

Systematic Review 17D

1. $9\sqrt{6} + 23\sqrt{6} = (9+23)\sqrt{6} = 32\sqrt{6}$
2. $7\sqrt{2} + 8\sqrt{2} = (7+8)\sqrt{2} = 15\sqrt{2}$
3. $\sqrt{7} - 5\sqrt{7} = 1\sqrt{7} - 5\sqrt{7} = (1-5)\sqrt{7} = -4\sqrt{7}$
4. $(3\sqrt{6})(2\sqrt{7}) = (3)(2)\sqrt{6}\sqrt{7} = 6\sqrt{42}$
5. $(\sqrt{11})(\sqrt{11}) = \sqrt{121} = 11$
6. $\frac{2\sqrt{30}}{\sqrt{5}} = \frac{2\sqrt{6}}{1} = 2\sqrt{6}$
7. $\sqrt{12} = \sqrt{4}\sqrt{3} = 2\sqrt{3}$
8. $\sqrt{200} = \sqrt{100}\sqrt{2} = 10\sqrt{2}$
9. $2\sqrt{3} \approx 3.46; 10\sqrt{2} \approx 14.14$
10. $V = Bh = \pi r^2 h \approx (3.14)(2^2)(16) = 200.96 \text{ cm}^3$
11. $SA = 2\pi r^2 + 2\pi rh \approx (2)(3.14)(2^2) + (2)(3.14)(16) = 25.12 + 200.96 = 226.08 \text{ cm}^2$
12. $A = \frac{4+5}{2}(6) = 27 \text{ units}^2$
13. $A = \pi r^2 \approx (3.14)(2.4^2) \approx 18.09 \text{ in}^2$
14. arc
15. interior angle $= 180^\circ - 45^\circ = 135^\circ$
16. $540^\circ = (N-2)180^\circ$
 $540^\circ = 180N^\circ - 360^\circ$
 $900^\circ = 180N^\circ$
 $\frac{900^\circ}{180^\circ} = N = 5 \text{ sides}$
17. CFD or BFC or AFD: all are 90°
18. 5 cm
19. ADF: line BD is a transversal cutting lines AD and BC, which are parallel, because they are opposite sides of a rhombus. $\angle CBF$ and $\angle ADF$ are alternate interior angles.
20. 30° ; alternate interior angles

Systematic Review 17E

1. $5\sqrt{5} + 2\sqrt{2} = 5\sqrt{5} + 2\sqrt{2}$: cannot be simplified
2. $3\sqrt{5} + 8\sqrt{5} = (3+8)\sqrt{5} = 11\sqrt{5}$

3. $13\sqrt{10} - 15\sqrt{10} = (13-15)\sqrt{10} = -2\sqrt{10}$
4. $(5\sqrt{10})(3\sqrt{13}) = (5)(3)\sqrt{10}\sqrt{13} = 15\sqrt{130}$
5. $(3\sqrt{8})(2\sqrt{8}) = (3)(2)\sqrt{8}\sqrt{8} = 6\sqrt{64} = 6(8) = 48$
6. $\frac{8\sqrt{12}}{2\sqrt{6}} = \frac{8\sqrt{2}}{2} = \frac{4\sqrt{2}}{1} = 4\sqrt{2}$
7. $\sqrt{27} = \sqrt{9}\sqrt{3} = 3\sqrt{3}$
8. $\sqrt{20} = \sqrt{4}\sqrt{5} = 2\sqrt{5}$
9. $3\sqrt{3} \approx 5.20; 2\sqrt{5} \approx 4.47$
10. $V = \frac{1}{3}Bh = \frac{1}{3}(21)(21)(13) = 1,911 \text{ mm}^3$
11. triangles:
 $SA = (4)(\frac{1}{2})(21)(15) = 630$
 base:
 $SA = (21)(21) = 441$
 total:
 $SA = 630 + 441 = 1,071 \text{ mm}^2$
12. $A = bh = (11)(8) = 88 \text{ units}^2$
13. $C = \pi d \approx (3.14)(6.4) \approx 20.10 \text{ in}$
14. isosceles
15. interior angle $= 180^\circ - 72^\circ = 108^\circ$
16. $360^\circ \div 72^\circ = 5 \text{ sides}$
17. $x^2 + 10x + 16 = (x+8)(x+2)$
18. $x^2 + 5x + 6 = (x+2)(x+3)$
19. $x^2 + 8x + 7 = (x+7)(x+1)$
20. $x^2 + 9x + 20 = (x+5)(x+4)$

