to their lowest terms.

a) $\dfrac{40xyz}{5x^2z}$

b) $\dfrac{12x^2y^5z^2}{4y^2z^4}$

6. Simplify the expressions below as much as possible.

a) $\left[\left(\dfrac{3}{5}\right)^2 - \dfrac{4}{25}\right]^2$

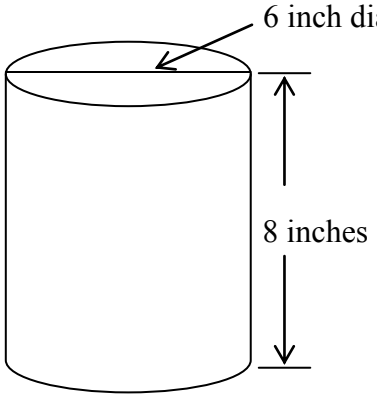
b) $\left[\left(\dfrac{2}{3}\right)^3 + \dfrac{1}{27}\right]^2 + \dfrac{2}{9}$

7. Simplify the expressions below as much as possible.

a) $\dfrac{\frac{1}{3}+\frac{3}{2}}{\frac{2}{5}-\frac{7}{6}}$

b) $\dfrac{\frac{5}{3}+\frac{7}{4}}{\frac{4}{6}-\frac{1}{8}}$

8. Find the volume of the right circular cylinder below.



$V = \pi r^2 h$

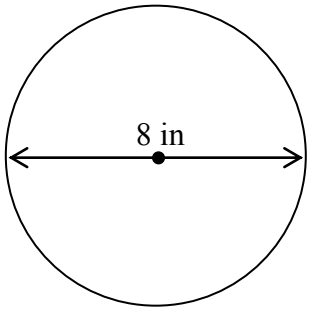
9. Find the following.

a) $3\sqrt{4}+\sqrt{9}$

b) $\sqrt{16}+2\sqrt{25}$

10. Find the circumference and the area of the circle.

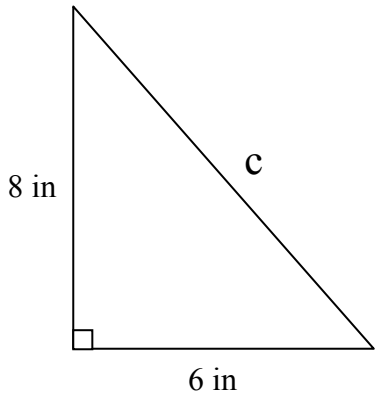
$A = \pi r^2$ $C = 2\pi r$



11. Change each decimal to a fraction. Reduce to lowest terms.

a) 0.375 b) 0.008

12. Solve for c. $a^2 + b^2 = c^2$



13. What number must be <u>subtracted</u> from 0.18 to obtain -2.16.

14. Solve for x:

a) $2x - 7 = 19$

b) $3x + 5 = -2$

c) $\frac{3}{4}x + \frac{2}{3} = \frac{1}{3} - \frac{3}{2}$

d) $\frac{3}{4}x - \frac{1}{2}x = \frac{1}{10} - \frac{1}{5}$

Pre-algebra

Practice Exam #02

1. Add or subtract as indicated. Reduce when possible.

a) $\frac{8}{6}+\frac{3}{6}$

$\frac{8+3}{6}$

$\boxed{\frac{11}{6}}$

b) $\frac{7}{6}-\frac{1}{2}+\frac{1}{3}$ LCD = 6

$\frac{7}{6}-\frac{1}{2}\left(\frac{3}{3}\right)+\frac{1}{3}\left(\frac{2}{2}\right)$

