Part A: Multiple Choice.

Write the letter of the correct response in the blank to the right. (10 marks)

1. Simplify: $3\sqrt{18} - (2\sqrt{27} - 3\sqrt{12})$ 1. _____

   A) $4\sqrt{3}$
   B) $6\sqrt{2}$
   C) $9\sqrt{2}$
   D) $18\sqrt{2} - 6\sqrt{3}$

2. Which mixed radical is equal to $\sqrt{486a^4b}$?   2. _____

   A) $3a^2\sqrt{54b}$
   B) $9a^2\sqrt{6b}$
   C) $2ab\sqrt{86}$
   D) $2ab\sqrt{243}$

3. Which expression represents $5ab^2\sqrt{5}$?   3. _____

   A) $ab^2\sqrt{25}$
   B) $25a^2b^3$
   C) $\sqrt{125ab^2}$
   D) $\sqrt{125a^2b^4}$

4. Simplify: $\dfrac{\sqrt{2}}{2\sqrt{3y}}$ 4. _____

   A) $\dfrac{\sqrt{5y}}{5y}$ B) $\dfrac{\sqrt{6y}}{6y}$ C) $\dfrac{\sqrt{6y}}{5y}$ D) $\dfrac{\sqrt{5y}}{3y}$

5. Simplify $\sqrt[5]{160u^{10}t^{15}}$ completely.   5. _____

   A) $2u^2t^3\left(\sqrt[5]{5}\right)$
   B) $2u^2t^2\left(\sqrt[5]{5}\right)$
   C) $4u^2t^3\left(\sqrt[5]{5}\right)$
   D) $10u^2t^3\left(\sqrt[5]{4}\right)$

6. Expand and simplify completely: $(4\sqrt{2} - \sqrt{5})^2$ 6. _____

   A) 21
   B) $21 - 8\sqrt{10}$
   C) 37
   D) $37 - 8\sqrt{10}$

7. Simplify: $\left(\sqrt{15n^2}\right)\left(\sqrt{10n^3}\right)$ 7. ____

A) $\sqrt{150n^5}$
B) $\sqrt{150n^6}$
C) $5\sqrt{6n^5}$
D) $5n^2\sqrt{6n}$

8. Simplify: $\dfrac{\sqrt{24x^5}}{\sqrt{8x}}$ 8. ____

A) $4x^2$
B) $x^2\sqrt{3}$
C) $\sqrt{16x^4}$
D) $\sqrt{3x^4}$

9. What are the restrictions of $\dfrac{3}{\sqrt{x+5}}$?   9. ____

A) $x > -5$
B) $x \geq -5$
C) $x > 5$
D) $x \geq 5$

10. What are the restrictions of $9x^2y\sqrt[4]{3x^5}$ 10. ____

A) $x \in \mathfrak{R}$
B) $x > 0$
C) $x \geq 0$
D) $x \geq 3$

11. Solve: $6 = \sqrt{v-2}$ 11. ____

A) $v = 4$
B) $v = 8$
C) $v = 34$
D) $v = 38$

12. The volume, V, in cubic units, of a cylinder is given by $V = \pi r^2 h$, where r is   12. ____
the radius and h is the height, both in the same units. What is the exact radius,
in cm, of a cylinder with a height of 64 cm and a volume of 576π cm^3 in
simplest form?

A) $\dfrac{1}{\sqrt{64}}$
B) 3
C) 8
D) 9

Part B: Constructed Response. Answer all questions in the space provided and **SHOW ALL WORKINGS.** Be sure to **completely simplify** all answers. (18 marks)

13. Find the **exact** PERIMETER of the rectangle below in simplest radical form.

_____ / 4

$$3\sqrt{32} + 9\sqrt{75}$$

$$6\sqrt{50} - 6\sqrt{48}$$
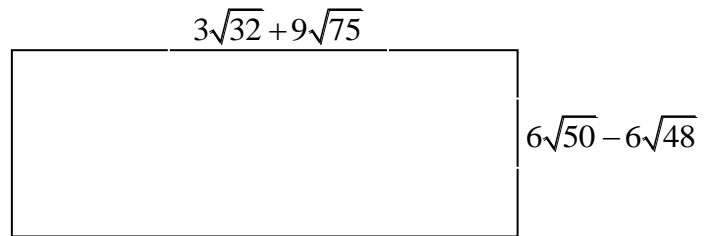
14. Rationalize the denominator for $\dfrac{6\sqrt{3} + \sqrt{2}}{2\sqrt{3} - \sqrt{2}}$ and simplify completely. _____ / 4

15. Simplify completely: $\dfrac{\sqrt{72y^5}}{2} - \sqrt{50y^5} + \dfrac{1}{3}\sqrt{162y^5}$ _____ / 3

16. Solve $5 + \sqrt{3x - 11} = x$. State any restrictions and verify your solution.

17. Adam made an error while simplifying the expression $\sqrt{18x^3} + 2\sqrt{8x^3}$. Identify his error and correct the solution.

$$\sqrt{18x^3} + 2\sqrt{8x^3}$$

$$= 3\sqrt{2x^3} + 4\sqrt{2x^3}$$

$$= 7\sqrt{4x^6}$$

$$= 14x^3$$