Lesson Practice 18A

1. right
2. legs
3. hypotenuse
4. Pythagorean

5. the hypotenuse squared;
If the leg squared plus the leg squared equals the hypotenuse squared, the triangle is a right triangle.

$$\begin{aligned} 6. \quad 8^2 + 9^2 &= H^2 \\ 64 + 81 &= H^2 \\ 145 &= H^2 \\ \sqrt{145} &= H \end{aligned}$$

$$\begin{aligned} 7. \quad 5^2 + 5^2 &= H^2 \\ 25 + 25 &= H^2 \\ 50 &= H^2 \\ \sqrt{50} &= H \\ \sqrt{25}\sqrt{2} &= H \\ 5\sqrt{2} &= H \end{aligned}$$

$$\begin{aligned} 8. \quad 7^2 + L^2 &= 12^2 \\ 49 + L^2 &= 144 \\ L^2 &= \sqrt{95} \end{aligned}$$

$$\begin{aligned} 9. \quad 12^2 + L^2 &= 13^2 \\ 144 + L^2 &= 169 \\ L^2 &= 25 \\ L &= \sqrt{25} \\ L &= 5 \end{aligned}$$

$$\begin{aligned} 10. \quad 5^2 + 6^2 &= 8^2 \\ 25 + 36 &= 64 \\ 61 &= 64: \text{ false} \\ \text{not a right triangle} \end{aligned}$$

$$\begin{aligned} 11. \quad 2^2 + 4^2 &= 6^2 \\ 4 + 16 &= 36 \\ 20 &= 36: \text{ false} \\ \text{not a right triangle} \end{aligned}$$

$$\begin{aligned} 12. \quad 6^2 + 8^2 &= 10^2 \\ 36 + 64 &= 100 \\ 100 &= 100: \text{ true} \\ \text{is a right triangle} \end{aligned}$$

Lesson Practice 18B

- 90°
- legs
- hypotenuse
- Pythagorean theorem
- the hypotenuse squared, then the triangle is a right triangle. If a triangle is a right triangle, then one leg squared plus the other leg squared equals the hypotenuse squared.

$$\begin{aligned} 6. \quad 7^2 + 10^2 &= H^2 \\ 49 + 100 &= H^2 \\ 149 &= H^2 \\ \sqrt{149} &= H \end{aligned}$$

$$\begin{aligned} 7. \quad 3^2 + 3^2 &= H^2 \\ 9 + 9 &= H^2 \\ 18 &= H^2 \\ \sqrt{18} &= H \\ \sqrt{9}\sqrt{2} &= H \\ 3\sqrt{2} &= H \end{aligned}$$

$$\begin{aligned} 8. \quad 24^2 + L^2 &= 25^2 \\ 576 + L^2 &= 625 \\ L^2 &= 49 \\ L &= \sqrt{49} \\ L &= 7 \end{aligned}$$

$$\begin{aligned} 9. \quad (5\sqrt{2})^2 + L^2 &= (10\sqrt{3})^2 \\ (5)(5)\sqrt{2}\sqrt{2} + L^2 &= (10)(10)\sqrt{3}\sqrt{3} \\ 25\sqrt{4} + L^2 &= 100\sqrt{9} \\ 25(2) + L^2 &= 100(3) \\ 50 + L^2 &= 300 \\ L^2 &= 250 \\ L &= \sqrt{250} \\ L &= \sqrt{25}\sqrt{10} \\ L &= 5\sqrt{10} \end{aligned}$$