$\frac{7}{6}-\frac{3}{6}+\frac{2}{6}$

$\frac{7-3+2}{6}$

$\frac{4+2}{6}$

$\frac{6}{6}$

$\boxed{1}$

c) $\frac{5a}{x}-\frac{8a}{x}$

$\frac{5a-8a}{x}$

$\boxed{\frac{-3a}{x}}$

- OR -

$\boxed{-\frac{3a}{x}}$

2. Multiply or divide as indicated. Reduce when possible.

a) $\frac{18}{5}\div\frac{9}{2}$

$\frac{18}{5}\cdot\frac{2}{9}$

$\frac{\overset{2}{\cancel{18}}}{5}\cdot\frac{2}{\underset{1}{\cancel{9}}}$

$\frac{2\cdot 2}{5\cdot 1}$

$\boxed{\frac{4}{5}}$

b) $\frac{x}{4}\cdot\frac{5}{3}\div\frac{x}{3}$

$\frac{x}{4}\cdot\frac{5}{3}\cdot\frac{3}{x}$

$\frac{\overset{1}{\cancel{x}}}{4}\cdot\frac{5}{\underset{1}{\cancel{3}}}\cdot\frac{\overset{1}{\cancel{3}}}{\underset{1}{\cancel{x}}}$

$\frac{1\cdot 5\cdot 1}{4\cdot 1\cdot 1}$

$\boxed{\frac{5}{4}}$

c) $\frac{1}{2}\div\frac{1}{3}\div\frac{1}{4}$

$\frac{1}{2}\cdot\frac{3}{1}\cdot\frac{4}{1}$

$\frac{\underset{1}{\cancel{1}}}{\underset{1}{\cancel{2}}}\cdot\frac{3}{1}\cdot\frac{\overset{2}{\cancel{4}}}{1}$

$\frac{1\cdot 3\cdot 2}{1\cdot 1\cdot 1}$

$\frac{6}{1}$

$\boxed{6}$

3. (8 Points) Simplify as much as possible.

a) $1-\frac{1}{5}\div\left(-\frac{1}{15}\right)$

$1-\frac{1}{5}\cdot\left(-\frac{15}{1}\right)$

$1-\left(-\frac{15}{5}\right)$

$1-(-3)$

$1+3$

$\boxed{4}$

b) $1+\frac{1}{9}\div\left(\frac{1}{3}\right)^3$

$1+\frac{1}{9}\div\frac{1}{27}$

$1+\frac{1}{9}\cdot\frac{27}{1}$

$1+\frac{27}{9}$

$1+3$

$\boxed{4}$

4. Find the value of each expression when $x=2$. Reduce when possible.

a) $3x^2-2x+1$

$3(2)^2-2(2)+1$

$3(4)-4+1$

$12-4+1$

$8+1$

$\boxed{9}$

b) $\frac{x}{2}-\frac{1}{2x}$

$\frac{2}{2}-\frac{1}{2(2)}$

$1-\frac{1}{4}$ LCD = 4

$\frac{4}{4}-\frac{1}{4}$

$\frac{4-1}{4}$

$\boxed{\frac{3}{4}}$

5. Reduce the following fractions to their lowest terms.

a) $\dfrac{40xyz}{5x^2z}$

$\dfrac{\cancel{40}^{8}\,x\,y\,\cancel{z}^{1}}{\cancel{5}^{1}\,\cancel{x^2}^{x}\,\cancel{z}^{1}}$

$\dfrac{8y}{x}$

b) $\dfrac{12x^2y^5z^2}{4y^2z^4}$

$\dfrac{\cancel{12}^{3}\,x^2\,\cancel{y^5}^{y^3}\,\cancel{z^2}^{1}}{\cancel{4}^{1}\,\cancel{y^2}^{1}\,\cancel{z^4}^{z^2}}$

$\dfrac{3x^2y^3}{z^2}$

6. Simplify the expressions below as much as possible.

a) $\left[\left(\dfrac{3}{5}\right)^2-\dfrac{4}{25}\right]^2$

$\left[\frac{3}{5}\cdot\frac{3}{5}-\frac{4}{25}\right]^2$

$\left[\frac{9}{25}-\frac{4}{25}\right]^2$

$\left[\frac{9-4}{25}\right]^2$

$\left[\frac{5}{25}\right]^2$

$\left[\frac{1}{5}\right]^2$

$\frac{1}{5}\cdot\frac{1}{5}$

$\boxed{\frac{1}{25}}$

b) $\left[\left(\dfrac{2}{3}\right)^3+\dfrac{1}{27}\right]^2+\dfrac{2}{9}$

$\left[\frac{2}{3}\cdot\frac{2}{3}\cdot\frac{2}{3}+\frac{1}{27}\right]^2+\frac{2}{9}$

