① 1.25×0.01

0.0125×2

0.025 B

② $3\left(\frac{5}{12} + \frac{3}{8}\right)$

$3\left(\frac{10}{24} + \frac{9}{24}\right)$

$\cancel{3}^{1}\left(\frac{19}{\cancel{24}_{8}}\right)$

$\frac{57}{24} = \frac{19}{8}$ D

3 $\frac{1}{(\sqrt{2}+\sqrt{3})}\cdot\frac{(\sqrt{2}-\sqrt{3})}{(\sqrt{2}-\sqrt{3})}$

$\frac{\sqrt{2}-\sqrt{3}}{2-\cancel{\sqrt{6}}+\cancel{\sqrt{6}}-3}$

$\frac{\sqrt{2}-\sqrt{3}}{-1}$

$-\sqrt{2}+\sqrt{3}$

$\sqrt{3}-\sqrt{2}$ D

4 $\frac{\frac{y}{1}\cdot\frac{x}{1}-\frac{1}{y}\cdot\frac{y}{1}}{\frac{x}{y}\cdot\frac{y}{1}}$

$\frac{xy-1}{x}$ E

⑤ $\frac{1}{x-2} - \frac{1}{x+2}$

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

$\frac{x+2-x+2}{(x-2)(x+2)}$

$\frac{4}{x^2-4}$

D

⑥ $2x^2-5x+3$ $\quad -2 \times -3 = 6$

$-2 + -3 = -5$

$(x-\frac{2}{2})(x-\frac{3}{2})$

$(x-1)(2x-3)$

B

$(x-\frac{2}{2})(x-\frac{3}{2})$

$(x-1)(2x-3)$

1) $x^2 - x = 6$

$x^2 - x - 6 = 0$

$-3 + 2 = -1$

$-3 \times 2 = -6$

$(x-3)(x+2) = 0$

$x - 3 = 0$ | $x + 2 = 0$

$x = 3$ | $x = -2$

A

(8) $x^2 + 6x + 7 = 0$

$a = 1 \quad b = 6 \quad c = 7$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-6 \pm \sqrt{36 - 28}}{2}$$

$$x = \frac{-6 \pm \sqrt{8}}{2}$$

$$x = \frac{-6 \pm 2\sqrt{2}}{2}$$

$$x = -3 \pm \sqrt{2}$$

(B)

(11) $(x-1)(x+2) < 0$ where is y negative

$y = (x-1)(x+2)$

x-int $(y=0)$

$x = 1, -2$

$-2 < x < 1$

$(-2, 1)$

b $f(x) = x^2 + 2x + 5$

$(x+h)(x+h) = x^2 + 2xh + h^2$

$f(x+h) = (x+h)^2 + 2(x+h) + 5$

$= x^2 + 2xh + h^2 + 2x + 2h + 5$

D

12 $|x-3| \leq 5$

case 1: (+)

$+(x-3) \leq 5$

$x-3 \leq 5$

$x \leq 8$

Case 2: (-)

$-(x-3) \leq 5$

$-x+3 \leq 5$

$-x \leq 2$

$x \geq -2$

$-2 \leq x \leq 8$

C

13

$8^{-1/3} \times 3^{0}$

$\left(\frac{1}{8}\right)^{1/3} \times 1$

$\frac{\sqrt[3]{1}}{\sqrt[3]{8}} \times 1$

$\frac{1}{2} \times 1$

$\frac{1}{2}$ C

14

$2^{-3} + 2^{3}$

$\left(\frac{1}{2}\right)^{3} + 8$

$\frac{1}{8} + \frac{8}{1}$

$\frac{1}{8} + \frac{64}{8}$

$\frac{65}{8}$ D

16

$$\frac{1}{(8x^3)^{1/3}} \cdot (4x^2)^{1/2}$$

$$\sqrt[3]{8x^3}$$

$$2x$$

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

$$1$$

C

(17) $2^x = 20$

$\log_{\underset{B}{2}} \underset{A}{20} = \underset{E}{x}$ (E)

$x = \log_2 20$

Logs are BAE

Base
Answer
Exponent

18 $\log_{10} 4 + \log_{10} 5$

$\log_{10}(4 \cdot 5)$

$\boxed{\log_{10} 20}$

B

$\log_{10} 4 - \log_{10} 5$

$\log_{10}\left(\frac{4}{5}\right)$

$\log\left(\frac{4}{5}\right)$

(19) $\log_3 81 = x$

$3^x = 81 \longrightarrow \frac{\log 81}{\log 3} = 4$

$\cancel{3}^x = \cancel{3}^4$

$\boxed{x = 4}$ A

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

$(3, 7)$
x_1 y_1

$(6, 9)$
x_2 y_2

$d = \sqrt{(6-3)^2+(9-7)^2}$

$d = \sqrt{(3)^2+(2)^2}$

$d = \sqrt{9+4} = \sqrt{13}$ B

21) equation of a line $y - y_1 = m(x - x_1)$

slope

point (x_1, y_1)