10. $4^2 + 5^2 = 6^2$
 $16 + 25 = 36$
 $41 = 36$: false
 not a right triangle
11. $10^2 + 24^2 = 26^2$
 $100 + 576 = 676$
 $676 = 676$: true
 is a right triangle
12. $12^2 + 16^2 = 20^2$
 $144 + 256 = 400$
 $400 = 400$: true
 is a right triangle

Systematic Review 18C

1. $7^2 + 10^2 = 49 + 100 = 149$
 $\sqrt{149}$ is between 12 and 13
 Any answer that is close
 is acceptable.
2. $7^2 + 10^2 = H^2$
3. $7^2 + 10^2 = H^2$
 $49 + 100 = H^2$
 $149 = H^2$
 $\sqrt{149} = H$
4. $\sqrt{149} = \sqrt{149}$:
 cannot be simplified
5. $4^2 - 3^2 = 16 - 9 = 7$
 $\sqrt{7}$ is between 2 and 3
6. $3^2 + L^2 = 4^2$
7. $3^2 + L^2 = 4^2$
 $9 + L^2 = 16$
 $L^2 = 7$
 $L = \sqrt{7}$
8. $\sqrt{7} \approx 2.65$
9. no
10. $5^2 + 7^2 \neq 9^2$
11. hypotenuse
12. $A = \frac{1}{2}bh = \frac{1}{2}(7)(9) = 31.5 \text{ in}^2$

13. $A = \pi r^2 \approx (3.14)(2^2) = 12.56 \text{ in}^2$
14. $A = 31.5 - 12.56 = 18.94 \text{ in}^2$
15. $11\sqrt{5} + 7\sqrt{5} = (11+7)\sqrt{5} = 18\sqrt{5}$
16. $(9\sqrt{2})(5\sqrt{2}) = (9)(5)\sqrt{2}\sqrt{2} =$
 $45\sqrt{4} = 45(2) = 90$
17. $\frac{9\sqrt{200}}{12\sqrt{2}} = \frac{3\sqrt{100}}{4} = \frac{3(10)}{4} =$
 $\frac{30}{4} = 7\frac{1}{2}$ or 7.5
18. $A = \frac{1}{2}bh = \frac{1}{2}(4)(2\sqrt{3}) =$
 $(2)(2\sqrt{3}) = 4\sqrt{3} \text{ in}^2$
19. $A = (5)(4\sqrt{3}) = 20\sqrt{3} \text{ in}^2$
20. $P = (5)(4) = 20 \text{ in}$

Systematic Review 18D

1. $7^2 + 7^2 = 49 + 49 = 98$
 $\sqrt{98}$ is between 9 and 10
2. $7^2 + 7^2 = B^2$
3. $7^2 + 7^2 = B^2$
 $49 + 49 = B^2$
 $98 = B^2$
 $\sqrt{98} = B$
4. $\sqrt{98} = \sqrt{49}\sqrt{2} = 7\sqrt{2}$
5. $18^2 - (9\sqrt{3})^2 = 324 - 81\sqrt{9} =$
 $324 - 81(3) = 324 - 243 = 81$
 $\sqrt{81} = 9$
6. $18^2 - (9\sqrt{3})^2 = M^2$
7. $18^2 - (9\sqrt{3})^2 = M^2$
 $324 - 81\sqrt{9} = M^2$
 $324 - 81(3) = M^2$
 $324 - 243 = M^2$
 $81 = M^2$
 $9 = M$
8. $9\sqrt{3} \approx 15.59$