$\left[\frac{8}{27}+\frac{1}{27}\right]^2+\frac{2}{9}$

$\left[\frac{8+1}{27}\right]^2+\frac{2}{9}$

$\left[\frac{9}{27}\right]^2+\frac{2}{9}$

$\left[\frac{1}{3}\right]^2+\frac{2}{9}$

$\frac{1}{3}\cdot\frac{1}{3}$

$\frac{1}{9}+\frac{2}{9}$

$\frac{3}{9}$

$\boxed{\frac{1}{3}}$

7. Simplify the expressions below as much as possible.

a) $\dfrac{\frac{1}{3}+\frac{3}{2}}{\frac{2}{5}-\frac{7}{6}}$ LCD = 30

$\dfrac{30\left(\frac{1}{3}+\frac{3}{2}\right)}{30\left(\frac{2}{5}-\frac{7}{6}\right)}$

$\dfrac{30\left(\frac{1}{3}\right)+30\left(\frac{3}{2}\right)}{30\left(\frac{2}{5}\right)-30\left(\frac{7}{6}\right)}$

$\dfrac{\overset{10}{\cancel{30}}\left(\frac{1}{\cancel{3}}\right)+\overset{15}{\cancel{30}}\left(\frac{3}{\cancel{2}}\right)}{\overset{3}{\cancel{30}}\left(\frac{2}{\cancel{5}}\right)-\overset{5}{\cancel{30}}\left(\frac{7}{\cancel{6}}\right)}$

$\dfrac{10+45}{12-35}$

$\dfrac{55}{-23}$ or $-\dfrac{55}{23}$

b) $\dfrac{\frac{5}{3}+\frac{7}{4}}{\frac{4}{6}-\frac{1}{8}}$ LCD = 24

$\dfrac{24\left(\frac{5}{3}+\frac{7}{4}\right)}{24\left(\frac{4}{6}-\frac{1}{8}\right)}$

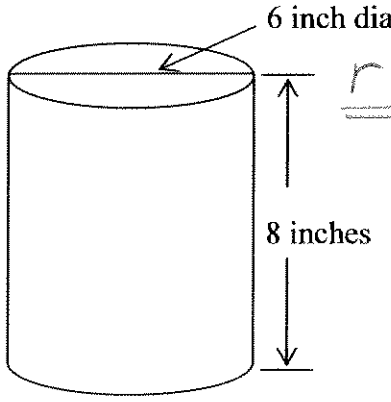
$\dfrac{24\left(\frac{5}{3}\right)+24\left(\frac{7}{4}\right)}{24\left(\frac{4}{6}\right)-24\left(\frac{1}{8}\right)}$

$\dfrac{\overset{8}{\cancel{24}}\left(\frac{5}{\cancel{3}}\right)+\overset{6}{\cancel{24}}\left(\frac{7}{\cancel{4}}\right)}{\overset{4}{\cancel{24}}\left(\frac{4}{\cancel{6}}\right)-\overset{3}{\cancel{24}}\left(\frac{1}{\cancel{8}}\right)}$