Given:

$(2,2)$ and $(3,6)$

x_1, y_1 x_2, y_2

$m = \dfrac{y_2 - y_1}{x_2 - x_1} = \dfrac{6-2}{3-2} = \dfrac{4}{1}$

$y - y_1 = m(x - x_1)$

$y - 2 = 4(x - 2)$

$y - 2 = 4x - 8$

$\boxed{0 = 4x - y - 6}$

B

22 $y = mx + b$ (Slope intercept form)

m y-int

$y = \underline{2}x - 3$

$m = \frac{2}{1}$

$m\underline{1} = -\frac{1}{2}$ c

23) $x - y = 3 \rightarrow x = 3 + y$

$x + y = 1$ $\quad x + y = 1$

$3 + y + y = 1$

$2y = -2$

$\boxed{y = -1}$

$x = 3 + y$

$x = 3 + (-1)$

$\boxed{x = 2}$

$(2, -1)$

C

24) ✓ I $y=3$ ✗ II $xy=3$ III $x^2+y^2=3$

$y=\frac{3}{x}$

circle

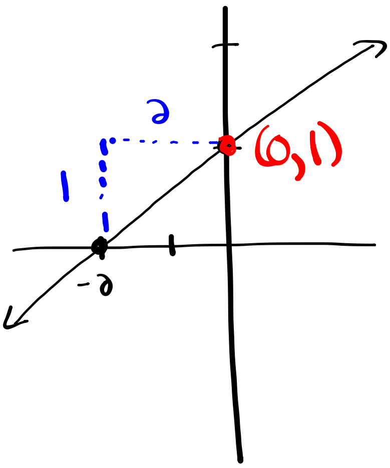
reciprocal

✓ IV $x+y=3$

$y=-x+3$

B I and IV

28



$b = 1$

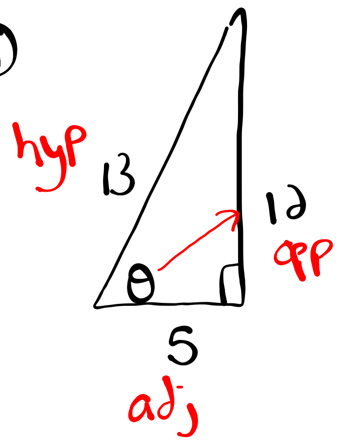
$m = \frac{1}{2}$

$y = mx + b$

$y = \frac{1}{2}x + 1$

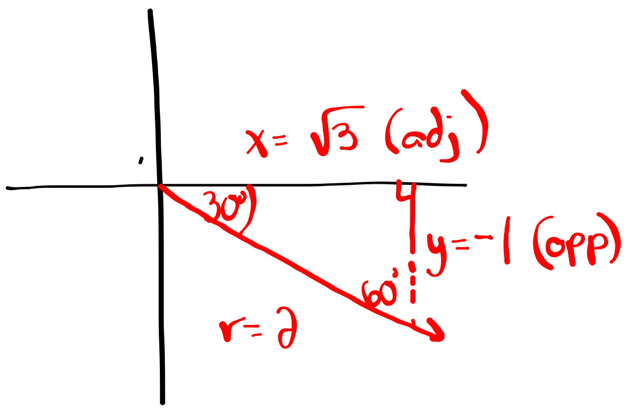
B

(29)

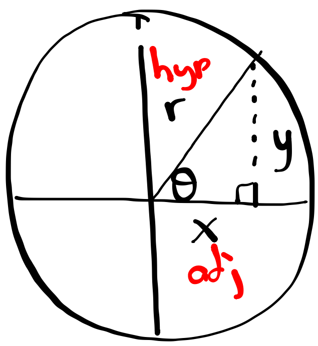


$\sin\theta = \dfrac{opp}{hyp} = \dfrac{12}{13}$ (C)

(30) $\tan(-30°)$ or $\tan 330° = \dfrac{-1}{\sqrt{3}}$ (C)



(31)



$\sec\theta = \dfrac{hyp}{adj} = \dfrac{r}{x}$ (B)

(37) $\sin\theta = -\frac{1}{\sqrt{10}}\ \frac{\text{opp}}{\text{hyp}}$ and $\cos\theta < 0\ldots$ find $\tan\theta$

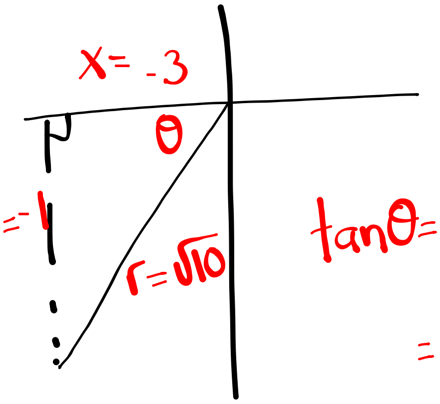
S	A
T	C

Given:

$\text{opp} = y = -1$

$\text{hyp} = r = \sqrt{10}$

$\text{adj} = x = ?$



$\tan\theta = \frac{-1}{-3}$

$= \frac{1}{3}$

(E)

$x^2 + y^2 = r^2$

$x^2 + 1 = 10$

$x^2 = 9$

$x = \pm 3$

$x = -3$ (Q3)

① $1.25 \times 0.01 = 0.0125 \times 2 = 0.025$ (B)

② $3\left(\frac{5}{12} + \frac{3}{8}\right)$

$3\left(\frac{10}{24} + \frac{9}{24}\right)$

$3\left(\frac{19}{24}\right)$

$\frac{57}{24}$

$\frac{19}{8}$ D

③ $\frac{1}{(\sqrt{2}+\sqrt{3})} \frac{(\sqrt{2}-\sqrt{3})}{(\sqrt{2}-\sqrt{3})}$

$\frac{\sqrt{2}-\sqrt{3}}{2-\cancel{\sqrt{6}}+\cancel{\sqrt{6}}-3}$

$\frac{\sqrt{2}-\sqrt{3}}{-1}$

$-\sqrt{2}+\sqrt{3}$

$\sqrt{3}-\sqrt{2}$ (D)

4) $$\frac{y \cdot \frac{x}{1} - \frac{1}{y} \cdot y}{\frac{x}{y} \cdot y}$$

$$\frac{xy-1}{x}$$ E

5) $$\frac{1}{x-2} - \frac{1}{x+2}$$

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

$$\frac{x+2-x+2}{(x-2)(x+2)}$$

$$\frac{4}{x^2-4}$$ D

⑥ $2x^2-5x+3$ $\quad -2 \times -3 = 6$, $\; -2 + -3 = -5$

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

$2x(x-1)-3(x-1)$

$(x-1)(2x-3)$

B

⑦ $x^2-x=6$ $\quad -3 \times 2 = -6$, $\; -3+2=-1$

$x^2-x-6=0$

$(x-3)(x+2)=0$

$x-3=0$ | $x+2=0$

$x=3$ | $x=-2$

A

⑧ x^2+6x+7

$a=1$

$b=6$

$c=7$

$$x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$$

$$x=\frac{-6\pm\sqrt{36-28}}{2}$$

$$x=\frac{-6\pm\sqrt{8}}{2}$$

$$x=\frac{-6\pm2\sqrt{2}}{2}=-3\pm\sqrt{2}$$

C

⑨ $f(x)=3x^4-7x^2+2x-9$

$f(-x)=3(-x)^4-7(-x)^2+2(-x)-9$

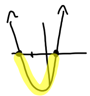
$=3x^4-7x^2-2x-9$ B

⑩ $f(x)=x^2+2x+5$

$f(x+h)=(x+h)^2+2(x+h)+5$

$=x^2+2xh+h^2+2x+2h+5$ D

⑪ $(x-1)(x+2)<0$



$y=(x-1)(x+2)$

x int: $(y=0)$

$x=-2, 1$

$-2<x<1$

E

$+ \quad - \quad +$

$(-3) \quad -2 \quad (0) \quad 1 \quad (2)$

⑫ $|x-3|\le 5$

Case 1: (+)

$+(x-3)\le 5$

$x-3\le 5$

$x\le 8$

Case 2: (−)

$-(x-3)\le 5$

$-x+3\le 5$

$-x\le 2$

$x\ge -2$

$-2\le x\le 8$ C

⑬ $8^{-1/3}\times 3^0$

$\left(\frac{1}{8}\right)^{1/3}\times 1$

$\frac{\sqrt[3]{1}}{\sqrt[3]{8}}\times 1$

$\frac{1}{2}$ C

⑭ $2^{-3}+2^3$

$\left(\frac{1}{2}\right)^3+8$

$\frac{1}{8}+\frac{64}{8}=\frac{65}{8}$ D

15 $a=16 \quad b=9$

$(a+b)^{-1/2}$

$(16+9)^{-1/2}$

$(25)^{-1/2}$

$\left(\frac{1}{25}\right)^{1/2}$

$\frac{1}{5}$ C

16 $\frac{1}{(8x^3)^{1/3}} \cdot (4x^2)^{1/2}$

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

1 C

17 $2^x = 20$

Logs are BAE

Base

Answer

Exponent

$\log_2 20 = x$

E

18 $\log_{10} 4 + \log_{10} 5$

$\log_{10}(4 \times 5)$

$\log_{10} 20$ B

19 $\log_3 81 = x$

$3^x = 81$

$3^x = 3^4$

$x = 4$ A

20 $d = \sqrt{(y_2-y_1)^2 + (x_2-x_1)^2}$

$d = \sqrt{(9-7)^2 + (6-3)^2}$

$d = \sqrt{4+9}$

$d = \sqrt{13}$ B