Additional Practice for Chapter 1A test

Estimate to the nearest tenth.

1. $\sqrt{78}$ $\sqrt{64} < \sqrt{78} < \sqrt{81}$
   $\quad 8 \approx 8.8 \quad 9$

2. $-\sqrt{57}$ $\sqrt{49} < \sqrt{57} < \sqrt{64}$
   $\quad 7 \approx 7.5 \quad 8$
   $\quad -7.5$

3. $\sqrt{39}$ $\sqrt{36} < \sqrt{39} < \sqrt{49}$
   $\quad 6 \approx 6.2 \quad 7$

Simplify each expression.

4. $\sqrt{243} = \sqrt{81}\sqrt{3} = 9\sqrt{3}$

5. $\dfrac{\sqrt{90}}{\sqrt{40}}$ $\dfrac{\sqrt{9}\sqrt{10}}{\sqrt{4}\sqrt{10}} = \dfrac{3}{2}$

6. $\sqrt{42} \cdot \sqrt{3} = \sqrt{126} = \sqrt{9}\sqrt{14} = 3\sqrt{14}$

7. $-\dfrac{4}{\sqrt{144}} = -\dfrac{4}{12} = -\dfrac{1}{3}$

8. $\sqrt{\dfrac{125}{5}} = \sqrt{25} = 5$

9. $-\sqrt{320} = -\sqrt{64}\sqrt{5} = -8\sqrt{5}$

Simplify by rationalizing each denominator.

10. $\dfrac{6}{\sqrt{5}} \cdot \dfrac{\sqrt{5}}{\sqrt{5}} = \dfrac{6\sqrt{5}}{5}$

11. $\dfrac{-3\sqrt{15}}{\sqrt{3}} \cdot \dfrac{\sqrt{3}}{\sqrt{3}} = \dfrac{-3\sqrt{45}}{3}$
    $= -\sqrt{9}\sqrt{5} = -3\sqrt{5}$

12. $\dfrac{\sqrt{13}}{4\sqrt{6}} \cdot \dfrac{\sqrt{6}}{\sqrt{6}} = \dfrac{\sqrt{78}}{24}$

Add or subtract.

13. $7\sqrt{5} - 10\sqrt{5}$
    $-3\sqrt{5}$

14. $12\sqrt{3} + 3\sqrt{12}$
    $12\sqrt{3} + 3\sqrt{4}\sqrt{3}$
    $12\sqrt{3} + 6\sqrt{3} \to 18\sqrt{3}$

15. $-6\sqrt{50} + 4\sqrt{32}$
    $-6\sqrt{25}\sqrt{2} + 4\sqrt{16}\sqrt{2}$
    $-30\sqrt{2} + 16\sqrt{2}$
    $-14\sqrt{2}$

Solve.

16. A building has a mural painted on an outside wall. The mural is a square with an area of 14,400 ft². What is the width of the mural?

$x^2 = 14400$
$x = \sqrt{14400}$
$x = \sqrt{144}\sqrt{100}$
$x = 12 \cdot 10$
$x = 120\ \text{ft}$

Answers:

1. 8.8

2. −7.5

3. 6.2

4. $9\sqrt{3}$

5. $\dfrac{3}{2}$

6. $3\sqrt{14}$

7. $-\dfrac{1}{3}$

8. 5

9. $-8\sqrt{5}$

10. $6\dfrac{\sqrt{5}}{5}$

11. $-3\sqrt{5}$
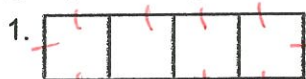
12. $\dfrac{\sqrt{78}}{24}$
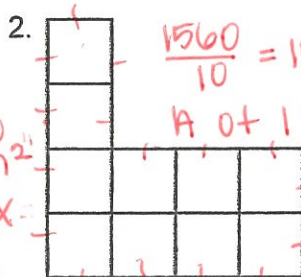
13. $-3\sqrt{5}$

14. $18\sqrt{3}$

15. $-14\sqrt{2}$

16. 120 ft

Each figure below is made from squares. Given the area of each figure, find its perimeter to the nearest tenth.
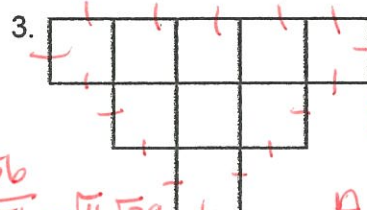
1.

$A = 720 \text{ m}^2$

$\dfrac{720}{8} = 90 \text{ m}^2$ A of 1 box

$x^2 = 90$

$P = 18(3\sqrt{10})$ $x = \sqrt{90} = \sqrt{9}\sqrt{10}$

$P = 54\sqrt{10}$ cm $x = 3\sqrt{10}$ m

2.