$\dfrac{40+42}{16-3}$

$\dfrac{82}{13}$

8. Calculate the volume of the right circular cylinder below.



$r = 3$ in

$V = \pi r^2 h$

$V = \pi (3\text{ in})^2 (8\text{ in})$

$V = \pi \cdot 9 \cdot 8\ \text{in}^3$

$V = \pi \cdot 72\ \text{in}^3$

$V = 72\pi\ \text{in}^3$

9. Find the following:

a) $3\sqrt{4}+\sqrt{9}$

$3 \cdot 2 + 3$

$6 + 3$

9

b) $\sqrt{16}+2\sqrt{25}$

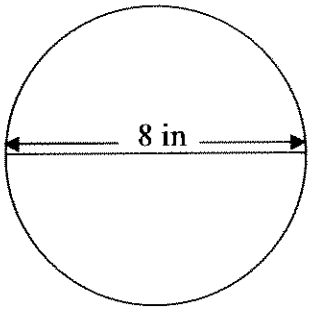
$4 + 2 \cdot 5$

$4 + 10$

14

10. Find the circumference and the area of the circle

Circle: $A = \pi r^2$; $C = 2\pi r$



$r = 4$ in

$A = \pi r^2$

$A = \pi (4\text{ in})^2$

$A = \pi \cdot 16\text{ in}^2$

$A = 16\pi\text{ in}^2$

$C = 2\pi r$

$C = 2\pi (4\text{ in})$

$C = 2 \cdot \pi \cdot 4\text{ in}$

$C = 8\pi$ in

11. Change each decimal to a fraction. Reduce to lowest terms.

a) 0.375

$\frac{375}{1000}$ $\div 25$

$\frac{15}{40}$ $\div 5$

$\frac{3}{8}$

b) 0.008

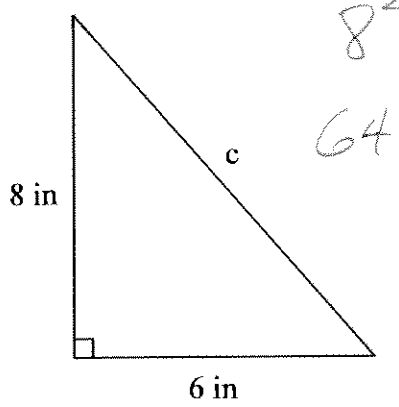
$\frac{8}{1000}$

$\frac{4}{500}$

$\frac{2}{250}$

$\frac{1}{125}$

12. Solve for c. $a^2 + b^2 = c^2$



$8^2 + 6^2 = c^2$

$64 + 36 = c^2$

$100 = c^2$

$10\text{in} = c$

13. What number must be <u>subtracted</u> from 0.18 to obtain -2.16

$0.18 - x = -2.16$

$-0.18 \qquad -0.18$

$\frac{-x}{-1} = \frac{-2.34}{-1}$

$x = 2.34$

14. Solve for x:

a) $2x - 7 = 19$

$+7 \quad +7$

$\frac{2x}{2} = \frac{26}{2}$

$x = 13$

b) $3x + 5 = -2$

$-5 \quad -5$

$\frac{3x}{3} = \frac{-7}{3}$

$x = -\frac{7}{3}$

-OR-

$x = -\frac{7}{3}$

c) $\frac{3}{4}x + \frac{2}{3} = \frac{1}{3} - \frac{3}{2}$ LCD = 12

$12\left(\frac{3}{4}x + \frac{2}{3}\right) = 12\left(\frac{1}{3} - \frac{3}{2}\right)$

$12\left(\frac{3}{4}x\right) + 12\left(\frac{2}{3}\right) = 12\left(\frac{1}{3}\right) - 12\left(\frac{3}{2}\right)$

$\overset{3}{\cancel{12}}\left(\frac{3}{\cancel{4}}x\right) + \overset{4}{\cancel{12}}\left(\frac{2}{\cancel{3}}\right) = \overset{4}{\cancel{12}}\left(\frac{1}{\cancel{3}}\right) - \overset{6}{\cancel{12}}\left(\frac{3}{\cancel{2}}\right)$

$9x + 8 = 4 - 18$

$9x + 8 = -14$

$-8 \quad -8$

$\frac{9x}{9} = \frac{-22}{9}$

$x = -\frac{22}{9}$

d) $\frac{3}{4}x - \frac{1}{2}x = \frac{1}{10} - \frac{1}{5}$ LCD = 20

$20\left(\frac{3}{4}x - \frac{1}{2}x\right) = 20\left(\frac{1}{10} - \frac{1}{5}\right)$

$20\left(\frac{3}{4}x\right) - 20\left(\frac{1}{2}x\right) = 20\left(\frac{1}{10}\right) - 20\left(\frac{1}{5}\right)$

$\overset{5}{\cancel{20}}\left(\frac{3}{\cancel{4}}x\right) - \overset{10}{\cancel{20}}\left(\frac{1}{\cancel{2}}x\right) = \overset{2}{\cancel{20}}\left(\frac{1}{\cancel{10}}\right) - \overset{4}{\cancel{20}}\left(\frac{1}{\cancel{5}}\right)$

$15x - 10x = 2 - 4$

$\frac{5x}{5} = \frac{-2}{5}$

$x = -\frac{2}{5}$