9. yes
10. $24^2 + 10^2 = 26^2$
 $576 + 100 = 676$
 $676 = 676$: true
11. equilateral
12. yes: they are both radii of the circle
13. 50°
14. $m\angle OAB + m\angle OBA + m\angle AOB = 180^\circ$
 $m\angle OAB + m\angle OBA + 50^\circ = 180^\circ$
 $m\angle OAB + m\angle OBA = 130^\circ$
 $m\angle OAB = 130^\circ \div 2 = 65^\circ$
15. $\sqrt{3} + \sqrt{3} = 2\sqrt{3}$
16. $(\sqrt{6})(-\sqrt{24}) = -\sqrt{144} = -12$
17. $\frac{2\sqrt{15}}{\sqrt{5}} = \frac{2\sqrt{3}}{1} = 2\sqrt{3}$
18. $A = \frac{1}{2}bh = \frac{1}{2}(12)(5\sqrt{6}) = 30\sqrt{6} \text{ in}^2$
 6 triangles
19. $30\sqrt{6}(6) = 180\sqrt{6} \text{ in}^2$
20. $P = 6(12) = 72 \text{ in}$

Systematic Review 18E

1. $6^2 + (2\sqrt{3})^2 = 36 + 4(\sqrt{9}) =$
 $36 + 4(3) = 36 + 12 = 48$
 $\sqrt{48}$ is between 6 and 7
2. $R^2 = 6^2 + (2\sqrt{3})^2$
3. $R^2 = 6^2 + (2\sqrt{3})^2$
 $R^2 = 36 + 4(\sqrt{9})$
 $R^2 = 36 + 4(3)$
 $R^2 = 36 + 12$
 $R^2 = 48$
 $R = \sqrt{48}$
4. $\sqrt{48} = \sqrt{16}\sqrt{3} = 4\sqrt{3}$
5. $11^2 + 11^2 = 121 + 121 = 242$
 $\sqrt{242}$ is between 15 and 16
6. $T^2 = 11^2 + 11^2$

7. $T^2 = 11^2 + 11^2$
 $T^2 = 121 + 121$
 $T^2 = 242$
 $T = \sqrt{242} = \sqrt{121}\sqrt{2} = 11\sqrt{2}$
8. $11\sqrt{2} \approx 15.56$
9. yes $(2\sqrt{7})^2 + (2\sqrt{3})^2 = (2\sqrt{10})^2$
 $4\sqrt{49} + 4\sqrt{9} = 4\sqrt{100}$
 $4(7) + 4(3) = 4(10)$
 $28 + 12 = 40$
 $40 = 40$: true
10. The sum of the legs squared equals the hypotenuse squared.
11. yes: It would be a right triangle with equal legs. ($45^\circ - 45^\circ - 90^\circ$)
12. $V = Bh = \pi r^2 h \approx (3.14)(2+3)^2(12)$
 $= 942 \text{ m}^3$
13. $V = Bh = \pi r^2 h \approx (3.14)(2^2)(12)$
 $= 150.72 \text{ m}^3$
14. $V = 942 - 150.72 = 791.28 \text{ m}^3$
15. $5\sqrt{2} - 4\sqrt{3} = 5\sqrt{2} - 4\sqrt{3}$:
 cannot be simplified
16. $(5\sqrt{6})(2\sqrt{10}) =$
 $(5)(2)\sqrt{6}\sqrt{10} = 10\sqrt{60} =$
 $10\sqrt{4}\sqrt{15} = 10(2)(\sqrt{15}) = 20\sqrt{15}$
17. $\frac{\sqrt{100}}{\sqrt{25}} = \frac{\sqrt{4}}{1} = \frac{2}{1} = 2$ or:
 $\frac{\sqrt{100}}{\sqrt{25}} = \frac{10}{5} = 2$
18. $x^2 + 3x - 10 = (x+5)(x-2)$
19. $x^2 - 2x - 3 = (x-3)(x+1)$
20. $x^2 + x - 6 = (x+3)(x-2)$

Lesson Practice 19A

1. $\frac{9}{\sqrt{2}} = \frac{9\sqrt{2}}{\sqrt{2}\sqrt{2}} = \frac{9\sqrt{2}}{\sqrt{4}} = \frac{9\sqrt{2}}{2}$