No Calculator

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KEY

Top 20 ACT Prep Version 5

1. Given $f(x) = -4x^2 - 2x - 3$, find $f(-2)$ *[110]*

$f(-2) = -4(-2)^2 - 2(-2) - 3$

$= -4(4) + 4 - 3$

$= -16 + 1$

$\boxed{f(-2) = -15}$

2. Simplify $(5a - 9n)^2$ *[211]*

$(5a - 9n)(5a - 9n)$

$25a^2 - 45an + 81n^2 - 45an$

$\boxed{25a^2 - 90an + 81n^2}$

3. Solve $21x^2 - 15x - 6 = 0$ *[85]*

$3(7x^2 - 5x - 2) = 0$

$7x^2 - 7x + 2x - 2 = 0$

$7x(x-1) + 2(x-1) = 0$

$(7x+2)(x-1) = 0$

$7x + 2 = 0$, $-2 \quad -2$

$7x = -2$

$\boxed{x = -2/7}$

$x - 1 = 0$, $+1 \quad +1$

$\boxed{x = 1}$

4. Find the distance between (0,-2) & (5,7)

[217] $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

$= \sqrt{(5-0)^2 + (7-(-2))^2}$

$= \sqrt{5^2 + 9^2} = \sqrt{25+81}$

$\boxed{d = \sqrt{106}}$

5. Simplify $\frac{4}{9} \cdot \frac{7}{8}$ *[42]*

$\frac{\cancel{4}^{1}}{9} \cdot \frac{7}{\cancel{8}_{2}} = \boxed{\frac{7}{18}}$

6. Simplify $\frac{-2 \pm \sqrt{8}}{12}$ *[214]*

$\frac{-2}{12} \pm \frac{\sqrt{8}}{12}$

$\frac{-1}{6} \pm \frac{\sqrt{4}\sqrt{2}}{12}$

$\frac{-1}{6} \pm \frac{2\sqrt{2}}{12}$

$\boxed{\frac{-1}{6} \pm \frac{\sqrt{2}}{6} \text{ or } \frac{-1 \pm \sqrt{2}}{6}}$

7. Simplify $\frac{27x^5yz^2}{9x^2z^3}$ *[74]*

$\frac{\cancel{9}^{1}(3)\cancel{x^2}(x^3)\cancel{(y)}\cancel{(z^2)}^{z}}{\cancel{9}^{1}(1)\cancel{x^2}\cancel{(z^2)}z}$

$\boxed{\frac{3x^3y}{z}}$

8. Simplify $\frac{\frac{3}{4}}{\frac{5}{9}}$ *[50]*

$\frac{3}{4} \div \frac{5}{9}$

$\frac{3}{4} \times \frac{9}{5} = \boxed{\frac{27}{20}}$

9. Multiply $(x^2 + 2)(x - 5)$ *[59]*

$\boxed{x^3 - 5x^2 + 2x - 10}$

10. Simplify $(2a^4b^3)^3 \cdot 3(a^2b^3)$ *[206]*

$(2)^3 a^{(4\cdot3)} b^{(3\cdot3)} \cdot 3a^2b^3$

$8a^{12}b^9 \cdot 3a^2b^3 \rightarrow \boxed{24a^{14}b^{12}}$

11. Solve $(x-6)^2 = 14$ *[84]*

$\sqrt{(x-6)^2} = \sqrt{14}$

$x - 6 = \pm\sqrt{14}$

$\boxed{x = 6 \pm \sqrt{14}}$

12. Simplify $2\frac{3}{4} - \frac{2}{5}$ *[39]*

$\frac{4}{4} + \frac{4}{4} + \frac{3}{4} - \frac{2}{5}$

$\frac{11}{4} - \frac{2}{5} \rightarrow \frac{11(5)}{4(5)} - \frac{2(4)}{5(4)}$

$\frac{55}{20} - \frac{8}{20} = \boxed{\frac{47}{20}}$

13. Clear fractions, solve $\frac{4}{9}a + 2 = \frac{1}{4}$ *[207]*

$\frac{4}{9}a + \frac{8}{4} = \frac{1}{4}$

$\frac{4}{9}a = \frac{-7}{4}$

$\times 9 \quad \times 9$

$4a = \frac{-63}{4}$

$\div 4 \quad \div 4$

$\boxed{a = \frac{-63}{16}}$

14. Find 3 points on $f(x) = x^2 + 3x - 7$

*Many possible pts

ex) $f(0) = (0)^2 + 3(0) - 7 = -7$

$f(1) = (1)^2 + 3(1) - 7 = -3$

$f(-1) = (-1)^2 + 3(-1) - 7 = -9$

X	Y
0	-7
1	-3
-1	-9

15. Simplify $\frac{x^2-7x-44}{x^2-121}$ *[209]*

$\frac{(x-11)(x+4)}{(x+11)(x-11)} = \boxed{\frac{x+4}{x+11}}$

16. Find the midpoint given (0,5) & (10,-3) *[218]*

$\frac{\Delta x}{2} = \frac{10-0}{2} = 5$ $\quad \Delta x + x_1 = 5 + 0 = 5$

$\frac{\Delta y}{2} = \frac{-3-(5)}{2} = \frac{-8}{2} = -4$ $\quad \Delta y + y_1 = -4 + 5 = 1$

$\boxed{\text{midpoint: } (5,1)}$

17. Write an equation using (12,7) & (-9,-3)

[210] $m = \frac{\Delta y}{\Delta x} = \frac{-3-7}{-9-12} = \frac{-10}{-21} = \frac{10}{21}$

$y = mx + b$

$7 = \frac{10}{21}(12) + b$

$b = \frac{27}{21}$

$\boxed{y = \frac{10}{21}x + \frac{27}{21}}$

$\boxed{y + 3 = \frac{10}{21}(x + 9)}$

$\boxed{y - 7 = \frac{10}{21}(x - 12)}$

18. Simplify (PEMDAS) $-2(x-1)^2 + 6$ *[212]*

$-2(x-1)(x-1) + 6$

$-2(x^2 - 2x + 1) + 6 \rightarrow -2x^2 + 4x - 2 + 6$

$\boxed{-2x^2 + 4x + 4}$

19. Solve $V = \pi r^2 h$ for r *[205]*

$\frac{V}{\pi h} = \frac{\pi r^2 h}{\pi h}$

$\sqrt{r^2} = \sqrt{\frac{V}{\pi h}} \rightarrow \boxed{r = \pm\sqrt{\frac{V}{\pi h}}}$

20. Solve. Show 3+ steps of work *[89]*

$-(6x + 4) + 2(x - 8) = 11x + 4$

$-6x - 4 + 2x - 16 = 11x + 4$

$-4x - 20 = 11x + 4$

$-24 = 15x$

$x = \frac{-24}{15} \rightarrow \boxed{\frac{-8}{5} = x}$