$\dfrac{1560}{10} = 156 \text{ ft}^2$ A of 1 box

$x^2 = 156$

$x = \sqrt{156} = \sqrt{4}\sqrt{39}$

$x = 2\sqrt{39}$ ft

$A = 1560 \text{ ft}^2$

$P = 16(2\sqrt{39}) = 32\sqrt{39}$ ft

3.

$A = 2070 \text{ in}^2$

$\dfrac{2070}{9} = 230 \text{ in}$ A of 1 box

$x^2 = 230$

$x = \sqrt{230}$

$P = 16\sqrt{230}$ in

Simplify each expression. Rationalize denominators when necessary.

4. $\dfrac{\sqrt{375}}{\sqrt{100}} = \dfrac{\sqrt{25}\sqrt{15}}{10} = \dfrac{5\sqrt{15}}{10} = \dfrac{\sqrt{15}}{2}$

5. $\dfrac{4\sqrt{8} + 3\sqrt{72}}{-\sqrt{50}}$ $\dfrac{4\sqrt{4}\sqrt{2} + 3\sqrt{36}\sqrt{2}}{-\sqrt{25}\sqrt{2}} = \dfrac{8\sqrt{2} + 18\sqrt{2}}{-5\sqrt{2}}$

$= \dfrac{26\sqrt{2}}{-5\sqrt{2}} = \dfrac{26}{-5}$

6. $-3\sqrt{60} \cdot 7\sqrt{44}$

$-3\sqrt{4}\sqrt{15} \cdot 7\sqrt{4}\sqrt{11} \rightarrow -84\sqrt{165}$

$-6\sqrt{15} \cdot 14\sqrt{11}$

7. $\sqrt{\dfrac{99}{121}} = \dfrac{\sqrt{99}}{\sqrt{121}} = \dfrac{\sqrt{9}\sqrt{11}}{11} = \dfrac{3\sqrt{11}}{11}$

8. $\dfrac{-9\sqrt{80}}{\sqrt{32}}$ $\dfrac{-9\sqrt{16}\sqrt{5}}{\sqrt{16}\sqrt{2}} = \dfrac{-9\sqrt{5}}{\sqrt{2}} \cdot \dfrac{\sqrt{2}}{\sqrt{2}} = \dfrac{-9\sqrt{10}}{2}$

9. $\dfrac{7\sqrt{3} - 12\sqrt{3}}{\sqrt{108}} = \dfrac{-5\sqrt{3}}{\sqrt{36}\sqrt{3}} = \dfrac{-5}{6}$

Solve.

10. Karly is building a patio using large square tiles with an area of 42.25 ft² each. She uses 9 tiles to make a square patio. What is the perimeter of her patio?

$P = 12(?) \rightarrow P = 12(6.5)$

$x^2 = 42.25$ $P = 78$ ft

$x = 6.5$

Answers:

1. $54\sqrt{10}$ m

2. $32\sqrt{39}$ ft

3. $16\sqrt{230}$ in

4. $\dfrac{\sqrt{15}}{2}$

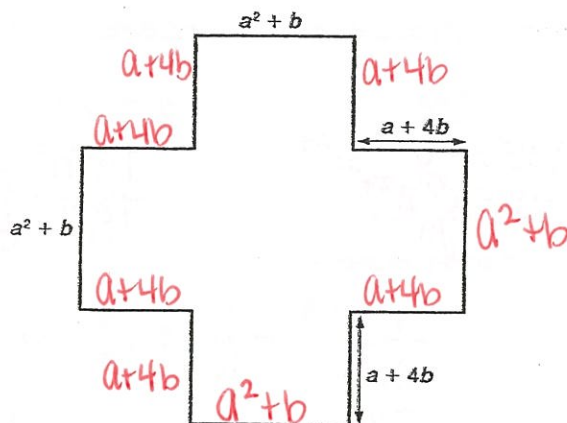5. $\dfrac{-26}{5}$

6. $-84\sqrt{165}$

7. $\dfrac{3\sqrt{11}}{11}$

8. $\dfrac{-9\sqrt{10}}{2}$

9. $\dfrac{-5}{6}$

Write and simplify an expression for the perimeter of the figure.

1.

$4a^2 + 36b + 8a$

Figure labels: $a^2 + b$, $a + 4b$, $a + 4b$, $a + 4b$, $a + 4b$, $a^2 + b$, $a^2 + b$, $a + 4b$, $a + 4b$, $a + 4b$, $a^2 + b$, $a + 4b$

Solve.

2. An Internet search engine company charges fees for advertising links. There is a $5 fee to set up an account and a set charge each time someone clicks on the link.

   a. Tony set up an account with a search engine company. The set charge is $0.75 per click. Write an expression for the amount Tony will pay for setup and c clicks.

    $5 + 0.75c$

   b. After a month, Tony noticed he wasn't getting many buyers at his website. He chose an increased rate of $1.25 per click. Write an expression for the amount Tony will pay for setup, c clicks at $0.75 per click, and d clicks at $1.25 per click.

    $5 + 0.75c + 1.25d$

   c. Find Tony's cost if he got 50 clicks in the first month and 85 clicks in the second month. $5 + 0.75(50) + 1.25(85) = \$148.75$

9. Marco delivers newspapers on the weekend. He delivers s newspapers on Saturday and $4s$ newspapers on Sunday. He earns $0.15 for each paper he delivers. $s + 4s = 5s$

   a. Write an expression for the total amount of money Marco earns each weekend.

    $0.15(5s)$

   b. Evaluate your expression for $s = 50$. $0.15(5 \cdot 50) =$

    $\$37.50$

   c. Write an expression for the amount of money Marco earns in a year if he delivers the same number of papers every weekend. $5 \cdot 52 = 260$

    $0.15(260s)$

10. A tank holds 500 gallons of water. It starts out full, then 10 gallons are released every minute.

   a. Write an expression for the number of gallons in the tank after m minutes.

    $500 - 10m$

   b. Write an expression for the number of gallons in the tank after m minutes if 2 gallons are *also* added every minute.

    $500 - 8m$

1. $4a^2 + 8a + 36b$

2. a. $5 + 0.75c$ b. $5 + 0.75c + 1.25d$ c. 148.75

9. a. $0.15(5s)$ b. $37.50   c. $0.15(260s)$

10. a. $500 - 10m$ b. $500 - 8m$

Simplify each expression. Assume all variables are nonzero.

1. $(-5x^5y^{-3}z^8)^3$

   $-125x^{15}y^{-9}z^{24}$

   $\dfrac{-125x^{15}z^{24}}{y^9}$

2. $7g^2h^3(-2h^5k^0)^{-3}$

   $7g^2h^3\left(\dfrac{1}{-2h^5}\right)^3$

   $7g^2h^3\left(\dfrac{1}{-8h^{15}}\right) = \dfrac{7g^2h^3}{-8h^{15}} = \dfrac{7g^2}{-8h^{12}}$

3. $\left(\dfrac{24m^7n^3}{4mn^{-5}}\right)^{-2} = \left(\dfrac{4mn^{-5}}{24m^7n^3}\right)^2$

   $= \dfrac{16m^2n^{-10}}{576m^{14}n^6} = \dfrac{1}{36m^{12}n^{16}}$

Evaluate each expression.

4. $-(-2)^{-4} = -\left(-\dfrac{1}{2}\right)^4 = -\dfrac{1}{16}$

   $-1/16$

5. $\left(\dfrac{5}{8}\right)^{-2} = \left(\dfrac{8}{5}\right)^2 = \dfrac{64}{25}$

   $64/25$

6. $\left(-\dfrac{3}{2}\right)^{-3} = \left(-\dfrac{2}{3}\right)^3 = \dfrac{-8}{27}$

   $-8/27$

Simplify each expression. Assume all variables are nonzero.

7. $\dfrac{68f^5g^{-3}}{4f^{-3}g^6} = \dfrac{17f^8}{g^9}$

8. $(-4a^3b^7)^{-2}$

   $\left(\dfrac{1}{-4a^3b^7}\right)^2 = \dfrac{1}{16a^6b^{14}}$

9. $6m^4n^9(-3m^2n^3)^{-2}$

   $6m^4n^9\left(\dfrac{1}{-3m^2n^3}\right)^2$

   $6m^4n^9\left(\dfrac{1}{9m^4n^6}\right)$

   $\dfrac{6m^4n^9}{9m^4n^6} = \dfrac{2n^3}{3}$

Answers:

1. $-\dfrac{125x^{15}z^{24}}{y^9}$

2. $-\dfrac{7g^2}{8h^{12}}$

3. $\dfrac{1}{36m^{12}n^{16}}$

4. $\dfrac{-1}{16}$

5. $\dfrac{64}{25}$

6. $\dfrac{-8}{27}$

7. $\dfrac{17f^8}{g^9}$

8. $\dfrac{1}{16a^6b^{14}}$

9. $\dfrac{2n^3}{3}$